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**TRENDS  
AND  
INNOVATIONS  
IN  
HUMANITIES  
MANAGEMENT  
COMMERCE  
SCIENCE  
AND  
TECHNOLOGY**

**EDITOR**

**DR. EKNATH MUNDHE**

**TRENDS AND INNOVATIONS IN  
HUMANITIES, MANAGEMENT,  
COMMERCE, SCIENCE AND  
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**S. M. Joshi College, Hadapsar, Pune-28**

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## PREFACE

*The present book focuses upon the Trends and Innovations in Humanities, Management, Commerce, Science and Technology. Humanities, Management, Commerce, Science and Technology are the key drivers for economic growth and human development. For India to march ahead on a sustainable development pathway to include economic development, social inclusion and environmental sustainability for achieving an "Atmanirbhar Bharat", a greater emphasis will be given on promoting traditional knowledge system, developing indigenous technologies and encouraging grass root innovation. The emergence of disruptive and impactful technologies poses new challenges and simultaneously greater opportunities. The COVID-19 pandemic provided a compelling opportunity for Research and Development institutions, academia and industry to work in unison for sharing of purpose, synergy, collaboration and cooperation. Innovations in Humanities, Management, Commerce, Science and Technology will to bring about profound changes through short-term, medium-term, and long-term mission mode projects by building a nurtured ecosystem that promotes research and innovation on the part of both individuals and organizations. It will identify and address strengths and weaknesses of the Indian Innovations in Humanities, Management, Commerce, Science and Technology ecosystem to catalyse socio-economic development of the country and also make the Indian Innovations in Humanities, Management, Commerce, Science and Technology ecosystem globally competitive. In this book we have covered all the related to Trends and Innovations in Humanities, Management, Commerce, Science and Technology issues.*

***Dr. Eknath Mundhe***



## ACKNOWLEDGEMENT

*The world is a better place where we live and lead the development around us. From time to time the professionals and academics play a more important role in enhancing the skills of the students. Intellectual role as a mentor is important in developing the talent of the student at various levels. Being professional educationists, we are happy to express our gratitude to our experience and to the authors who supported us morally in bringing out this book, which focuses on Trends and Innovations in Humanities, Management, Commerce, Science and Technology.*

*I would like to express my sincere gratitude to all the authors, researchers and reviewers, who provided their detail research and views for “Trends and Innovations in Humanities, Management, Commerce, Science and Technology”. I would like to thank my Teacher family. This volume is wholly a collective venture. This cause would not have been possible without the great efforts paid by all the authors and we are sure their valuable contributions increased the significance of the book. All the authors played an equal role in bringing out this book.*

***Dr. Eknath Mundhe***

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## CHAPTER-1

### THE EFFECT OF A MEDIUM IRRIGATION PROJECT ON CROP COMBINATION IN ITS HINTERLAND

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#### INTRODUCTION:

Agriculture is the backbone of Indian economy. Agriculture activity contributes a major share in national income. It provides raw material to agro-based industries. It is the main employment sector as it provides job opportunities to more than 70 crore people in the country. Indian agriculture is mainly based on Monsoon which is irregular, uncertain and uneven in distribution. Therefore, these characteristics of Monsoon affected agriculture production. Although, major part of the country receives rainfall more than sufficient, but unevenness and irregularities affect the growth of crops. Sometimes, large amount of rain occurs in very short period of time while a major portion of rainy season remains dry.

It is therefore, there is a need of providing water to agriculture from other sources. Irrigation projects are mainly constructed for the same purpose. Major irrigation projects require huge investments and it also cause displacement of thousand people. Displacement of people is critical issue and the Governments have to face many allegations regarding it. But constricting small dams like Minor irrigation project is beneficial as it requires less cost and minimum displacement.

The cost efficiency of Minor irrigation project is important aspect as it evaluates viability of the project. Groundwater recharge and change in cropping pattern (from subsistence to commercial) are two important aspects. The present chapter evaluates the rationality of Anjani Minor Irrigation project by using change in cropping pattern in the form of crop combination. This study may be a role model for the other minor irrigation project in the state or country.

#### STUDY REGION:

The study region lies in Erandol tehsil of Jalgaon district in Maharashtra state. Erandol tehsil is located in the central part of Jalgaon district and is mainly flank by rivers Girna and Anjani. Girna river flows along the eastern border of the tehsil. Erandol is situated in the Tapi valley of the Deccan Plateau, between the Satpura hills and Ajanta hills. It has an average elevation of 227 meters (744 feet). The Anjani River passes through the town, and the Anjani Dam lies nearby. National Highway 6, which connects Mumbai and Nagpur, links Erandol with Dhule to the west and Jalgaon to the east.

#### EFFECT ON CROP COMBINATION:

The secondary crop data collected at village level from tehsil department to identify crop region by applying, crop combination method for the study area. In the light of soil, irrigation, nature of terrain, use of chemical fertilizer, pesticides, insecticides, smalls

agricultural service centers and market centers in the vicinity of Anjani irrigation project. Considering this situation, it is necessary to make an exhaustive study of the newly delineated agricultural regions. The particular crop cultivation in certain rural area indicates strength and weakness. Individual crop grown in particular region gives realistic picture. This explains the causal relationship between landuse and related physio-socio-economic and environmental factors for the variations of crop region in study area. The spatio-temporal changes in the crop combination for the periods of before and after construction of Anjani irrigation project will clear the picture of effect of irrigation project is changing the picture of agricultural regionalization.

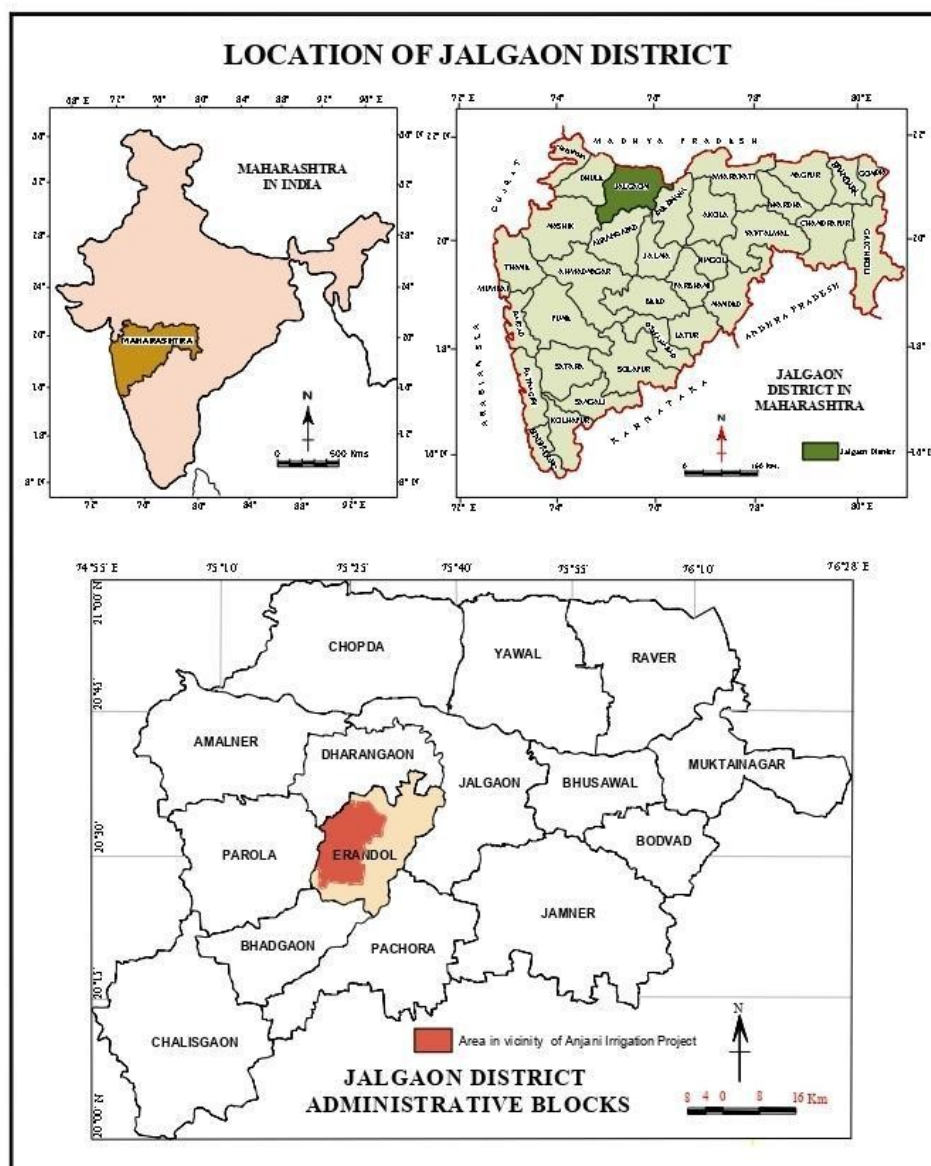


Fig. No. 01

For computation of crop combination, the secondary data collected at rural level was used. These data were obtained from Agricultural department of tehsil office (Table 20) for the years 2005-06 and 2018-19. Data regarding twenty-eight crops was gathered initially but the minor crops occupying less than one per cent to their net sown area were omitted from

this calculation as these crops show negligible share of cultivation in study area. The crops are grouped in the category as cereals, pulses, oilseeds, cotton, vegetables etc.

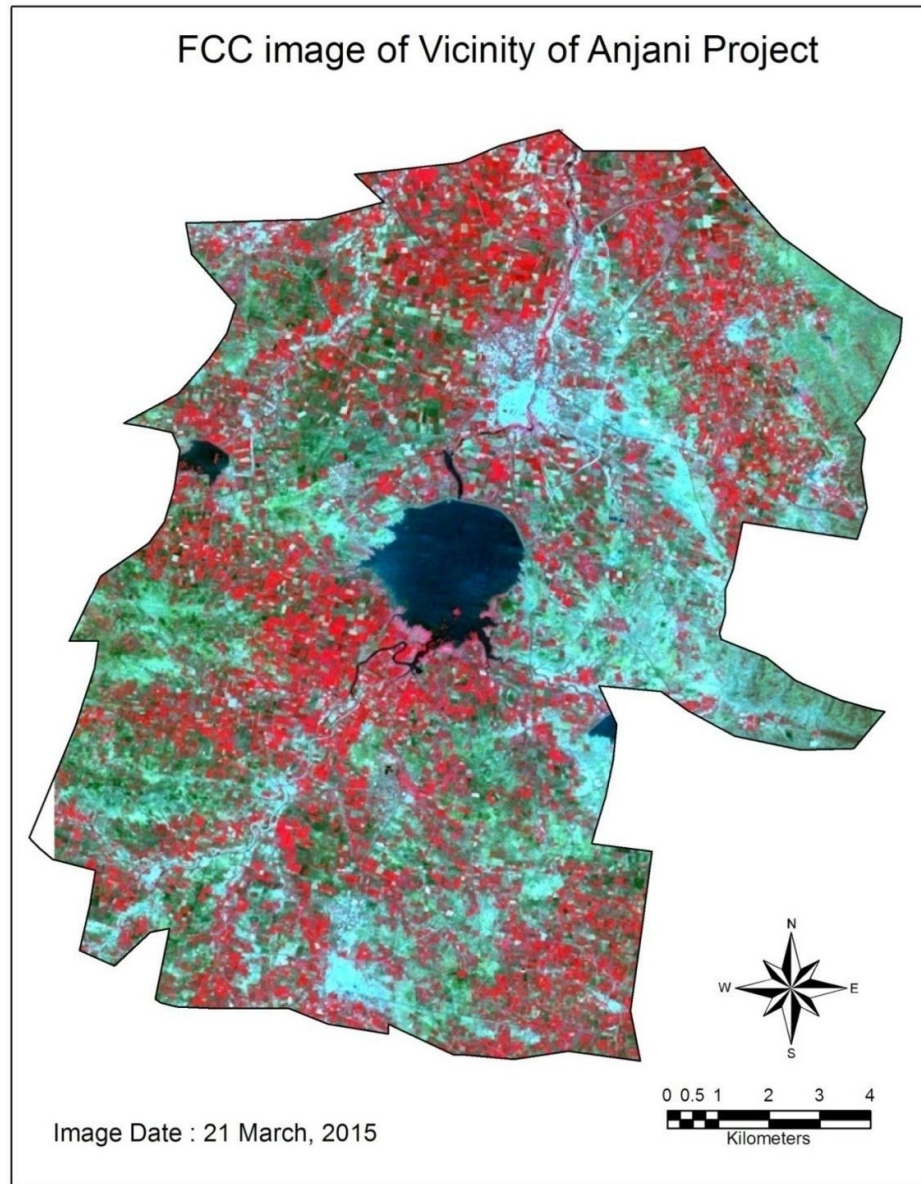


Fig. No. 02

Crops are generally grown in combinations (Weaver, 1954). The study of crop combination of any region has gained importance in geographical study. It gives us the relative position of crops on regional scale. Farmers grow crops in varied physical and cultural condition. The pattern of crop combination gives spatial predominance of certain crops or combination resulting the emergence of crop regions. Such analysis would ultimately minimize the chances of oversimplified generalization (Ali, Mohamad, 1978). Crop combination study in geography is fruitful in many ways, firstly it provides an adequate understanding of an individual crop. Secondly, combination is in itself an integrative reality and finally crop combination regions are essential for the construction of more complex structure of vivid agricultural regions (Weaver, 1954). The study of crop combination thus



forms an integral part of agricultural geography and such study is greatly helpful for regional agricultural planning.

A number of quantitative and qualitative methods have been used for computing of crop combination regions. In quantitative method, crops are arranged or ranked in hierarchical order and then crop combinations are determined. The ease of this method is the simplicity in calculation. Quantitative techniques are more precise, accurate and scientific than qualitative methods. First attempt for delineation of agricultural regions was made by Weaver in 1954. He studied crop combination for Middle West in United States. Later on, many more methods were introduced. Thomas in 1963 modified Weaver's formula by including all crops with zero percent theoretical values in each step of the method in the crop combination studies carried out in Wales but it did not yield different results than obtained by Weaver's method.

Coppock (1964) also modified version of Weaver's method wherein he considered the rank in recognizing the leading crops. The Weaver's technique was subsequently modified by Doi in 1959 where he supplied one sheet of table required only the summing up of actual percentages under different crops instead of finding differences between actual percentage and theoretical distribution. Looking at this weakness, Rafiullah (1965) modified Weaver's method and introduced a new method known as "Maximum Positive Deviation Method" by applying same statistical procedure with altogether different format. This method has been used for present study for computing crop-combination region in vicinity of Anjani irrigation project. The modified formula of Rafiullah is as below:

$$d = \frac{\sum D^2p - D^2n}{N^2}$$

Where:

D= Deviation

DP = positive differences

DN = Negative differences from the medial value

N= Number of crops

The under root sign may be ignored to save labourious calculations and this formula may be used in the following form:

$$d = \frac{\sum D^2p - D^2n}{N^2}$$

The statistical technique adopted by Rafiullah is more accurate and rational and therefore it is quite popular for delineation of crop combination regions. According to this method, percentage of area for all crops was arranged in descending order. The crops having area less than five percent were omitted from the calculation and maximum positive deviation of variance was calculated. For monoculture medial value was considered at 50 percent, for two crop-combinations it is 25 percent, three crop-combinations the value is 16.7 percent, for four it is 12.5 percent and for five crops it is 10 percent and so on. In present study area, 15 crops were used for computation of crop combination region.

The obtained results of crop combination are shown in Fig. 03 & 04, Table No. 01 & 02. Three crop combination regions have been identified in vicinity of Anjani irrigation project as below:

### Two Crop Combination:

In the year 2005, i. e. before the construction of Anjani irrigation project, two crop combination was found in 12 villages. It contributes exactly 50 percent of the total villages in the region. This region included northern, northeastern and southern villages. In the northern villages (Erاندول, Vikharan and Umarde) Cereals, Cotton and pulses crops were included in crop combination. The southern region included Khadke Kh., Javkhede, Vankothe, Kasoda, Anturli, Nandkhurde Kh., Nandkhude Bk., Hanmantkhede Majre and Hanmantkhede Bk. Villages. Here also cereals, cotton and pulses were included in crop combination.

**Table No. 01**

**Vicinity of Anjani Project: Crop Combination according to J. C. Weaver's Method (2005)**

Sr. No.	Villages	Area in Hectares	Crop Combination	Types of crops
1	Erاندول	541.08	02	CE, PU
2	Vikharan	3197.30	02	CE, CO
3	Umarde	801.15	02	CO, CE
4	Ganeshnagar	259.05	03	CO, CE, PU
5	Khadke Sim	652.88	03	PU, CO, CE
6	Khadke Kh.	436.00	02	PU, CE
7	Vankothe	796.43	02	CO, CE
8	Bambhori Kh.	611.65	03	CE, CO, PU
9	Javkhede Sim	873.08	02	CE, CO
10	Anturli Kh.	692.31	02	CE, CO
11	Kasoda	1900.17	02	CE, CO
12	Janfal	793.60	04	CO, CE, PU, OS
13	Farkande	482.13	04	CE, CO, PU, OS
14	Nandkhurde Bk.	596.14	02	CE, CO
15	Nandkhurde Kh.	237.50	02	CE, CO
16	Sonbardi	284.60	03	CE, CO, PU
17	Hanmantkhade Majre	120.64	02	CE, CO
18	Hanmantkhede Bk.	198.44	02	CE, CO
19	Jalu	741.87	03	CE, PU, CO
20	Dharagir	554.00	03	CE, PU, CO
21	Patarkhede	194.00	03	CE, PU, CO
22	Palasdal	613.41	03	PU, CO, CE
23	Bhalgaon Bk.	954.41	03	CO, PU, CE
24	Nandgaon Bk.	512.88	03	PU, CO, CE

Source: Records from tehsil office, Erاندول, T-20 tables (2005)

(Abbreviation: CE – Cereals, CO – Cotton, PU – Pulses, OS – Oilseeds, VG – Vegetables)

**Table No. 02**  
**Vicinity of Anjani Project: Crop Combination according to J. C. Weaver's Method**  
**(2018)**

Sr. No.	Villages	Area in Hectares	Crop Combination	Types of crops
1	Erandol	541.08	02	CO, CE
2	Vikharan	3197.30	02	CO, CE
3	Umarde	801.15	02	CO, CE
4	Ganeshnagar	259.05	02	CO, CE
5	Khadke Sim	652.88	02	CO, CE
6	Khadke Kh.	436.00	02	CO, CE
7	Vankothe	796.43	02	CO, CE
8	Bambhori Kh.	611.65	02	CO, CE
9	Javkhede Sim	873.08	02	CO, CE
10	Anturli Kh.	692.31	02	CO, CE
11	Kasoda	1900.17	02	CO, CE
12	Janfal	793.60	02	CO, CE
13	Farkande	482.13	02	CO, CE
14	Nandkhurde Bk.	596.14	02	CO, CE
15	Nandkhurde Kh.	237.50	02	CO, CE
16	Sonbardi	284.60	02	CO, CE
17	Hanmantkhade Majre	120.64	02	CO, VG
18	Hanmantkhede Bk.	198.44	02	CO, CE
19	Jalu	741.87	02	CO, CE
20	Dharagir	554.00	02	CO, CE
21	Patarkhede	194.00	02	CO, CE
22	Palasdal	613.41	02	CO, CE
23	Bhalgaon Bk.	954.41	02	CE, CO
24	Nandgaon Bk.	512.88	02	CE, CO

*Source: Records from tehsil office, Erandol, T-20 tables (2018)*

(Abbreviation: CE – Cereals, CO – Cotton, PU – Pulses, OS – Oilseeds, VG – Vegetables)

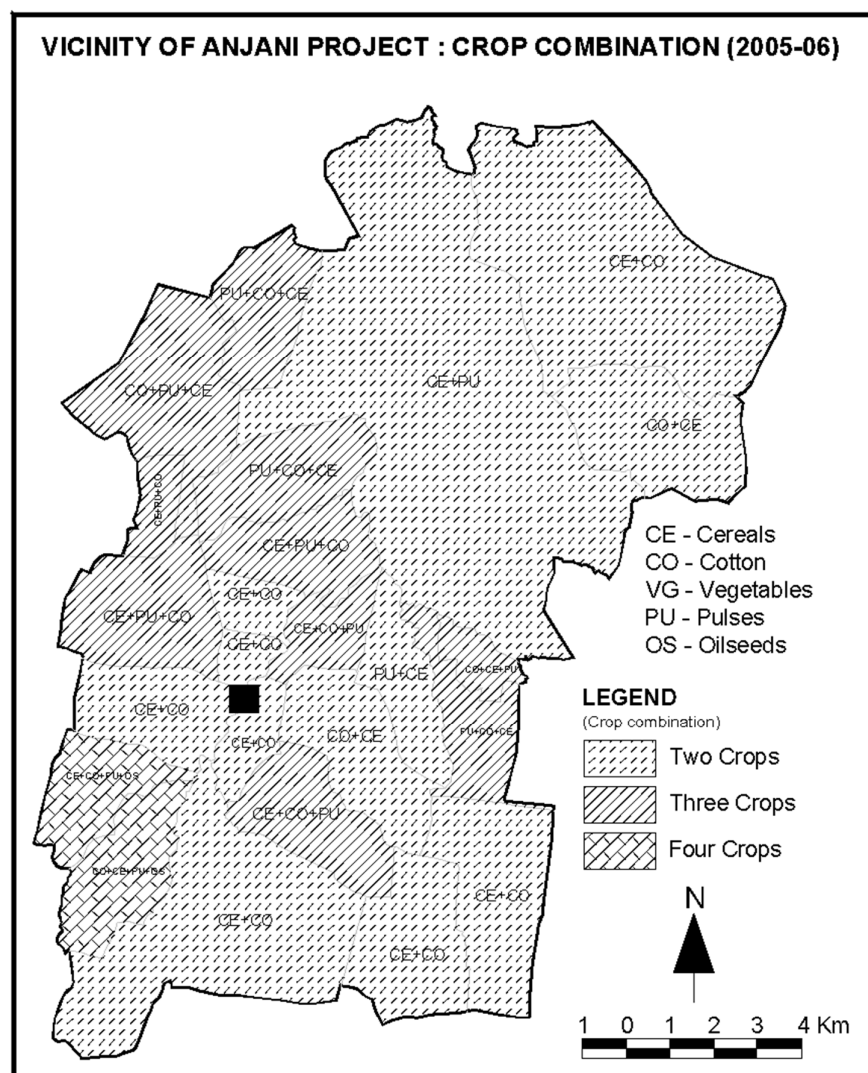


Fig. No. 03

In the year 2018, i.e. after the construction of Anjani irrigation project, the all villages in the study region have recorded two crop combination. Only cereals and cotton crops are found in crop combination. It means after increase in ground water level due to construction of Anjani irrigation project, the sources of irrigation have made positive change in cropping pattern. Due to availability of water for irrigation farmers have trend towards cultivation of cash crops like cotton. In many villages cotton is the first ranking crop.

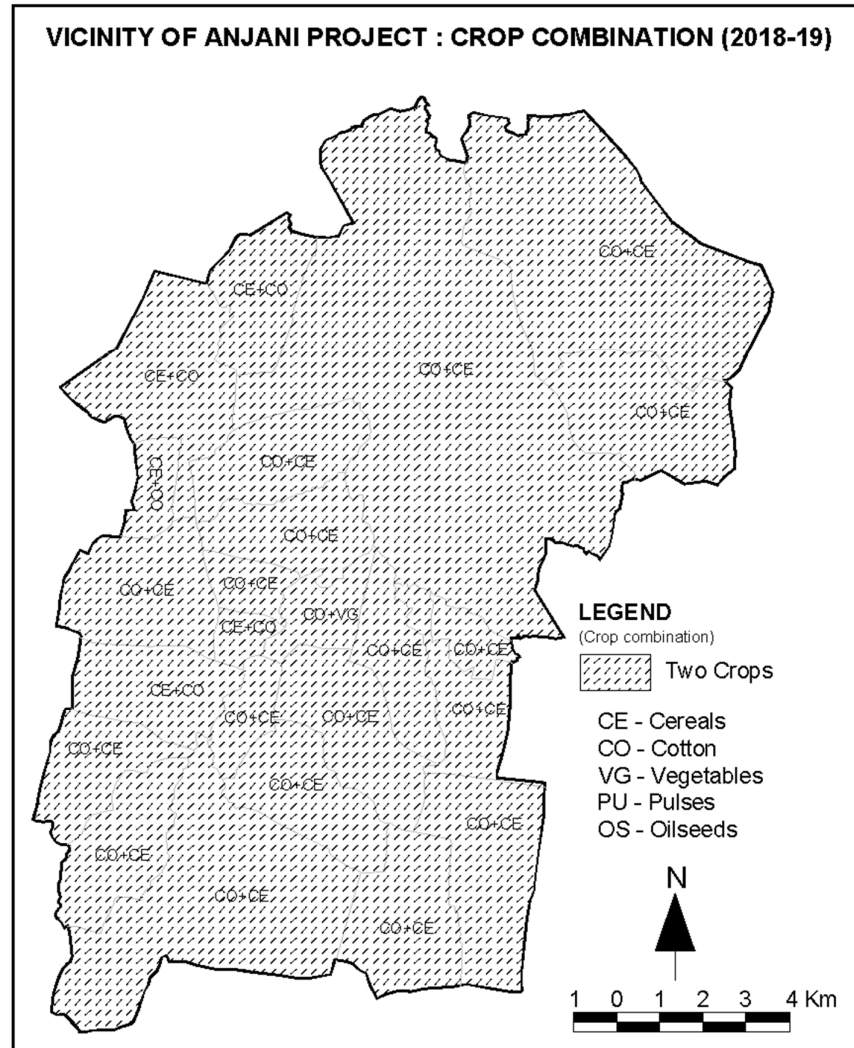


Fig. No. 04

### Three Crop Combination:

In the year 2005, the crop combination was found in the western and central parts of the study region. These parts comprise Ganeshnagar, Khadke sim, Bambhori Kh., Sonbardi, Jalu, Dharagir, Patarkhede, Palasdal, Bhargaon Bk. and Nandgaon Bk. villages. Cotton, cereals and pulses are the crops which form three crop combination. In this region, the deep black soil and comparatively more availability of water for irrigation enabled three crop combination. But after the construction of Anjani irrigation project, in the year 2018, no village has recorded three crop combination in the study region.

### Four Crop Combination:

Only two villages namely Janfal and Farkande in the southwestern part of the study region had recorded four crop combination in the year 2005. Cotton, cereals, pulses and oilseeds were the crops in four crop combination. But in the year 2018, i.e. after the construction of Anjani irrigation project, no village has recorded four crop combinations.

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## CHAPTER-2

### FRIEDRICH SCHLEGEL'S APPRECIATION OF ANCIENT GREEK POETRY

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**Abstract:**

*Critiquing the modern poetry Friedrich Schlegel contended that it lacked unity, harmony and a proper direction. In as much as it falls short of satisfying expectations, modern poetry leaves a thorn in human soul. Nonetheless, occasional appearance of a good work of modernity all the more reveals its deficiencies. In this context, Schlegel turned to a revaluation of the ancient Greek poetry, noting the understanding of the modern cannot preclude a thorough appreciation of the Greek antiquity. In 17<sup>th</sup> and 18<sup>th</sup> centuries, in Europe, the poets and thinkers were reassessing the ancient-modern tension. Whereas in France it was being argued that the Greece could not be the absolute standard of artistic perfection, the thinkers like Nicolas Despréaux defended the aesthetic values of Greek antiquity. The thinkers like Johann Gottfried Herder, Johann Joachim Winckelmann, and Lessing in 18<sup>th</sup> century Germany praised the aesthetic pinnacles of Greek ancient art and literature. Friedrich Schlegel stands in their lineage and he stressed the emulation of the Greeks to acknowledge and promote the national-regional traditions in German literature. Friedrich Schlegel acknowledged the greatness of Homer and argued for a better understanding of the organic relationship between the part and whole in his works. In his theory of novel, Friedrich Schlegel developed the notion of "Unbestimmtheit" (vagueness), which he worked out on the basis of Homer's writings.*

**Keywords:** Modern Poetry, Alexander Pope, Homer, Plato and Aristotle

**INTRODUCTION:**

In his essay *On the Study of Greek Poetry*, which was published in 1797, Friedrich Schlegel lamented the inability of the modern poetry to reach its desired destination. He underlined that modern poetry was even directionless and devoid of a unity in its whole striving and structure. He had noted: "It is obvious that modern poetry either has not yet attained the goal towards which it is striving, or that its striving has no established goal, its development no specific direction, the sum of its history no regular continuity, the whole no unity" (Barnett17). Modern poetry fails to impress harmony on the human mind. An encounter with modern poetry always leaves scars on the human soul and far from fulfilling the yearnings of human; it burdens the mind of the human being. Not pleasure, the feeling of sorrow overpowers the reader of the modern poetry. As Friedrich Schlegel observed: "Even the most splendid poems of the moderns...frequently unify the mind only to rend it in an even more painful fashion. They leave a thorn in the soul..." (Barnett 17). Modern poetry lacks the force that could satisfy human mind and soul. This happens so because it falls short of satisfying expectations of man. Friedrich Schlegel remarked: "Satisfaction occurs only

where every expectation is fulfilled-where all longing ceases. This is what is missing from the poetry of our age!” (Barnett 17) Schlegel, however, does not refuse to acknowledge some good literary works that now and then appear and ensure a future of modern aesthetics. He calls such works as high cliffs of creativity emerging from the disappointing vagueness prevailing in the arena of the literary productions. Pointing towards such creations, he writes: “Nonetheless, there is also a *better* class of art, whose works stand out from the more common works like high cliffs out of the vague fog bank of a distant region. Every now and then in the recent history of art we come across poets, who, in the midst of an oblivious age, appear to be foreigners from a nobler world. If they do not entirely achieve harmony and satisfaction in their works, they nonetheless strive so ardently...that they raise the most justified hope that the goal of poetry will not remain forever unattainable” (Barnett17-18). It is important to note that Schlegel recognized the deficiency of modern poetry in these new writings, which strove to present something worthy amid the general decline in the aesthetic promises of the literature of his time. He believed that in their best attempts, these literary works represent not the principle of beauty, but that of ‘ugly’. He commented: “This is...the governing principle of modern poetry that many of its most splendid works are...representations of the ugly. One must finally...admit that there does indeed exist a representation of confusion in all its plenitude...” (Barnett18). In the awareness of such aesthetic deficiencies of modern poetry, Friedrich Schlegel turned to the revaluation of the classical Greek antiquity for modern times and modern literary production.

Friedrich Schlegel’s efforts towards the revaluation of the Greeks have to be seen in proper historical context. In seventeenth and eighteenth centuries in Europe the interrelationship between the ancient Greek culture and modernity was being widely discussed. Predominantly these discussions found fertile ground in England and France. Stuart Barnett summarizes the debate on the ancient and modern in France in 17<sup>th</sup> and 18<sup>th</sup> centuries as follows: “The question of the relation of modernity to antiquity did not originate with Schlegel. It first took shape in the 17<sup>th</sup> century in France and England. The authority of Aristotle was disputed. It was argued that the ancients could no longer serve as absolute standards of artistic production. For instance, Charles Perrault argued that the ancient writers were full of errors. Fontenelle argued that the ancients suffered from the lack of accumulated wisdom and a knowledge that the moderns possess. Despite such attacks, the ancients were defended by Nicolas Boileau-Despréaux, who emphasized the exemplary role the ancients played for various cultures throughout history” (4).

The question of the relation between the ancient and the modern was intensely investigated by the literary scholars of England at this time also. Writers such as Sir William Temple and William Wotton debated the ability of the moderns to improve upon the ancients. The debate reached its literary apogee in Swift’s “An Account of the Battle between the Ancient and Modern Books in St. James’s Library”, in which the books of the two camps literally do battle” (Barnett 4).

From the debate obtaining in France and England at that time, it is evident that the ancient Greek culture’s exemplariness in the realm of art and literature was simultaneously attacked and defended. Here, it is significant to mention other two prominent poet-thinkers, namely the English Augustan poet Alexander Pope and the German Enlightenment poet Johann Gottfried Herder. Both of them advocated for the exemplariness of the Greek culture



in terms of artistic and poetic productions. Many scholars have identified the presence of the Greek Muses in the writings of the 18<sup>th</sup> century English poet Alexander Pope. Yasmine Gooneratne remarks that Pope's entanglement with the Greek Muse began when he started translating Homer's *Iliad*. Yasmine Gooneratne observes: "The long-term exposure to Greek poetry involved in Pope's translation of *The Iliad* makes Homer and the Muses seem as engagingly alive in his poetry..." (14). Gooneratne contends that the Greek Muse functioned like a sacred force in the writing of Pope. According to Gooneratne: "For Pope, however, although he was writing in the eighteenth century and in England, as a Roman Catholic in a society dominated by Christian values, the Greek Muses were still very much alive. His invocation of their 'sacred' power is no mere rhetorical figure..." (14). The high level of artistic creativity of Alexander Pope had resulted from his productive assimilation of the Greek tradition. To argue with Yasmine Gooneratne: "Such a recognition of the Muses' power over the dedicated artist as Pope evinces throughout his work, came about through his assimilation of Greek and Latin literature, and his ability to achieve a synthesis between his Christian inheritance and a classical, essentially 'pagan' tradition" (14). Essentially, Pope believed that an imitation of the Greeks was still very relevant for the artists and poets of his time. For Pope "ancients were exemplary imitators of nature, to imitate them would be faithful to nature" (Barnett4).

In 18<sup>th</sup> century, in Germany many thinkers and poet eulogized the artistic, poetic and linguistic glory of the ancient Greece. Famous thinker and art-historian of 18<sup>th</sup> century Germany Johann Joachim Winckelmann underlined that "the Greeks should be imitated because "good taste...first formed itself under the Greek sky," because one "finds in the masterpieces of the Greeks not only the *most* beautiful nature, certain *ideal* forms of the beauty of nature," and because Greek works of art are "the *purest* fountains of art" which are marked by a "noble simplicity and quiet grandeur" (Staden 129). Johann Gottfried Herder in 18<sup>th</sup> century Germany highlighted the perfection and beauty of the Greek language and literary creations. In his words: "The Greek language is the *most* cultivated in the world, Greek mythology the *richest* and *most* beautiful on earth, and, finally, Greek poetry perhaps the *most* perfect of its kind" (Staden 129).

From the above references to Alexander Pope and German poets and thinker, it is evident that Greek antiquity remained much inspiring for the European poets and thinkers in 18<sup>th</sup> century. Like Winckelmann, Lessing, and Herder, Friedrich Schlegel also came to appreciate and glorify the Greek classical antiquity as an instance of 'perfection'. Friedrich Schlegel remarked: "All the classical poems of the ancients are coherent, inseparable; they form an organic whole, they constitute, properly viewed, only a single poem, the only one in which poetry itself appears in perfection" (Barnett 3). Friedrich Schlegel stressed two aspects of the classical Greek poetry to draw attention to their contemporary relevance. The first referred to his thesis that the Greeks had been able to present a synthetic view of art, in which the part and the whole mutually adjust, illuminate and thus constitute an organic totality. He gave expression to this idea about the Greek poetry in the following words: "Sie ist der höchsten und der allseitigen Bildung fähig; nicht bloß von innen heraus, sondern auch von außen hinein; indem sie jedem, was ein Ganzes in ihren Produkten sein soll, alle Teile ähnlich organisiert, wodurch ihr die Aussicht auf eine grenzlos wachsende Klassizität eröffnet wird" (Immerwahr 385). The second sense, in which Friedrich Schlegel considered classical Greek

antiquity to be glorious, referred to its 'emulative' value. Schlegel argued that modern poets must assign themselves to this emulative concern of the ancient Greek culture. Ancient Greek literary creativity reached such a perfect status precisely because it emerged from a deep reverence for regional traditions. This reverence for regional, national traditions should be revalued and from such a revaluation there could develop a modern poetry as perfect and powerful as the Greek poetry of antiquity. In this context, Schlegel was attempting to relate the evolution of German Romantic Movement in literature to the Greek antiquity. Raymond Immerwahr comments: "The sense in which ancient classicism may properly be emulated by the moderns is explained in the Paris-Cologne lectures of 1803-04. The universality and ideality of ancient Greek literature can never be imitated because it is always inseparably fused with particular characteristics growing out of regional societies and traditions. We can best emulate the ancients, first by being true to our own national and regional traditions, then by adopting their practice of compiling "eine kleine Auswahl der besten Werke unserer eigenen Sprache und Nation" as a model for continuous study" (386).

Friedrich Schlegel's effort to relativize and reevaluate Greek antiquity would be inadequate without his reassessment of Plato and Homer. Schlegel, among the romantics in Germany, cast doubt on the theoretical authority of Aristotle and instead tried to idealize Plato for literature of his time. Regarding Friedrich Schlegel in this context Ernst Behler observes: "The revaluation also brought about a decisive change in the prevalent relationship to classical antiquity, which can be described as a departure from the dominant Roman and Aristotelian influence upon European criticism in exchange for a closer bond with the Greeks and especially with the Platonic tradition. Previously, the Greeks had maintained their impact on the history of aesthetics through the Romans as well as through various adaptations of Aristotle's *Poetics*. Following Winckelmann and their tradition of German humanism, the Schlegels attempted to terminate this form of classicism by establishing a close connection with the aesthetic world of the Greeks and by referring directly to pronouncements on poetry by Plato and the Greek rhetoricians" (Barnett 11).

It is only in the context of Schlegel's preference for Plato over Aristotle that one can grasp his assessment of Homer for his own time. In 1796 appeared Friedrich Schlegel's essay on Homer under the title "On Homeric Poetry". In this work, Schlegel was not attempting to present the figure Homer; rather he was trying to develop a theory of art with leanings on Homer. Here, Schlegel placed himself against Aristotle and argued against Aristotle that he had brought the notion of epic all too close to that of drama, characterized by stiff logical rigidity. Aristotle conceptualized the notion of hero as a central figure in drama or epic, and Schlegel fully refused to accept this model of epic. Schlegel was vehemently struggling against the indispensability of logical totality of the literary works as propounded by Aristotle. Hence, he was diametrically opposed to the principles of Aristotle's *Poetics*. It was in opposition to the principle of logical unity of the work of art as propounded by Aristotle that Schlegel proceeded from the assumption of the 'vagueness' to receive the works of Homer. In his reception of Homer, Friedrich Schlegel developed the idea of the 'Unbestimmtheit' (vagueness) and raised this idea to the standard notion of epic in his time. Epic to him has neither limit nor does it have any form with a formal end. It unfolds in perpetual progression. Friedrich Schlegel had underlined: "This epic harmony is so very different from the closed world of drama" (Wohlleben 204). Schlegel defined epic in terms of

infinite chain of events and strove to gain an image of Homer in accordance with this kind of faith in the infinite unfolding of the epic. According to him, in epic “every occurrence is a link in an endless chain, the consequence of earlier ones and the germ of those to come” (Wohlleben 205).

One noteworthy dimension of Friedrich Schlegel’s appreciation and reception of Homer relates to his understanding of the organic interrelationship between the part and whole. In this context, the contemporary advances in the sciences bore its impact on the thoughts of Friedrich Schlegel. In Germany, in Göttingen experiments were being made on octopus at that time and it was being scientifically established that the part and whole of an organic, living unity mutually sustained each other. These scientific experiments led Schlegel to develop his theory of epic, in which both part and whole are equally important in the unending unfolding of the narration. In Homer, he tried to seek an exemplification of his convictions about the mutual sustaining organic relationship between the part and the whole. Joachim Wohlleben comments: “Many experiments were made with the octopus (or polyp) around 1780, especially by Lichtenberg at Göttingen. He found that from the smallest part, when amputated, a new creature could grow. It was also learned that groups of octopi can join together to form one large one. This is a close natural analogy to the Homeric epic. Schlegel characterized a phenomenon that could be divided into endless parts but at the same time had the ability endlessly to continue. He formulated his aperçu epigrammatically: “The Homeric epithet is a small rhapsody and the rhapsody is a large epithet” (206).

Friedrich Schlegel’s way of appreciating the idea of epic in Homer determined his own concept of novel also. Later on, while Schlegel was formulating the concept of novel, he was emphasizing that the tensions involved in the novel’s texture must be viewed in its unending nature. Marilyn E. Johns points out this significant aspect of the theory of the novel informed by the idea of infinity as available in Friedrich Schlegel: “The author establishes a wealth of tensions which keep extending themselves but are never really resolved. He seems to be maintaining that actually a synthesis or unification of these opposites is possible only through their intensification—a schematization which gives birth in the “Brief über den Roman” to the concept of the arabesque” (138).

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## CHAPTER-3

### BETWEEN SCHOLARLY INQUISITIVENESS AND ALLEGIANCE TO EUROPEAN SUPERIORITY: SIR WILLIAM JONES AS TRANSLATOR OF SANSKRIT LITERARY TEXTS

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#### **Abstract:**

*Apart from the administrative concerns, persuaded by the possibility to replenish the stagnant western literature with novelties from the east, Sir William Jones set out to translate the Sanskrit texts of Kalidasa and Jayadeva into English. He aimed alongside to present an authentic picture of the Hindu manners to Europe. His translations are marked by exclusion of certain passages from translation. Earlier scholars attempted to explain this text-passage-eliminations referring to his purpose not to divert from impressing the West with his translations. New studies indicate the restraints posed by the standards of literary taste in Europe in the age of Enlightenment. Jones's translation-projects were equally impacted by the constitution and perpetuation of the Greco-Roman canon of classics. The canonical status of Greco-Roman classics-which Jones always turned to in his comparative way of studying Sanskrit, rested firmly on championing classical Greek tradition of reason and abhorring the luxuriant imagination of the oriental poetry and mythology. Sir William Jones expressed on occasions the superiority of Europe compared to the Asiatic societies, claiming it to be dating back to Alexander. Thus, while Jones's keenness in unearthing the luminous literary past of Sanskrit cannot be belied, his allegiance to the Eurocentric superiority cannot be kept out of critical sight.*

**Keywords:** *Sakuntala-translation, kindred-relationship between Sanskrit and Greek/Latin, Omission of passages from Sakuntala and Gitagovinda, Puritanical translation, Western classics and European superiority*

#### **INTRODUCTION:**

Sir William Jones had made considerable achievements in the study of the languages, literature and culture of the Orient before he arrived in India as a judge of the High Court of Bengal. Not only was he well versed with Persian and Arabic languages, rather he had also to his credit some noticeable works of translations. His ingenuity at translation of the Persian and Arabic texts was amply illustrated in his *Poems, Consisting Chiefly of Translations from the Asiatick Languages*, published in 1772. His exemplary and enviable intellectual position with regard to oriental scholarship rested also on his close studies of the advances gained in the European philological circles about the inquiry of Indo-European languages and cultures. Stefan Arvidsson alludes to it, that "Jones had begun to supplement his knowledge of Greek and Latin with studies in Oriental languages" (17) preceding his arrival in Calcutta. His knowledge of the contemporary researches in Indo-European languages led him to announce on February 2, 1786 in Calcutta that "there were striking similarities between Latin, Greek,

and Sanskrit, and that this circumstance should be explained in terms of kinship” (Arvidsson 17). Michael J. Franklin remarks about Sir William Jones in his book *Orientalist Jones. Sir William Jones, Poet, Lawyer, and Linguist, 1746-1794*, that being a British administrator in India he had to facilitate colonial governance though, he entertained the belief that “India possessed an advanced civilization and a sophisticated culture” (21). His reference to the parallels existing between Greek, Latin and Sanskrit in his Third Anniversary Discourse notwithstanding, he remained convinced that Europe may experience novelties in literary taste once the works from the East are made available to them through translation. Zak Sitter, in a new finding, quotes William Jones saying that he “cannot but think that our *European* poetry has subsisted too long on the perpetual repetition of the same images, and incessant allusions to the same fables: and it has been my endeavor for several years to inculcate this truth, that, if the principal writings of the *Asiaticks*, which are repositied in our publick libraries, were printed with the usual advantage of notes and illustrations, and if the languages of the Eastern nations were studied in our places of education, where every other branch of useful knowledge is taught to perfection, a new and ample field would be opened for speculation; we should have a more extensive insight into the history of the human mind, we should be furnished with a new set of images and similitudes, and a number of excellent compositions would be brought to light, which future scholars might explain, and future poets might imitate” (397).

Accordingly, even as he would not have ceded his colonial-administrative imperatives, he aspired to reveal rich and unknown treasure of poetic imagery of the East to the West through his translations. Not accidentally, he sought consultations with scholars before embarking on his translations from Sanskrit literature. It was a certain pundit Radhakant Sarman, who apprised him that *natakas* were similar to plays in English. Garland Cannon and Siddheshwar Pandey underline that “delighted with the help from this pundit he chose to translate the *Sakuntala*, “the most esteemed” Sanskrit play” (529). After he had translated *Hitopdesa* and Jayadeva’s *Gita Govinda*, Jones undertook the translation of *Sakuntala* to acquaint the West with the genuine representation of the Hindu manners. Garland Cannon and Siddheshwar Pandey observe that Jones himself had expressed that through the translation of *Sakuntala*, he intended to place “a most pleasing and authentick picture of the old Hindu manners, and one of the greatest curiosities that the literature of Asia has yet brought to light” (529). By translating *Sakuntala*, Jones had made erudite and prolific literary riches of ancient India accessible to the West. He registered his wish that imitation will be set in motion and Kalidasa’s other works will be translated. Garland Cannon and Siddheshwar Pandey point out about Jones that being “a person extremely sensitive to and perceptive of ideas and objects-botanical, linguistic, literature, mythological, and humanistic-he was entranced by the hidden treasures which he had unearthed” (535). About his vision of the continuation of a work of translation initiated by him, Garland Cannon and Siddheshwar Pandey observe that “With all humility he said in his Preface: “It is my anxious wish that others may take the pains to learn Sanscrit, and may be persuaded to translate the works of Calidas”” (535). Within a very short span of time, the desire of Jones went into discernible fulfillment. Emphasizing how his translation served this purpose, Garland Cannon and Siddheshwar Pandey remark that “Western scholars...tried to translate or emulate them, ranging from Goethe to linguists” (535). Jones’s translation of *Sakuntala* influenced

immediately German scholars, poets, and philologists. In 1791, Georg Forster brought out his translation of *Sakuntala* in German from Jones's rendition of *Sakuntala* in English. When Goethe received a copy of *Sakuntala* from Georg Forster, he composed his famous epigram on *Sakuntala*, which appeared in the *Deutsche Monatschrift* in 1791. Under the sway of Goethe's epigram, Herder visualized to compose an essay on the Oriental drama. Dorothy Matilda Figueira states that Herder "appropriated Goethe's epigram as the motto for his essay "Über ein morgenländisches Drama"" (13). Thus, with the translation of *Sakuntala* by Jones commenced a series of poetic compositions, essays, and emulations, which in a no trivial way paved the way for the incipience of Indomania in Europe towards the end of 18<sup>th</sup> century.

Jones's scholarly yearning for Sanskrit language and literature stood undeniably beyond doubt. To gain access to the literary treasures of Sanskrit literature, he had been resolutely learning Sanskrit language as perfectly as he could. In a letter to Warren Hastings on October 23, 1786 he confessed: "I...have therefore been under a necessity of learning Sanscrit myself. Since it will be my last language, I am learning it more grammatically and accurately than the indolence of childhood, and the impatience of youth allowed me to learn any other; and when, by way of exercise, I have finished a translation of the Hitopdésa, I shall translate one of the best grammars" (Emeneau 961). In the course of learning Sanskrit, he harped on its affinity with Latin and Greek and his correspondences bear witness to such observations by him. In a letter to the second Earl Spencer on September 29, 1786 he wrote: "I find Sanscrit to be a sister of the Latin" (Emeneau 960). As his familiarity with Sanskrit advanced, he wrote in a letter to Earl Spencer on August 11, 1787 that Sanskrit is "a sister of Latin and Greek" (Emeneau 960). In his scheme of scholarship, Sanskrit had now moved close to the edifice of Greco-Roman classics. In a letter to Sir John Macpherson in November 1786, he noted: "Sanscrit...so beautiful a sister of Latin and Greek" (Emeneau 960). In his Third Anniversary Discourse of 1786, discussing "On the Hindus", contemplating a common source existing between Greek, Latin and Sanskrit Jones had already pointed out: "The *Sanscrit* language, whatever be its antiquity, is of a wonderful structure; more perfect than the *Greek*, more copious than the *Latin*, and more exquisitely refined than either; yet bearing to them a stronger affinity, both in the roots of verbs and in the forms of grammar, than could possibly have been produced by accident; so strong, indeed, that no philologer could examine them all three without believing them to have sprung from some common source, which, perhaps, no longer exists" (Vasunia 17).

Given this acknowledgement of the kindred affiliation between Greco-Roman classical edifice and Sanskrit, and Sanskrit appearing nothing less than as a sister of Greek and Latin, one is taken by surprise to note that Jones excluded certain passages of *Sakuntala* from translation. Identifying sternness in Jones's translation of *Sakuntala*, Garland Cannon and Siddheshwar Pandey note: "He said in his Preface: "It must be confessed that the whole of Dushmanta's conversation with his buffoon, and a great part of his courtship in the hermitage might be omitted without any injury to the drama." (533). While addressing this issue, the imperatives of European cultural legacy have to be accorded due consideration. Jones desisted from inclining to take the risk of incurring the repugnance of the European readership toward his translation of Kalidasa's work from Sanskrit. William Jones had grown up in the intellectual-cultural set-up of the eighteenth century Europe. The age of Enlightenment guided not only the quest for truth in science, rather also that for reason,

virtue, and morality in literature and arts. The embodiment of such ideals in literature was manifest as a model in the classical works of the Greek and Latin literatures and Jones unambiguously adhered to these classical yardsticks. S. Mukherjee quotes from Sir William Jones: "From my earliest years I was charmed with the poetry of the Greeks; nothing, I then thought, could be more sublime than the odes of Pindar, nothing sweeter than Anacreon, nothing more polished or elegant than the Golden Remains of Sappho" ([openjournals.library.sydney.edu.au](http://openjournals.library.sydney.edu.au)). It is in this contextual framework that one may make out Jones's intentional exclusion of certain passages of *Sakuntala* from translation. Alluding to certain puritanical approach inherent in Jones's translation of *Sakuntala* Garland Cannon and Siddheshwar Pandey argue that it is in rendering the erotic element "that Jones is alleged to have been puritanical" (533). Although Garland Cannon and Siddheshwar Pandey attempt to interpret this puritanical approach in conjunction with Jones's ambition to ward off any impediment in impressing Europe by the project of translating Kalidasa's *Sakuntala*, in a more recent study Michael J. Franklin finds that in his translation projects William Jones had to negotiate with the contemporary Enlightenment restraints. Michael J. Franklin, in his essay *Sir William Jones, the Celtic Revival and the Oriental Renaissance* contends that "Enlightened consumer approval...testified to the success with which both Macpherson and Jones had finely judged metropolitan tastes. Novelty and difference were remarkable features, but restraint had to be exercised in the transmission of 'alien' cultures...It was a problem that was to exercise Jones's ingenuity in his cultural translation of Hinduism, notably in Kalidasa's *Sakuntala* and particularly Jayadeva's erotic allegory, *Gitagovinda*" (22).

A close reading of the resources substantiates the argument that Jones undertook and continued his studies of Sanskrit characteristically in a comparative framework, in which the questions of cultural hegemony were intricately located. In a letter to Lady Spencer on October 8, 1787 he wrote about learning Sanskrit, which was being facilitated by his knowledge of Greek and Latin, as follows: "I am charmed with Sanscrit...; the good Brahmins, who do not know how much I am assisted by Latin and Greek, are astonished at my progress" (Emeneau 960). Jones had arrived in India as a colonial administrator and while engaged in his literary pursuits, he would not have transgressed his commitment to maintain the towering cultural sanctity of the classical Greco-Roman literature. While he pursued the studies of Sanskrit, he had yet not abandoned his inclinations for comparing it to Greco-Roman classics. In a letter to second Earl Spencer on August 23, 1787 he had acknowledged: "To what shall I compare my literary pursuits in India? Suppose Greek literature to be known in modern Greece only, and there to be in the hands of priests and philosophers; and suppose them to be still worshippers of Jupiter and Apollo; suppose Greece to have been conquered successively by Goths, Huns, Vandals, Tartars, and lastly by the English; then suppose a court of judicature to be established by the British parliament, at Athens, and an inquisitive Englishman to be one of its judges; suppose him to learn Greek there, which none of his countrymen knew, and to read Homer, Pindar, Plato, which no other European had even heard of. Such am I in this country; substituting Sanscrit for Greek, the *Brahmins*, for the priests of *Jupiter*, and *Valmic*, *Vyasa*, *Calidasa*, for Homer, Plato, Pindar" (Vasunia 3). This explicit expression about a conscious endeavor of comparison is deeply embedded in the recognition of cultural hegemony. Jones, for all his literary pursuits of Sanskrit, would not forsake the awareness that he was an arbiter of the advanced European culture, which drove

its reinforcements from the belief in 'reason' and 'rational judgments' in art, literature, and philosophical inquiries. Ancient Greek culture, for its part, served as a model of literary, artistic, and philosophical endeavors, in which the force of 'reason' had retained its domineering height. Jones's subscription to hegemony ingrained in the Greco-Roman classics is explicit, in that "Asian and Greek poets drank from the same cup, Jones allows, but...Greek gods are superior given that they presage the rationality that Jones's Europe now knows as Enlightenment" (Hoerner 217). In the literary transaction, therefore, anything inferior from the East must be withheld from being presented before the superior Europe.

Above letter assumes significance in the light of the fact, that Sir William Jones never lost sight of the cultural and civilizational difference existing between Europe and India. In a study, Sharada Sugirtharajah has underlined that Jones held on to "his hypothesis that Hindus are still in a state of childhood-yet to grow out of their wild imagination and innocence" (5). Jones encountered, thus, India and Sanskrit literature from a superior vantage-point. Europe of eighteenth century had matured with the Enlightenment whereas ancient Sanskrit literature of India mirrored the depictions of luxuriant imaginations. It is as well significant a fact that Jones's professional occupation in India was inextricably interspersed with a civilizing-mission. Fred Hoerner points out that at the time "Jones arrived in Calcutta in 1783 to direct the East India Company court, the push from home was to convert India into a "civil society"-that is, make it mirror England's own" (217). In continuation of his East-West transaction, abiding to this obligation entailed omissions and exclusions of the Sanskrit passages from translation. Thus, Jones adopted a puritanical attitude in translating *Sakuntala* and while translating *Gitagovinda* of Jayadeva, "he...omitted...those physical descriptions which he judged to be too luxuriant and bold for European taste" (Cannon 421). The omission of passage alludes not only to his constraints in his transactions in literature. A Eurocentric superiority also lurks in his statements, when he reflected on the comparison between the East and Europe. Michael Palencia-Roth articulates Jones's Eurocentric superiority by reiterating that "in his presidency, Jones has his audience of British men in Calcutta very much in mind as he delivers his discourses. For them, the superiority of England over India is not in question, and Jones, in the second discourse, supports that sense of superiority. At the same time that he is introducing the history, culture and potential of India to his listeners, he tells them: "Whoever travels in Asia, especially if he be conversant with the literature of the countries through which he passes, must naturally remark the superiority of European talents: the observation, indeed, is at least as old as Alexander" (30).

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## CHAPTER-4

### A STUDY ON BACKWARDNESS AMONG MUSLIMS IN SCIENCE & EDUCATION

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#### Introduction –

Education is the instrument of change and development for society. It train and develops the manpower resources, transforms the society as well as change the status of a person from one status to another in social hierarchy. Education according to Indian tradition is not merely a means of earning a living; nor it is only a nursery of thought or a school for citizenship. It is an initiation into the life of spirit and training of human souls in the pursuit of truth and the practice of virtue (*Radhakrishnan*)<sup>1</sup>. In contemporary world particularly in developing countries modern education is seen as a means and goal for modernization (Pandey, 1988). Growth of education is considered as a sign of human growth and development.

At the beginning of the twentieth century, the Muslim population (in the post-Partition areas) was close to 30 million and grew rather slowly up to 1921 and later moderately,<sup>2</sup> as did the overall population. Partition led to large-scale migration, and in 1961, well after the major Partition-linked migration had ended, India's Muslim population was enumerated at 47 million, about 10% of the total population of 439 million. The latest census, conducted in 2011, enumerated 172 million Muslims out of India's total population of 1.21 billion. (About 14.22% of the total Population)

The condition of Muslims in India is pitiable. As it has been documented by the Sachar committee Report (SCR), Muslims are virtually lagging behind all other communities and a trend of relative deterioration is observed in almost all spheres of day to day life especially in the field of education, the situation is of grave concern.

While the overall literary rate in India is above 65% the literary rate of Muslims is around 59%. However, on extending the consideration beyond more literary rate, Muslims fall far behind others, where, in general, 26% of those aged 17 years and above have completed matriculation. This percentage is only 17% amongst Muslims. The mean years of schooling among children of age group of 7-16 years is lowest among Muslims at around 3.4 years whereas for others it is above 5 years according to the 2001 census data, while only about 7 per cent of the overall population aged 20 years and above are graduates or hold diplomas, this proportion is less than 4 percent amongst Muslims. Besides, those having technical education at the appropriate ages (18 years and above) are as low as one per cent and amongst Muslims, that is almost non-existent.

The literary rate for female Muslim which is as low as 50.1% is not only much worse than their male counterparts who have a literary rate of 67.6% but it is also lower than the national female literary rate of 53.2% the status and growth of literary among

Muslims in different parts of the country has not been uniform. In northern and eastern states their literary rates have been lower than their all India literary rates, whereas these rates were somewhat higher in many southern states than their national rate of literary. They performed the worst in some states like Haryana (40%) Bihar (42%), Meghalaya (42.7%) Jammu and Kashmir (47.5%), Uttar Pradesh (47.8%), Nagaland's (48.2%) and Assam (48.4%), Muslim female literary rates in these states are still worse. These are 21.5% in Haryana, 31.5% in Bihar, 33.5% in Nagaland, 34.9% in Jammu and Kashmir, 35.2% in Meghalaya, 40.2% in Assam, 40.3% in Uttaranchal, 42.7% in Jharkhand and 43.4% in Punjab. It may be noted that 64.3% Muslims live in rural areas, while literary rate of all Muslims is 59.1% the situation is worse for the rural Muslims who are only 52.7% literate and among them rural female literacy rate is much below 50% urban Muslims with 70% literary rates are much better off than Muslims in rural areas and are also closer to the all India urban literary rate of 79.9%. as per the 61<sup>st</sup> round of the National Sample Survey, literary rate among rural Muslim women was 41%. It is worth nothing that Muslims do not always prefer to be literate in Urdu or do not learn in Urdu medium alone as is evident from the fact that against their population of 138.19 million in 2001, only 51.54 million people returned Urdu as their mother tongue and it is also not necessary that all these who returned Urdu as their mother tongue may be Muslims

**Objectives -**

1. To examine the educational status among Muslims.
2. To study the backwardness of Muslims.
3. Contribution of researcher in analyzing Muslims backwardness.

**Contribution-**

In this section, the attempt has been made to review a few pertinent studies on the issue of education in general and higher education in particular among Indian Muslims. The findings of a few studies have been illustrated below.

Menon (1981) conducted a study on the educational status of Muslim women in Kerala. The sample selected for the study comprises of 450 women and 150 men belonging to four districts of the State through random sampling method. The study found that 46% of Muslim women were married below 15 years, 51% of them between 15-19 years and only 3% of Muslim women were found to be married between 21-24 years of age. The study found that early marriage, seclusion and lack of meaningful role of the educated women in the community were the main reasons for the low level of educational attainment among Muslim women in Kerala.

Hussain (1990) found that Muslims are ranked among the most marginalized communities in Bihar. The study observed that the vast majority of non-Ashraf Muslims in the state is the converts from the low caste Hindus. Pre-Islamic customs, conservative interpretations of Islam, economic and political factors are contributing to Muslim women's marginalization. The study notes an alarmingly high dropout rate of girls after secondary school. The problem of getting appropriate husbands for highly educated Muslim girls is also another major difficulty. The study also reveals a sharp criticism of the orthodox Ulema on the part of many educated Muslim women.

Mabood (1993) carried out a study based on a sample of 70 Muslim teachers in government and aided schools and Madrasas in the Azamgarh district in the eastern Uttar

Pradesh. The aim of the study was to discover the attitudes towards Muslim women education. The study also included the parents of students studying in these institutions. The study reveals that Madrasa teachers emphasize more importance to religious education. School teachers are in favour of both the religious and secular education the parents, though they favour education, majority of the parents favour education of girls but only till the age of puberty.

Mondal (1997) argues that the educational backwardness of Muslims in India should be understood in the context of their overall socio-economic and political marginalization. Many Muslims are engaged in marginal economic activities that do not require modern education. The survey discovered that the high dropout rates and low levels of Muslim girl's educational attainment owed to various factors such as poverty, to engage in household chores, opposition to co-education after puberty and difficulty to get a spouse for highly educated girl. The survey also found that the older generation males and females favored only Quranic education for Muslim girls, many younger generation Muslims advocated both religious and secular education for them.

Hamid (2005) in his article on Muslim education in India explained that the development and growth of education is slow and poor. The study reveals that Muslims remain backward when compared to other religious groups.

Sachar (2006) have pointed out that the Muslims are the most economically, educationally and socially backward sections of Indian society. While issuing notification during March 2005 the Prime Minister's Office had noted that there is lack of authentic information about the social, economic and educational status of the Muslim community of India. The PMO had observed that such lack of information comes in the way of planning, formulating and implementing specific interventions, policies and programmes to address the issues relating to the socio-economic backwardness of this community. Hence, the Prime Minister's High Level Committee was mandated to obtain relevant information from departments / agencies of the Central and State Governments and also conduct an intensive literature survey to identify published data, articles and research on relevant status of Muslims in India. The Committee was to find out the asset base and income levels of Muslims relative to other groups across various states and regions. It had to find out the level of socio-economic development of Muslims in terms of relevant indicators such as religious rate, dropout rate, MMR, IMR etc. What is their relative share in public and private sector employment? Is this share in proportion to their population in various states? If not, what are the hurdles. The Report which was presented to the Prime Minister on 17 November 2006 and was tabled in Parliament on 30 November 2006 has twelve chapters. Chapter I is introductory. Chapter II talks of Public Perceptions and Perspectives gathered by the Committee during its widespread interaction with the people and their representatives while it visited 13 most Muslim populous states and organized 5 Round Table Conferences in Delhi. Chapter III deals with the population size, distribution and health conditions of Muslims etc. In the subsequent chapters the Committee has analyzed the educational condition of Muslims, their economy and employment, their access to bank credits, their access to social and physical infrastructure, their poverty level and standard of living, their participation in government employment and programmes and empirical situation of Muslim OBCs.

In the field of literacy, the Committee found that the rate among Muslims was far below the national average. The gap between Muslims and the general average is greater in urban areas and women. 25 per cent of Muslim children in the 6-14-year age group have either never attended school or have dropped out. Expansion of educational opportunities since Independence has not led to a convergence of attainment levels between Muslims and all others. Dropout rates among Muslims are higher at the level of primary, middle and higher secondary. The Committee observed that since artisanship is a dominant activity among Muslims technical training should be provided to even those who may not have completed schooling. The disparity in graduation attainment rates is widening since 1970s between Muslims and all other categories in both urban and rural areas. In premier colleges only one out of 25 under-graduate students and one out of 50 post-graduate students is a Muslim. Unemployment rate among Muslim graduates is the highest among all socio-religious communities. Only 3% of Muslim children among the school going age go to Madarsas. There is dearth of facilities for teaching Urdu. Lower enrolment in Urdu medium schools is due to limited availability of such schools at the elementary level.

### **Golden Age of Muslims**

Over the last 50 years there has been renewed interest in Islamic countries in examining the relationship between Islam and science in the spectrum of its history. After gaining independence most of the Islamic countries have been struggling to come to terms with their religious beliefs and the Western concepts of science and education. The education systems adopted by the most of the Islamic countries have been based on 'so-called secular Western education'. Consequently, a cultural dichotomy is observed in their societies between a traditional Islamic education on the one hand restricted to religious groups, and a secular Western education in main stream schools, colleges and universities. Education is viewed as a means of acquiring scientific knowledge and technology, in order to progress economically in the modern world. However, education has unsuccessfully tried to blend Islamic thinking with this Western education system (Al-Faruqi and Nasseef, 1981). The period between the seventh to the fifteenth centuries is considered as the 'Golden Age of Islamic Civilization'. During this period there was great emphasis on the pursuit of knowledge. Consequently, there were individuals who lived scholarly and pious lives, such as Ibn Sina, AlKhwarizmi, and Al-Biruni, who in addition to excellence in the study of religious texts also excelled in mathematics, geography, astronomy, physics, chemistry, and medicine. At this time Islam was not just a set of religious beliefs, but a set of ideas, ethics and ideals encompassing all aspects of human life. This resulted in the establishment of an Islamic civilization. Thus the motivating force of this civilization was its Islamic faith (used here both in the spiritual and temporal sense) and its language was Arabic (Khattani, 1976). While the progress of scientific knowledge in Europe languished during the Dark Ages, science flourished in the Golden Age of Islam. The renaissance that subsequently occurred in Europe might not have taken place without the contribution of Muslim science in the preceding period.

The Islamic Golden Age refers to a period in the history of Islam, traditionally dated from the 8th century to the 13th century, during which much of the historically Islamic world was ruled by various caliphates and science, economic development, and cultural works flourished. This period is traditionally understood to have begun during the reign of the

Abbasid caliph Harun al-Rashid (786–809) with the inauguration of the House of Wisdom in Baghdad, where scholars from various parts of the world with different cultural backgrounds were mandated to gather and translate all of the world's classical knowledge into the Arabic language.

The end of the age is variously given as 1258 with the Mongolian Sack of Baghdad, or 1492 with the completion of the Christian Reconquista of the Emirate of Granada in Al-Andalus, Iberian Peninsula. During the Golden Age, the major Islamic capital cities of Baghdad, Cairo, and Córdoba became the main intellectual centers for science, philosophy, medicine, and education. The government heavily patronized scholars, and the best scholars and notable translators, such as Hunayn ibn Ishaq, had salaries estimated to be the equivalent of those of professional athletes today.

The School of Nisibis and later the School of Edessa became centres of learning and transmission of classical wisdom. The House of Wisdom was a library, translation institute, and academy, and the Library of Alexandria and the Imperial Library of Constantinople housed new works of literature. Nestorian Christians played an important role in the formation of Arab culture, with the Jundishapur hospital and medical academy prominent in the late Sassanid, Umayyad, and early Abbasid periods. Notably, eight generations of the Nestorian Bukhtishu family served as private doctors to caliphs and sultans between the 8th and 11th centuries.

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## CHAPTER-5

### DNA BARCODING AND IDENTIFICATION OF MEDICINAL PLANTS IN SOUTH INDIA

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#### **ABSTRACT:**

*DNA barcoding is a simple and highly accurate technique which is widely used nowadays to identify the plants. For land plants, the core DNA markers are two sections of coding regions within the chloroplast, part of genes, *rbcL* and *matK*. We therefore tested the potential of *rbcL* Marker for the identification of wild plants belonging to diverse families and regions. The phylogenetic tree was constructed using maximum likelihood method to evaluate the changes in *rbcL* gene. This study showed that using *rbcL* gene sequences enabled identification of the majority of the samples (92%) to genus level and only 17% to species level.*

**Key words:** *DNA barcoding; *rbcL*; Wild plants; Identification; Phylogenetics.*

#### **INTRODUCTION: -**

DNA barcoding uses a single gene to identify a given species through comparison of nucleotides sequences in the DNA to that of the same gene in other species. Using DNA Barcoding, species identification and discovery are performed by using short and standard fragments of DNA, called as DNA markers. DNA barcoding was first invented by Hebert<sup>1</sup>. DNA marker is a sequence of genes whose location on the chromosome is known. DNA markers are short tandem repeats that are widely used in various fields for the identification of genes and species. In plant technology, DNA marker is used to identify the species of plants from their closely related species. Many markers like *MatK*, *rbcL*, *ITS*, *trnL-F*, *16s-rRNA* and *18S-rRNA* regions are being used as DNA barcodes in plants<sup>2</sup>. DNA barcoding involves the use of DNA marker to compare the same sequence with other species to identify the species of organisms. DNA barcoding is applicable in plants by combining two or three DNA markers to make a standardized plant barcode. From a given DNA barcoding marker, the genetic gaps between species can be identified<sup>3</sup>. The marker used in this study is *rbcL* gene. This gene is responsible for the first steps in photosynthesis in plants and has been well conserved throughout; it is not interrupted by introns, which illustrates one of several important advantages of the *rbcL* gene<sup>4</sup>. In this study, PCR was performed by isolating the DNA from a sample and then using a pair of oligonucleotides, commonly known as primers, to repeatedly amplify target DNA. To evaluate whether species were recovered as monophyletic with *rbcL* barcode primer, we used Neighbor-joining method for the construction of phylogenetic trees. The output data was processed using MEGA 10 to draw the phylogenetic trees. A total of 1000 bootstrap replicates were considered for the Neighbor-joining tree construction<sup>5</sup>



**MATERIALS AND METHOD: -****Sample collection: -**

Leaf samples of *Phyllanthus niruri* (Keelanelli leaves), *Heliotropium indicum* (vetiver leaves), *Boerhavia diffusa* (Punarnava leaves) were collected from Chennai, TamilNadu.

**Procedure of genomic DNA from Plant samples: -**

To 200 mg of plant tissue, 500 µl of CTAB buffer was added and the sample was incubated at 95 °c for 20 minutes. The sample was then centrifuged at 10,000 rpm for 10 minutes, to which supernatant 30% chloroform was added. It was again centrifuged at 10,000 rpm for 10 minutes adding supernatant 100% ethanol and incubated at -20°C for 30 minutes. Further, it was centrifuged at 10,000 rpm for 5 minutes and the supernatant was discarded and 70% ethanol added to the pellet. Finally centrifuged at 7000 rpm for 10 minutes and 30µl TE buffer was added to the pellet<sup>6</sup>

**Molecular Methods: -**

The obtained DNA sample from the leaves were amplified by PCR. A total volume of 30 µL PCR master mixtures contained the following: master mix, taq polymerase, dNTPS, buffer, magnesium chloride<sup>7</sup>. The composition of PCR mixture is given in Table 1. The PCR conditions were started with pre-initiation at 95°C for 5 min, followed by a total of 35 cycles of initiation at 94°C for 40 s, annealing at 55°C for 1 min, extension at 72°C for 30 s. The reaction was completed with a final extension at 72°C for 5 mins<sup>8</sup>.

**Table 1: Composition of ITS PCR mixture**

Composition	Quantity
Master MIX	12.5µL
Taq polymerase	1-2.5
DNTPS	20-200µM
Buffer [Tris, EDTA]	pH 8.3-8.
Magnesium Chloride	0.5-2.5 mM.

To the PCR mix contained ITS amplification reaction mixture (30µl) consisting of 2X master mix (Amplicon, Denmark), 10 ng of template DNA and 10 pmol of each primer were added. The primer designed for the PCR amplification process is given in Table 2. PCR amplification was performed in Agilent Sure Cyclor 8800° gradient PCR machine. The following cyclic conditions were performed Initial denaturation for 5 min at 95°C followed by 35 cycles of denaturation for 45 sec at 94°C; annealing for 1 min at 59°C; extension for 1 min at 72°C followed by a final extension at 72°C for 5 min. The amplified PCR products were separated using 1.2% agarose gel electrophoresis along with 1 kb ready to use DNA marker at 100 volt for 45 min at room temperature using 1X TAE buffer (Tris–acetate 40mM pH 8.0, EDTA 1mM, pH 8.0). The PCR products were stained with ethidium bromide and visualized and photographed using Gelstan gel documentation system. After separation the DNA fragments were purified and sequenced using DNA sequencing services employing the same primer used for PCR amplification.

**Table 2: Primers used for PCR Process**

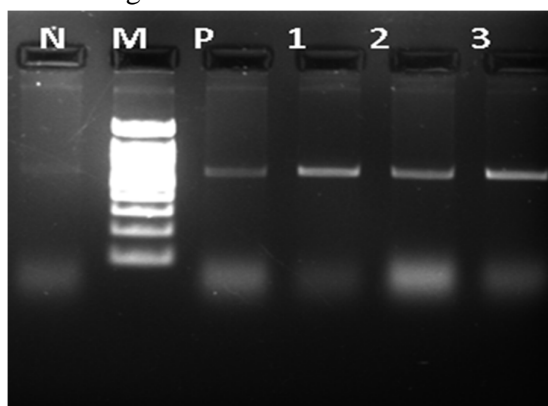
Marker	Primer	Sequence 5'-3'
rbcL	rbcLaF	ATGTCACCACAAACAGAGACTAAAG C
	rbcLaR	GTAAAATCAAGTCCACCRCG
	rbcL 1F	ATGTCACCACAAACAGAAAC
	rbcL 724R	TCGCATGTACCTGCAGTAGC

**Phylogenetic Tree Construction**

The sequences were edited using Bioedit software v 7.0.9<sup>9</sup>. The edited sequences were subjected to BLAST with Gen Bank Nucleotide Database (<http://www.ncbi.nlm.nih.gov/BLAST/>) using the algorithm Blast N<sup>10</sup>. The output of BLAST searches was sorted based on maximum identity with other genus or species names in GenBank records. The sequence based identity showed cut off of 97% or greater was considered as significant, and best hit was defined as the sequence with highest maximum identity to the query sequence. The overall outputs of BLAST and tree analysis were compared and alignments of the rbcL genes were performed using clustal W<sup>11</sup>. The phylogenetic tree was constructed using mega software version 10 and analyzed for the rbcL sequences, using Neighbour-Joining (NJ) method<sup>12,13</sup>.

**RESULT AND DISCUSSION: -**

The DNA from the leaves of *Phyllanthusniruri*, *Heliotropium indicum* and *Boerhavia diffusa* were amplified using the rbcL PCR primers and were sequenced successfully. The rbcL gene is reported to be highly successful for amplification and bidirectional sequencing. The amplified products were separated using agarose gel electrophoresis. Figure 1 depicts PCR amplification of rbcL gene tested by agarose gel electrophoresis. The amplified PCR products were subjected to DNA sequencing. The gene sequences of the plant isolates were deposited in GenBank and accession numbers were obtained. After sequencing, BLASTn analysis was performed to find the homologous sequences in the database. The BLAST results showed that the samples sequences were close to *Phyllanthusniruri*, *Heliotropium indicum* and *Boerhavia diffusa*. BLAST analysis provided the percent identity of sequences, which is the percentage of nucleotides in our sample matched with the nucleotide sequence of database genes. After alignment, phylogenetic tree was constructed for the sequence with its homologous sequences using Neighbour-joining method using MEGA software.

**Figure 1: PCR Amplified DNA from Plant samples.**

P- Positive control, N- Negative control, Marker DNA, Well 1- *Phyllanthus niruri*, well 2 *Heliotropium indicum* and well 3 *Boerhavia diffusa*

#### Phylogenetic tree: -

The phylogenetic tree was constructed using Mega software version 10. Phylogenetic tree was analysed for the *rbcl* sequences, using Neighbour-Joining (NJ) method. Figure 2, 3 and 4 represents the phylogenetic tree results of species of *Phyllanthus niruri*, *Heliotropium indicum*, *Boerhavia diffusa*. The phylogenetic tree of *Phyllanthus niruri* sequence showed that the sequence is 99% similar to *Phyllanthus amarus*. The similarities of the *Phyllanthus niruri* were in the range of 90-99%. A similar study involving the identification of various *Phyllanthus* species was performed using *rbcl* and also other markers<sup>14</sup>. The *Heliotropium indicum* sequence similarity ranged between 37-96%. A study using *nrITS* marker in different *Heliotropium* showed a low vegetative diversity in different *Heliotropium*<sup>15</sup>. The phylogenetic tree of *Boerhavia diffusa* showed 77% with the *Boerhavia diffusa* sequence in the database and the similarity ranged between 74-82%.

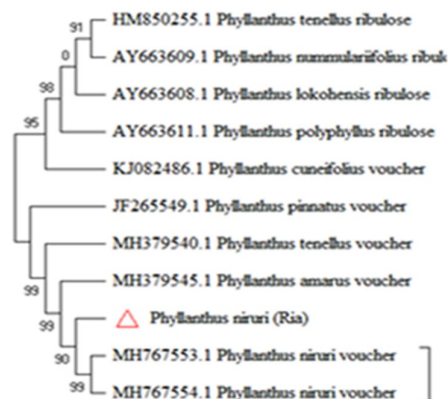


Figure 2. Phylogenetic tree of *Phyllanthus niruri*

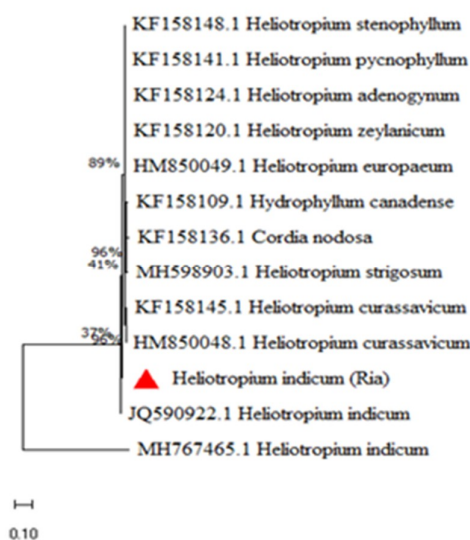


Figure 3. Phylogenetic tree of *Heliotropium indicum*



**Figure 4. Phylogenetic tree of *Boerhavia diffusa***

#### **CONCLUSION: -**

In this study, the DNA barcoding of *Phyllanthus niruri*, *Boerhavia diffusa*, *Heliotropium indicum* was performed. The sequences were analyzed with BLASTn to retrieve the homologous sequence. From the results of BLAST, sequences with highest similarity were used to construct phylogenetic tree. With the phylogenetic tree the evolutionary distances between the species were analyzed. The relationship between the species was analyzed based on rbcL region in the gene. Phylogenetic study is an easy and efficient method to identify and differentiate a species from their closely related species. This study shows that rbcL gene can be useful in the species level identification of medicinal plants and to understand the evolutionary distances.

#### **ACKNOWLEDGMENTS:**

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#### **CONFLICTS OF INTEREST:**

The authors declare that no conflict of interest.

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## CHAPTER-6

### INDIA'S EXPORT OF AGRICULTURE AND ALLIED PRODUCTS COMMODITIES DURING THE PERIOD 1990-91 TO 2019-20

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Guest Lecturer,  
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#### **ABSTRACT**

*Agriculture is the main occupation of the Indian peoples. Performance of Indian economy is dependent upon the growth of Agriculture sector. Agriculture can help reduce poverty, raise incomes and improve food security for 80 percent of the world's poor, who live in rural areas and work mainly in farming. Agriculture plays an important role in economic development, such as provision of food to the nation, enlarging exports, transfer of manpower to non-agricultural sectors, contribution to capital formation, and securing markets for industrialization. Agriculture forms the backbone of Indian economy and even though large industrialization in last 60 years, agriculture still occupies a place of pleasure. The entire data for the present study is collected from the secondary sources. The present paper highlights the growth and contribution of Agriculture and Allied products in total exports of India. Now a day's trade is being regarded as one of the indicators of development. No country can be self-dependent for its needs, various needs and requirements of countries of the world can only be fulfilled through international trade. India being a net exporter of agricultural commodities, the forex earnings by way of exports will lead to the import of capital goods which will pave way for the increased investment resulting in technological advances, eventually leading to improved productivity and efficiency. To accelerate the pace of economic development, reliance on international trade becomes desirable to muster foreign exchange. For the agrarian economies of developing countries like India, agricultural and allied commodities of exports seem to be the engine of the exports. A study about the performance of exports in this sector is important for India.*

#### **INTRODUCTION**

International trade is the main pillar of economic development. In this analysis, the growth rate, tendency and the percentage of Agricultural Commodities in total export. Trade implies the sale and purchase of goods and services when there is export and import of goods and services between two or more than two countries, it is called international trade. The global agriculture exports are valued at USD 1.76 trillion (2014) of which India's share is only 2.5%. The largest exporting nations include EU, USA, Brazil, China and Canada. Agriculture plays a vital role in India's economy. Over 58.4% of the rural households depend on agriculture as their principal means of livelihood. Agriculture, along with fisheries and forestry, is one of the largest contributors to the Gross Domestic Product (GDP). As per estimates by the Central Statistics Office (CSO), the share of agriculture and allied sectors (including agriculture, livestock, forestry and fishery) was 15.35% of the Gross Value Added (GVA) during 2015–16 at 2011–12 prices. Agricultural export constitutes 10.5% of the country's exports and is the fourth-largest exported principal commodity. Agriculture is the

mainstay of our rural economy. Each year, our 11 million farmers and farm workers cultivate around 16.9 million hectares of land with around 51 major field crops to feed more than 100 million of our countrymen and women. It contributes around 26 per cent of our gross national product (GNP) and supports 60 per cent employment in the rural areas. Indian agriculture has been going through a serious crisis during the post-reform period. Besides domestic concerns, such as decline in productivity, high input-cost, stagnated net-sown area, declining public sector investment, inadequate availability of institutional credit, depressing prices of farm products, and rising agricultural imports, Indian agriculture has also been facing external challenges under the WTO regime. In order to boldly face the challenges and avail the opportunity that may arise after successful implementation of Agreement on Agriculture (AoA), there is not only need to evolve a more conducive policy regime, credit, technology, processing, distribution, marketing and trade, but also there is an emergent need to develop a team of experts comprising eminent trade economists, policy analysts, scientists, legal experts and political scientists that may effectively protect our interests in the WTO. The inclusion of agriculture in the Uruguay Round (UR) of multilateral negotiations held prospects of achieving significant progress on reducing the policy-induced trade distortions in agricultural products.

### **COMPOSITION OF EXPORTS**

Composition of exports means goods that we are selling to other countries. At the time of Independence; our exports consisted mainly of agricultural products like Tea, Spices, Tobacco and other raw materials etc. We were also exporting cotton textiles and jute products in large quantities. With the industrialization of the economy, composition of exports have under gone a change, thereby the proportion of raw materials in our exports has declined while that of manufactured goods has increased. We are now exporting large quantities of items such as machinery and transport equipment, chemicals allied products, marine products, handicrafts, fish however export of items such as cotton fabric tea, jute manufactures, spices etc. also continue.

### **OBJECTIVES OF THE STUDY**

1. To find out the growth and trend of agricultural exports of India during the study period.
2. To analyse the share of Agriculture and Allied products in Exports of India and to suggest appropriate measures.

### **RESEARCH METHODOLOGY**

In the present study analysis was carried out to find out the total export of India and the export performance of Agriculture and Allied products. The study based on secondary data covering a period of thirty years, starting from 1990-91 to 2019-20. For this research paper secondary data collected from the various issues of Reports on currency and finance, Economic survey and Indian Journal of Agricultural economics, research journals, articles, research paper, books, websites etc. are used to collect secondary data and information. In this study, tabular and graphical representation tools and statistical techniques have been used to analyse the data.

### **REVIEW OF LITERATURE**

**Goldar, B., D. Pratap, et al. (2012)** studied the Impact of Tariff Reduction according to Doha Modalities on India's Trade of Agricultural Products. The trade data considered for

the analyses relates to 2006- 2009. Demand function was used for calculation of partial elasticities. The estimates indicated that the reductions in agricultural tariff rates will lead to an increase in India's imports of agricultural products by about 1%. An increase in its exports of agricultural products to the US and US markets by about 2% to 4%.

**Bhat (2011)** reported that the post reform period in India has witnessed significant changes in the trend, pattern and structure of external trade. The share of manufacturing sector has marginally fallen in the GDP and significantly declined in the share of export. The growth of services was more pronounced in GDP growth and is reflected in the increasing share of services in exports. The share of primary products has fallen in export and that of petroleum products showed an increase. The author hence reported that in near future India may emerge as an 'Asian Petroleum Hub. He further remarked that India has not taken the advantage of international segmentation of production process and the export is still heavily dominated by labour intensive products characterized by a slow growing international demand and protected markets.

**Ana I. Sanjuan-Lopez and P. J. Dawson (2010)** study the contribution of agricultural exports to economic growth in developing countries. The study estimates the relationship between GDP and agricultural and non-agricultural exports for 42 countries using panel co-integration methods. Results show that there is a long-run relationship between agricultural export and development of these countries. The agricultural export elasticity of GDP is 0.07 whereas that of non-agricultural exports is 0.13. Structural differences exist in the relationship by broad income group. Balanced export-promotion policies are implied for the poorest countries, but, for those with higher incomes, higher economic growth is achieved from non-agricultural exports.

**Pathak (2009)** in his research paper stated that the contribution of agriculture in growth of a nation is constituted by the growth of the products within the sector itself as well as the agricultural development permits the other sectors to develop by the goods produced in the domestic and international market.

#### **ANALYSIS OF AGRICULTURAL AND ALLIED PRODUCTS**

In the table, India's Export of Agricultural commodities since 1990-91 to 2019-20 is represented. It is evident from the table that during the period 1990-91 to 2019-20 the agricultural and allied products were fluctuated.

Indian agriculture is the most important sector absorbing about three-fourth of the labours force and contributing half of the total gross domestic product. Viewing the export of agricultural product from other angle, it can be seen that it formed 18.49% of total exports of the country in 1990-91. But this percentage declined to 15.23% in 1999-00 compared with 9.85% in 2010-11 and 11.19% in 2019-20. It indicated that though in absolute terms, the export of agricultural products are rising but as percentage of total exports, it consistently on the decline due to faster rise in the export from other sectors.

The export of agricultural and allied products amounted Rs. 6019 crores in the year 1990-91 which rose to Rs.24301 crores in the year 1990-00. It shows 4.04<sup>th</sup> fold over 1990-91. The export of agricultural and allied commodities became Rs.112522 in the year 2010-11 which rose to Rs.248385crores in the year 2019-20. It shows nearly 2.21<sup>th</sup> fold increase over 2010-11.



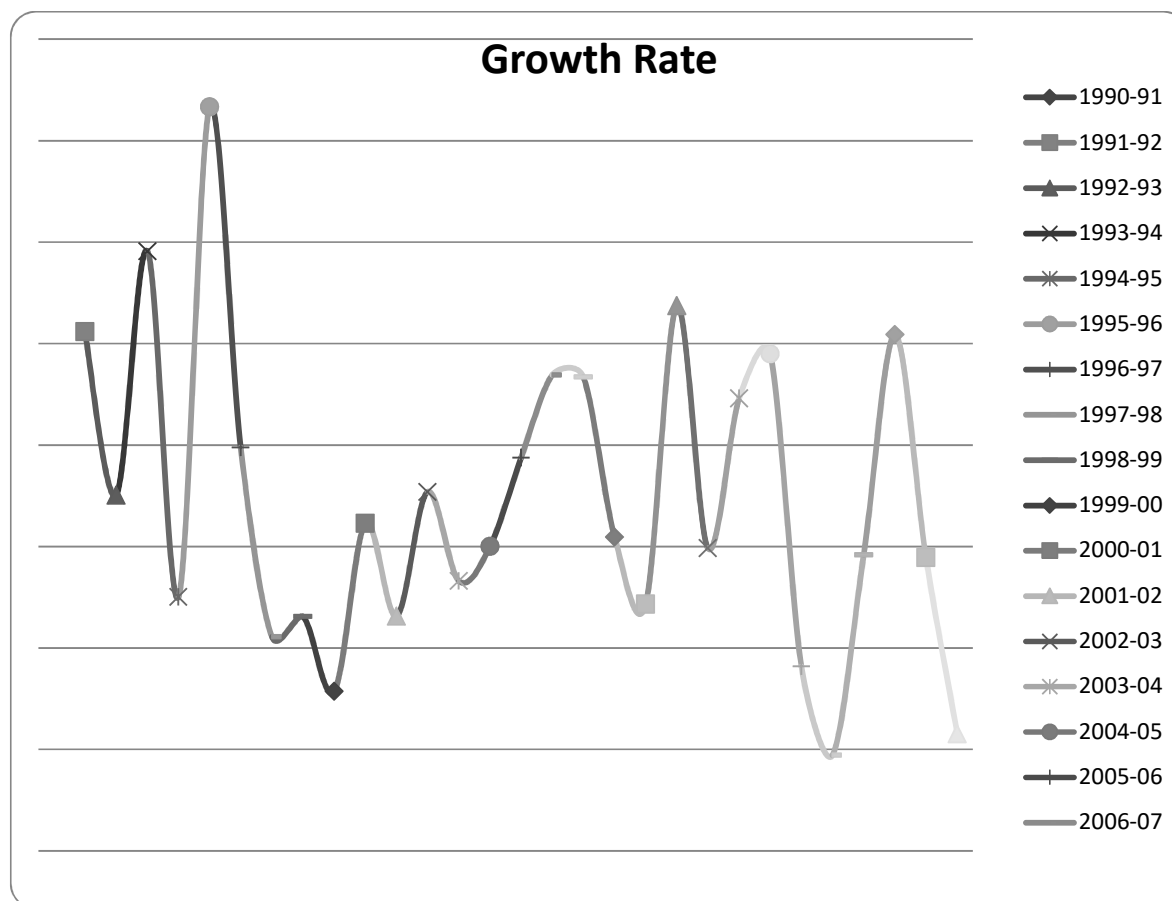
**TABLE-1**

**Trends in Total Export, Agriculture and Allied Products and Growth Rate  
(Rupees In Crores)**

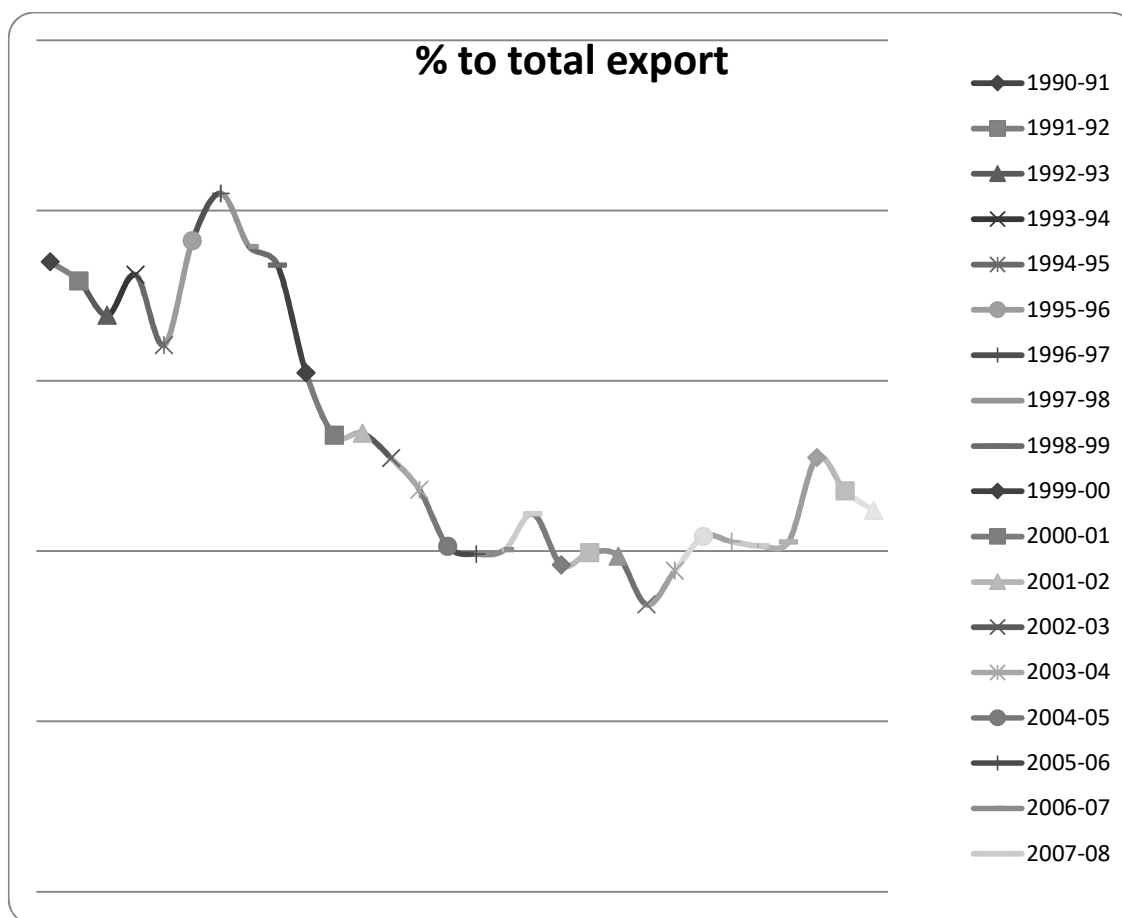
Year	Total Export	Agricultural & Allied Products of which	Growth Rate	% to total export
1990-91	32558	6019		18.49
1991-92	44042	7895	31.17	17.93
1992-93	53688	9082	15.04	16.92
1993-94	69751	12633	39.09	18.11
1994-95	82674	13270	5.04	16.05
1995-96	106465	20344	53.32	19.11
1996-97	118817	24363	19.75	20.50
1997-98	130101	24627	1.08	18.93
1998-99	137953	25388	3.09	18.40
1999-00	159561	24301	-4.28	15.23
2000-01	203571	27288	12.29	13.40
2001-02	209081	28144	3.14	13.46
2002-03	255137	32473	15.38	12.73
2003-04	293367	34616	6.60	11.80
2004-05	375340	38078	10.00	10.14
2005-06	456418	45220	18.76	9.91
2006-07	571779	57392	26.92	10.04
2007-08	655864	72710	26.69	11.09
2008-09	840755	80649	10.92	9.59
2009-10	845534	84136	4.32	9.95
2010-11	1142922	112522	33.74	9.85
2011-12	1465959	123590	9.84	8.43
2012-13	1634318	154010	24.61	9.42
2013-14	1905011	198630	28.97	10.43
2014-15	1896445	195000	-1.83	10.28
2015-16	1716378	174380	-10.57	10.16
2016-17	1854096	190400	9.19	10.27
2017-18	1956515	249182	30.87	12.74
2018-19	2307726	271358	8.90	11.76
2019-20	2219854	248385	-8.47	11.19

*Source: RBI Handbook of Statistics on Indian Economy*

Compound Annual Growth Rate (in %)		
Year	Total Export	Agricultural & Allied Products
1990-2000	17.23	14.98
2001-2010	15.30	11.92
2011-2020	6.86	8.24



Trends in Export of Total Agricultural and Allied Products



The maximum export of agricultural products were Rs.2,48,385 crores in the year 2019-20 while the minimum exports of agricultural exports were Rs.6019 crores in 1990-91. The agricultural exports compound growth rate for the period 1990-91 to 1999-00 stood at 14.98, while the compound growth rate for the period 2000-01 to 2009-10 stood 11.92% and the compound growth rate for the period 2010-11 to 2019-20 stood at 8.24%, it shows the decline in the agricultural exports. Thus, it shows growth rate of agricultural export was declined. The Indian agricultural exports just about managed to keep pace with the rate of growth of world exports in these commodities. In the wake of recent efforts of liberalization policies of foreign trade by Indian Government and affecting GATT treaty since January 1995, export of agricultural commodities requires a fresh look.

### CONCLUSION AND SUGGESTIONS

For the economic development of any country the necessary thing is foreign trade. By foreign trade we mean the sale and purchase of goods and services. Trade can be local, regional and international. But generally trade is considered as internal trade and international trade. The international trade, increase in co-operation, consumption of surplus production, availability of raw material, fighting against natural calamities, incentive to rationalization and modernization, division of labour, cultural relation, foreign exchange

To conclude from the topic entitled “India’s export of Agricultural Commodities” that the export of agricultural commodities increased in total export. The export of agricultural and

allied products amounted Rs.6019 crore in the 1990-91 which rose to Rs. 248385 crore in the year 2019-20.

Though after the New Economic Reforms the export has increased but the increase in export is not that much which could do away the trade deficit. Therefore, it suggested that the export is required to be increased more. The balance of trade should be controlled. Otherwise the development programme cannot be undertaken successfully as the foreign currencies go out when imports are greater than export. An important step to reduce deficit in India's balance of payments is to promote India's exports to the maximize exports earnings as stimulus to economic development.

- India should produce qualitative goods and make the economy export oriented. With this only it can capture the world market and earn valuable foreign exchanges.
- The inflationary pressure on the economy should be checked. It is due to the fact that the inflation taken out the fruits of the development. It results into the loss of market, investment and into the trade.
- India should have her strict and self-imposed stand over the New Economic Reforms. She should continue following New Economic Reform so that the seeds of the policy are reaped in the future.
- India should try to search new horizons in the trading partners. India has got a number of advantages to have good trade with Asian developing countries and African countries. India can strengthen its trade with the countries of newly disintegrated USSR. India has vast scope to have good trade with the countries of the American regions. Therefore, it is required that India should maintain its more dynamic export oriented trade policy.
- Moreover, India should try to export the agricultural products in manufactured or processed form because now-a-days consumer prefer goods in manufactured form rather than in raw forms. Rather, processed agricultural goods would certainly fetch higher prices in the international market in comparison to their raw form, in turn which will result in some higher export earnings.

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## CHAPTER-7

### SILVER NANOPARTICLES, IT'S SYNTHESIS AND CANCER THERAPY - A REVIEW

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#### **ABSTRACT:**

*With the development in the field of nanotechnology, there has been a significant increase in the usage of nanoparticles within the field of biomedical and biotechnology. The promising property of nanoparticles have got them included in multiple fields beyond and within science and biology. Nanoparticles come in a size range of about 1 - 100 nm (nanometer). Out of all the nanoparticles, the Silver Nanoparticles (AgNPs) has been the most discovered and extensively covers the enlarged field of science and technology. The recent studies of AgNPs, it has wide applications with the biological activities and physiochemical therapeutic properties. With having a stronghold over the biological activities, the anti-cancer, anti-fungal, anti-viral, and anti-bacterial, has utmost potential with areas flourished throughout the field. Recent researches have been proving AgNPs are the most successful usages in cancer therapy. Silver Nanoparticles have proved their uniqueness with every anti-cancer activity and their potential to approach each and delivery specific cytotoxicity. With the Silver Nanoparticles being synthesized with several methods as biological synthesis and green synthesis, there are multiple danger elimination factors at priority. In this review, the studies of Silver Nanoparticles are done in accordance with their methods of synthesis and wide applications they carry in cancer therapy.*

**KEYWORDS:** Nanotechnology, Nanomaterials, Silver Nanoparticles (AgNPs), Cancer Therapy, Anti-Cancer.

#### **1. INTRODUCTION**

Nanotechnology has been a developing field with conjugate fields, say medicine, biomaterials, and biotechnology. After introducing nanomedicine, the researchers have been interested in restoring the health care system, thereby finding cures to diseases with a high-efficiency rate being the final goal. Nanotechnology has more significant potential as the 10 nanometers (nm) to 1000 nm materials can manipulate the design, synthesis, and structure of the bodily organisation. These properties are significant for the physical and chemical changes that occur in a particular disease. Nanotechnology can have their products made economical to promote their usage and have a unique perspective towards the health care industry. [1]

Nanotechnology has paved a new path that has discovered aspects of fighting and preventing diseases using nanoscale materials. With this ability, the biosystems can be dissembled, and the research can be successful enough to manipulate their structure and function, leading to significant improvements in biotechnology, medicine, biomedical, and healthcare, majorly biology. The size of nanomaterials and their research and applications are

essential in integrating biomaterials with helpful in both in vivo and in vitro. The nanomaterials integration with the field of biology has sped up the process of development towards diagnostic devices, analytical tools, drug delivery capsules, therapy applications, and much more. [2]

Nanoparticle's production and manufacturing is very crucial as these are the essential component of nanotechnology. The specific properties of action induced within the nanoparticles, aka nanocrystal, are then assembled as the precursor particles to be used as the nanostructured materials for the related structures. The generation of carbon black is the nanoparticles that have been empirically synthesized for over a thousand years. The promising property of nanoparticles have got them included in multiple fields beyond and within science and biology, say the hard disks in computers, photography systems, dispersion with novel optoelectronic properties, bio detectors, lasers of new generation, chemical catalysts, drug delivery system, nanoparticle reinforced material, inkjet systems and printers, colorants, chips and much more. [3]

### **1.1 NANOTECHNOLOGY AND SILVER NANOPARTICLES (AgNPs)**

Silver has been known as the compound to have medicinal and preservative properties for over 20 Centuries. With the silver vessels and other products in use they have wide applications in medicine as wound therapy, burns, and being bactericidal. With the discovery of silver being engineered into nanoparticles of size 1 - 100 nms, silver has got a new path to pave. With having a small size, the silver nanoparticles (AgNPs) fit right in the nanoparticle's activity range of ratio. Also, the property is distinctly different from the other bulky metal compounds, thereby AgNPs have attracted focused attention of researchers and have found several applications in the areas of research in technology, medicine, textile, bioengineering, electronics, optics, water treatment, and much more. With the recent developments, AgNPs are widely known to have anti-bacterial, anti-fungal, and anti-cancer development applications. [4]

As compared to silvers original solid form, AgNPs have a much larger surface area that increases the efficiency and serves the industries which uses it as biomedicine. [5] Nanotechnology has the range of applications in field of biology and engineering that employs the development of silver nanoparticles as an equipment to diagnose, the more sensitive and specific diseases. The most interesting application that can come out of research and development is the nanomedicine. The never-ending need of targeted therapy for each patient with a chronic disease is to be found. With the possibility of development, nanomedicine has site-specific applications that can decrease the toxicity levels of a certain disease say cancer therapy.

Such nanomaterials as AgNPs have a broad spectrum of coverage and can be further advanced to improve the drug delivery and serve as an ideal vehicle for the drug transport to the cancer cell. [6] While AgNPs holds potential with drug delivery there are methods of silver nanoparticles synthesis that needs to be studied to proceed.

## **2. SYNTHESIS OF SILVER NANOPARTICLES**

Silver Nanoparticles are synthesized using the chemical, physical, or biological methods of synthesis that has sol gel process, chemical precipitation, laser ablation, green synthesis, microbial extraction and many more processes.

## 2.1 PHYSICAL METHOD OF SYNTHESIS OF AgNPs

The physical synthesis is regarded to be the most common method of synthesis for silver nanoparticles. The process of evaporation and condensation are the ones that successfully obtain the AgNPs with the presence of tube furnace and atmospheric pressure. The physical approach when compared with the other method of approaches has a wide gradient to be considered.

The laser ablation is another physical method that gains with silver nanoparticles. The particle characteristics depends on the varied factors used within the experiment as the laser wavelength, pulse duration, ablation time, medium used, surfactant presence, laser fluence. Laser ablation has an advantage for the physical approach that it has no chemical involved and gains pure AgNPs without any chemical contamination. [7]

Other conventional methods that have physical approach are spark discharging and pyrolysis for the synthesis of AgNPs. The advantage that backs up the physical methods are that they occur at speed, radiation that acts as reducing agent, no chemicals or hazardous substances involved and minimal contamination. [8]

## 2.2 CHEMICAL METHOD OF SYNTHESIS OF AgNPs

The chemical synthesis of silver nanoparticles are the ones that are successfully done with the synthesis of our AgNPs with multiple methods. One of them is the 50ml of  $10^{-3}$  M of silver nitrate solution, heating at a certain temperature. The 1% tri-sodium citrate is added dropwise up to 5 ml. The process of dropwise adding is sidebyside done with vigorously mixing and heating the solution. The color change is evident with brown pigmented change that is removed from the heating solution which is stirred until it cools to match the room temperature. Such a process results in the aqueous solution being lyophilized and powdered silver nanoparticles are obtained at the end of the analysis and procedure. [9]

The chemical method of synthesis for AgNPs are also possible from the chemical reduction method that has unique approach by organic and inorganic reducing agents. The several reducing agents are used to get the silver ions reduced in the solutions both aqueous and non-aqueous. The reducing agents are usually the sodium citrate, ascorbate, sodium borohydride, elemental hydrogen, tollens reagent, ethylene glycol-block polymers, N, N - dimethylformamide.

These reducing agents take role in reducing Ag ions and lead the formation for silver metal, that is taken ahead by agglomeration into oligomeric clusters. These clusters are the ones that form metallic colloidal silver particles which are the ones that act as protection agents to stabilize disperse nanoparticles. These act at the time of silver nanoparticles preparation stage and protect the silver nanoparticles that can get absorbed or binded to the surfactant preventing their agglomeration. The presence includes the surfactant functions as the amines, thiols, acids, and alcohols. While interactions with AgNPs can protect them from the further breakdown or reactions as sedimentation, agglomeration, or the possibility of losing surface properties. [10]

Iso, the methods that uses the chemical reduction of silver salts along the reducing agents as borohydrate in aqueous solution, say the reduction of silver acetylacetonate with dimethyl-amine-borane in presence of a surfactant that is fluorinated in supercritical CO<sub>2</sub>. Also, the reduction of silver iodide along alkali metal in NH<sub>3</sub>. The silver nanoparticles are the ones that produced with different chemical methods and others as mentioned in this review.



### **2.3 ELECTROCHEMICAL METHOD OF SYNTHESIS OF AgNPs**

The electrochemical method of synthesis has the foremost method of AgNPs synthesis that has silver polarisation in the organic solvents which when carried has the stability complexes and silver electrodeposition. The AgNPs production with the electrochemical process has the silver electrode of a usual higher range to obtain potential deposition. [11]

Also, the process of electrochemical method of synthesis of AgNPs have the usage of metal sheet that is anodically dissolved with the intermediate metal salt that is reduced at the cathode. This gives rise to the metal particles that is stabilised by the tetraalkylammonium salts. The process has advantage as it results in higher purity measures of the AgNPs. Precise particle-size can also be controlled that has the potential to get achieved with adjusting the current density that is in the electrochemical solution. There are varied factors that are of concern when silver nanoparticles are to be synthesized say type of electrode, choice of right solvent, supporting electrolyte rod, current density of the solution. The optical properties are also been the ones to be investigated with the years of synthesis methods. [12]

### **2.4 BIOLOGICAL METHOD OF SYNTHESIS OF AgNPs**

Biological method of synthesis of silver nanoparticles are the most efficient and cost-effective method that is ecofriendly and has the capability to replace the above methods of synthesis. The above methods are regarded to be toxic and costly; the biological method can serve as the right replacement to the synthesis using both plants and microorganisms.

Also, plant synthesis method has an upper hand over the microorganisms as they have easy availability, and are non-biohazardous that are devoid of cell cultures maintenance. The integration of nanoparticles with biological molecules has led to a different progressive path in the diagnostic devices and result as an essential tool in cancer therapy. The biological synthesis method of silver nanoparticles production has got into popularity and opened a wide dimension that has achieved a commercial space recently. [13]

The biological method of synthesis of silver nanoparticles are the ones divided into the following two categories. [14]

#### **2.5 Microbial Based Synthesis of AgNPs**

Microorganisms are the ones which sustain in the extreme conditions and have remarkable ability to fight the metal ions that are present in those environments. With the metal interactions of microorganisms there is an important biotechnological application that includes the bioremediation. Also, it is regarded as the potential bio factory for the synthesis of silver nanoparticles. It is an ecofriendly and cost-effective method when compared to all those chemicals and physical equipment methods that are executed to produce silver nanoparticles. [15]

Microbes are considered the possibility factory that has the most economical and environment friendly process for the synthesis of silver nanoparticles. With being toxic friendly and has no chemical usage, there is no power energy required in the synthesis procedure. The microorganisms have the potential ability to detoxify heavy metal with the help of the reductase enzyme in them and the reduced metal salts to silver nanomaterials. Microbes are the ones that can produce silver nanoparticles with nano size distribution and polydispersity factor. Microorganisms as the bacteria, fungi, actinomycetes, yeasts are all major producers of AgNPs. [16]

Amongst all the microbes, the prokaryotic bacteria have been recognized to carry the utmost potential for the biological synthesis of silver nanoparticles. Microbial resistance plays a major factor against the heavy metals as iron, cobalt, nickel, zinc, copper, cadmium, lead. These have greater potential to carry out mechanisms that leads to formation of silver nanoparticles that are synthesized by the bacteria or microbe that is resistant by the silver metal. [17]

## **2.6 Plant Based Synthesis of AgNPs**

When the plant-based synthesis is taken in consideration there is secretion of functional molecules from them that is compatible with green chemistry and gives out the ecofriendly property that can be employed with a reducing agent. Also, it can be used as a capping agent in the reaction. With synthesizing the silver nanoparticles using plants as the major things, there is no toxicity induced and are ideal for synthesis with direct formation of AgNPs in their extract solution. [18]

The broad spectrum of AgNPs issynthesized with various plant-based methods that are to avoid the toxicity and damage to the environment. With the extensive usage of plants, the green chemistry has been hovering as a major method to develop AgNPs. *Ocimum sanctum* or Tulsi, is one of the traditional medicinal plants found in India and is also a potential bio-reductant and stabilizer. The leaf extract of the *Ocimum sanctum* leaf when dried and done the further analysis has the potential for green synthesis of AgNPs. [19]

Synthesis of AgNPs using plants can be actually bio-compatible which eliminates the problem that comes with the chemicals and else. The use of plant extract can be advantageous with the environmental processes that can eliminate the process of cell cultures which can turn out to be benign. [20]

## **3. NANOTECHNOLOGY AND CANCER THERAPY**

Cancer has been a prime concern for death worldwide. And there have been advancements in technologies to develop treatments that can detect it at the earliest stages. With this the survival rates are to become higher. With the recent advancements in nanotechnology as a possible element in cancer diagnosis and treatment there has been wide research for the same. With nanotechnology serving for diagnosis and treatment of the cancer, there has been improved early detection and diagnosis with the imaging that has been possible.

Nanotechnology have been emerging on the frontiers in cancer treatment that includes right from the detection and site recognition to serve as with a procedure that introduced targeted drug therapy at the cancer cell. [21]

### **3.1 SILVER NANOPARTICLES IN CANCER THERAPY**

AgNPs have been excelling in delivering good anti-cancer activities in the cancer types such as breast cancer, colon cancer, ovarian cancer, pancreaticductal cancer, lung cancer, hepatocellular cancer, melanoma, osteosarcoma, and much more. Several studies have proven the AgNPs to be beneficial in successfully promoting anti-cancer behaviors with variation in their size, dose concentration, shape and texture and other factors of the cancel cell of target as their composition, pH, cell lines, and else. The AgNPs with spherical shape has better cytotoxicity compared to other shapes and structures. [22]

The silver nanoparticles have a good antitumor activity that promotes the apoptosis in cancer cells without leading to any damage to the other healthy cells. [23] Now, we can have

a detailed look on the below Silver Nanoparticles role in different types of cancers that are majorly affecting the world. The AgNPs being dose-dependent has capable efficacy with the pathogens as well as human cancer cells. The application in being the anti-cancer agent and having imaging capability has made AgNPs more in link for cancer therapy. [24]

### **3.2 SILVER NANOPARTICLES IN CANCER THERAPY**

The application of silver nanoparticles is distributed both in diagnostic and therapeutic purposes that are addressed in the laboratory. With the nanoparticles serving the functionalities of targeted delivery, chemotherapeutic agents, and varied approaches against the cancer cell lines have shown efficient progress. Recently the cancer treatment, diagnosis, prevention are all done based on the photo therapeutic approaches of silver nanoparticles. These nanoparticles having the capability to destroy and develop the sensitive specificity is greater with therapeutic efficiency. The AgNPs derived from different sources and their specifications in showing toxicity towards a certain cancer is diverse. [25]

### **4. CONCLUSION AND FUTURE ASPECTS**

The initial knowledge that biomedical field has in the area of cancer has been widely developed and explored with AgNPs. It has come for showing potential for detecting and imaging of tumors and serving as drug delivery vectors, angiogenesis inhibitors, and tumor growth inhibitors. [26] The use of AgNPs is regarded as safe and efficient method that serves the field not only with anticancer therapy and diagnosis but with being a part of nanomedicine and raising the bar to detecting in imaging, biosensing systems, and having stability in these nanostructures. [27]

Biological synthesis being the optimal method, the AgNPs has captured a large area of biotechnology and has shown its potential in being the variety in research and diagnosis concentration on applications in medicine. [28] With being known wide for its important contribution in cancer and creating a revolution in cancer therapy and diagnosis, AgNPs have a potential greater in the future.

With the undetectable toxicity by usage of the biological activity method for AgNPs, there is a bright compatibility for the usage of same for the treatment of cancer. [29]

Silver Nanoparticles have proved their uniqueness with every anti-cancer activity and their potential to approach each and delivery specific cytotoxicity. Future challenges for the silver nanoparticles synthesis comes just with a small concern on releasing them in the environment. With the scaling aspect of silver nanoparticles, the future holds more efficient and effective solutions to the cancer therapy domain. [30]

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## CHAPTER-8

### CHARACTERISTICS OF MARINE SPONGES AND ITS ANTIVIRAL DRUG DISCOVERY

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#### **ABSTRACT:**

*Natural merchandise is a concept to be a wealthy supply of novel chemical systems that would cause healing drug treatments for numerous sicknesses. Approximately half of the medication brought to the marketplace are herbal merchandise/derivatives or herbal product mimics. The recent two decades demonstrate the significance of herbal merchandise in drug development. Current programs of molecular microbial ecology strategies to sponge microbe relationships have provided a glimpse into the kind of those microbial groups this is only "the end of the iceberg," in line with the researchers. In phrases of the variety in their secondary metabolites, marine sponges appeared as a gold mine beyond 50 years. Sponges (phylum Porifera) are sessile marine clear out feeders which have set up vital protection mechanisms in opposition to overseas attackers along with viruses, bacteria, or eukaryotic organisms. Sponges are sessile marine clear-out feeders with well-advanced protection mechanisms in opposition to alien invaders like viruses, bacteria, and eukaryotic species. One of the maximum ample reasserts of pharmacologically energetic compounds from marine creatures is marine sponges. Sponges can also additionally, sooner or later, offer medicines to deal with extreme sicknesses along with cancer, numerous viral infections, malaria, and inflammation. This evidence is one of the leading vital factors of turning bioactive materials into drug treatments. In this evaluation essay, we can improve awareness of the geographical factors of sponges and their antiviral drugs.*

**KEYWORDS:** *sponges, marine natural products, cancer, inflammation, antiviral.*

#### **1. INTRODUCTION:**

Marine sponges (Porifera) have gotten a lot of interest from scientists across the board. Sponges have left extraordinary fossil records, which have been studied by both palaeontologists and evolutionary biologists (Sagar et al. 2013). Sponges are sessile animals that circulate in marine or freshwater from the deep sea to the coast (Sipkema et al. 2005). They are abundant among marine species, particularly deep-sea species. Anticancer, antibacterial, antifungal, antiviral, antiprotozoal, anthelmintic, anti-inflammatory, immunosuppressive, neurosuppressive, and antifouling actions have been demonstrated in bioactive substances derived from sponges or related microbes (Osinga, Tramper, and Wijffels 1999). The chemical diversity of sponge materials is astounding. Other chemicals have been identified from sponges or their associated bacteria, including bioactive terpenes, sterols, cyclic peptides, alkaloids, fatty acids, peroxides, and amino acid derivatives (which are repeatedly halogenated).

## 2. HISTORY:

For thousands of years, sponges have been used as a commodity. Sponge farming was prevalent in the Mediterranean in the mid-nineteenth century. When it comes to the variety of marine compounds, sponges are the most important producers. Marine sponges produce roughly 5300 different natural chemicals and novel compounds (Osinga, Tramper, and Wijffels 1999). The discovery of the nucleosides spongothymidine and spongouridine in the sea sponge *Cryptotethia crypto* in the early 1950s sparked pharmaceutical interest in sponges (Hentschel et al. 2003). These nucleosides were used to make ara-C, the first marine-derived anticancer medication, and ara-A, an antiviral medicine. Ara-C is now used to treat leukaemia and lymphoma patients (Laport, Santos, and Muricy 2009). At the same time, it was discovered that several lipid components, such as fatty acids, sterols, and other unsaponifiable compounds, are found in lower invertebrates in significantly higher diversity than invertebrate animals (Mohammad F. Mehbub et al. 2016).



**Figure 2.1: Demospongiae**



**Figure 2.2: hexactinellida**

## 3. BIOLOGICAL CHARACTERISTICS OF SPONGES:

Sponges are the crudest multicellular organisms; they comprise relatively autonomous cells portrayed by fluidity and separation potential. Most sponge organic exercises (for example, feeding, propagation, and gas trade) are finished and constrained by current (Mohammad F. Mehbub et al. 2016). For example, Flagellated choanocytes in choanocyte chambers can remove food particles from water. Sponge classification is currently based on the spicule, dividing sponges into four classes: Calcarea, Demospongiae, Hexactinellida, and Archaeotyatha (Anjum et al. 2016) (El-Demerdash et al. 2019). Sponge reproduction is known to occur both asexually and sexually. The majority of sponges reproduce sexually. Sponges generate sperm and eggs at different times of the year. Sponge sperm are transformed into eggs with the help of archeocytes (Sagar, Kaur, and Minneman 2010) (Belarbi et al. 2003).

## 4. GEOGRAPHICAL DISTRIBUTION:

Sponges can be found all across the planet, from the poles to the tropics. They can be found in rivers and streams, as well as in rock pools and deep ocean depths, and frigid arctic

seas as well as warm tropical seas (Mohammad Ferdous Mehbub et al. 2014). Sponges can be found in large quantities on hard surfaces such as rocks. The phylum Porifera includes sponges, which are primitive multicellular aquatic creatures. They are estimated to number 5,000 species and can be found clinging to surfaces from the intertidal zone to depths of 8,500 metres (29,000 feet) or more in all seas (Ravichandran, Kathiresan, and Balaram 2007). Although 99 percent of sponges live in seawater, sponges formed of spongin fibre can be found in freshwater. Sponges can be connected to surfaces as deep as 8 kilometres below the ocean's surface on the ocean floor (Mollica et al. 2012). Freshwater sponges grow on solid submerged items in fresh, clear streams, lakes, and rivers. Their existence implies high water quality and minimal contaminants because they are sensitive to water conditions (Andavan and Lemmens-Gruber 2010).

## 5. CULTIVATION:

### 5.1 *In situ culture*

Growing sponges in their natural environment on artificial structures such as longlines with scallop lamps, vertical ropes, underwater platforms, frames, and cages are known as sea-based sponge culture (also known as mariculture or *in situ* culture (Kennedy, Marchesi, and Dobson 2007). Donor sponges collected from the wild are frequently artificially fragmented by cutting them into tiny parts known as explants to begin sponge mariculture. The explants are then attached to a synthetic substrate, such as ropes, nylon lines, plastic plates, or placed in nets or cages (Bayona, Videnova, and Choi 2018). The fracturing concept sponges into explants date back to the nineteenth century (see historical perspective by Pronzato and Manconi, 2008) (Monks et al. 2002). Schmidt (1863) was the first to publish a scientific report on fractured sponge mariculture (Santos et al. 2019).

Species	Method	Location	Survival (%)	Growth rate reported	Estimated SGR (day <sup>-1</sup> )	Reference
<i>Diacarnus erythraeus</i>	Attached with steel wires to PVC plates on frames	Red Sea, 20 m	70	79.3% year <sup>-1</sup>	0.0016	Bergman <i>et al.</i> (2011)
<i>Lissodendoryx</i> sp.	Scallop lanterns	Wellington Harbour, New Zealand	n.d.	5000% month <sup>-1</sup>	0.131	Battershill and Page (1996)
<i>Mycale cecilia</i>	Bound to ceramic tiles	Mexican Pacific, 3–6 m	95	207% in 60 days	0.0187	Carballo <i>et al.</i> (2010)
<i>Mycale hentcheli</i>	Horizontal ropes, F0 generation explants	Pelorus Sound, New Zealand, near mussel farm, 5–10 m	n.d.	1355–2437% year <sup>-1</sup>	0.0073–0.0089	Page <i>et al.</i> (2011)
<i>Mycale hentcheli</i>	Horizontal ropes, F1 generation explants	Pelorus Sound, New Zealand, near mussel farm, 5–10 m	n.d.	359% year <sup>-1</sup>	0.0042	Page <i>et al.</i> (2011)
<i>Mycale hentcheli</i>	Horizontal ropes, F2 generation explants	Pelorus Sound, New Zealand, near mussel farm, 5–10 m	n.d.	–157% year <sup>-1</sup>	Negative	Page <i>et al.</i> (2011)

The abbreviation n.d. means "not determined". Estimated specific growth rates (SGR) per day were calculated assuming first-order kinetics (Šipkema *et al.*, 2006).

**Table 5.1.1: Growth rates and survival percentages of sponges in mariculture**



### 5.2. *Sponge mariculture design concepts*

Several studies have established the viability of mariculture for the commercial production of sponges, leading to the conclusion that mariculture is a viable supply method (Wijffels 2008). A different conclusion is that good cultivation processes are species-specific to a significant extent and site-specific (the latter being exemplified by the case study). *D. avara* yielded contradictory results in two separate Mediterranean locations (Mohammad F. Mehbub et al. 2016) (Osinga, Tramper, and Wijffels 1999).

Surprisingly, there have not been many studies on sponge aquaculture design principles. The following is an example of a simple design model

$Y = \frac{1}{4} N_{exp} P_{exp}$

### 5.3. *Ex situ culture*

Keeping sponges alive in ex situ systems like aquaria is a complex undertaking. Although there are few success stories (see Table 2 for an overview of sponge growth rates in aquaria), some progress has been made in better understanding sponge culture requirements (Asif 2016). Continuous addition of ferric iron (Fe<sup>3+</sup>; given as ferric citrate) to aquarium water promoted oscular production and pumping activity in the Mediterranean sponges *C. Reniformis* and *Acanthella acuta*, according to Osinga and Kotterman (2007) (Teng et al. 2020). *Avara* pumping behaviour. This species produces delicate exhalant structures flattened by drag forces generated by more excellent flow rates. Greater than 7.5 cm s<sup>-1</sup>) *D. Avara* only grows in sheltered areas in natural habitats with an average (oscillating) flow of less than 5.9 cm s<sup>-1</sup>).

Species	Food	Survival (%)	Growth rate reported	Estimated SGR (day <sup>-1</sup> )	Reference
<i>Axinella corrugata</i>	Four bacterial strains, <i>Isochrysis galbana</i> , <i>Thalassiosira weissflogii</i> and <i>S. cerevisiae</i>	100	22% in 8 weeks	0.0036	Duckworth et al. (2003)
<i>Chondrosia reniformis</i>	Algae powder from <i>Phaeodactylum tricornutum</i> and fish powder	100	0.0067 day <sup>-1</sup>	0.0067	Sipkema et al. (2006)
<i>Crambe crambe</i>	RPMI 1640 commercial medium enriched with amino acids and 20% extract of <i>Octopus vulgaris</i>	n.d.	400% in 100 days	0.0161	Garcia Camacho et al. (2006b)
<i>Dysidea avara</i>	<i>Phaeodactylum tricornutum</i>	100	0.1–0.028 day <sup>-1</sup>	0.01–0.028	Sipkema et al. (2006)
<i>Halichondria melanadocia</i>	Four bacterial strains: <i>M. halophilus</i> , <i>V. alginolyticus</i> , <i>E. coli</i> and <i>B. subtilis</i>	50–100	0.08% day <sup>-1</sup>	0.0008	Duckworth and Pomponi (2005)
<i>Halichondria melanadocia</i>	Two bacterial strains, <i>Isochrysis galbana</i> and <i>Saccharomyces cerevisiae</i>	50–100	0.60% day <sup>-1</sup>	0.006	Duckworth and Pomponi (2005)
<i>Hymeniacidon perleve (juveniles)</i>	<i>Isochrysis galbana</i> and photosynthetic bacteria	65	2900% in 43 days	0.078	Xue and Zhang (2009)
<i>Mycale cecilia</i>	<i>Isochrysis</i> sp., <i>Tetraselmis</i> sp., powdered yeast	65	65% in 60 days	0.0084	Carballo et al. (2010)
<i>Pseudosuberites andrewsi</i>	<i>Phaeodactylum tricornutum</i> or an extract of <i>P. tricornutum</i>	100	2% day <sup>-1</sup>	0.02	Osinga et al. (2003)

Estimated specific growth rates (SGR) per day were calculated assuming first-order kinetics (Sipkema et al., 2006).

**Table 5.3.1: Growth and survival of sponges in ex situ systems**

#### 5.4. Metabolite production in aquaculture

The ability of cultivated sponges to produce the metabolites of interest is critical for the commercial production of sponge metabolites through aquaculture. Some of the papers mentioned above include information on the cultivated sponges' generation of secondary metabolites. Osinga et al. (2010) and Bergman et al. (2011) discovered that avarol levels were similar. Peroxide acids of norsesterterpenes in wild and mariculture sponges (*D. avara*) *D. erythraenus* and *D. erythraenus*, respectively) (Sagar, Kaur, and Minneman 2010) (Schippers et al. 2012).

### 6. ANTIVIRAL DRUGS FROM MARINE SPONGES:

#### 6.1 Nucleosides

##### 6.1.1. Ara-A or Vidarabine

Ara-A or Vidarabine Bergmann et al. isolated the *Tethya crypta* (Tethylidae) sponge. Spongothymidine and spongouridine were glycosides with an arabinose sugar instead of the same old sugar. These nucleosides embrace a lot of ordinary saccharide sugar. Vidarabine conjointly referred to as Ara-A, could be an artificial counterpart of Vidarabine. The improved antiviral activity of spongouridine. Privat de Garilhe and First State Rudder ab initio represented (vidarabine, Ara-A) in 1964 (Hou et al. 2018). Whitley's study in 1976 verified the compound's clinical utility in treating herpes simplex encephalitis and different herpes infections that occur in infants on rare occasions (Liu et al. 2017) (Cao et al. 2019).

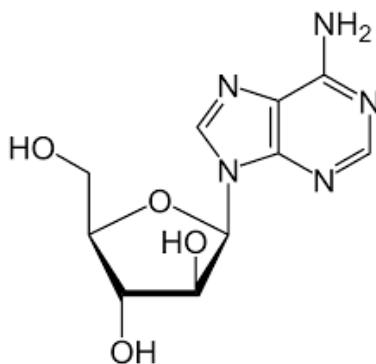


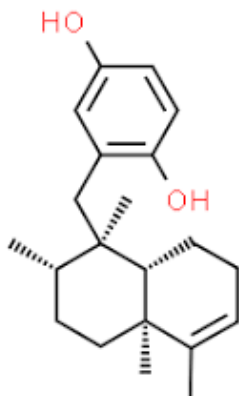
Figure 6.1.1.1: structure of vidarabine

#### 6.2. Sesquiterpene Hydroquinones

##### 6.2.1. Avarol

Avarol was first isolated from the sea sponge *Disidea avara* in 1974; it is a sesquiterpenoid hydroquinone with a rearranged Driman structure. Standard analytical methods for the chemical structure and chemical degradation of Avarol are established, as is its stereocontrolled total synthesis (Hermawan et al. 2019). At a dose of 0.1 g / ml in human H9 cells, the chemical inhibited replication of the etiologic agent of acquired immunodeficiency syndrome (AIDS) and human lymphotropic retrovirus (HTLV III) / lymphadenopathy-associated virus, depending on the dose. Suggested that it suppresses the expression of gag HTLVIII p24 and p17 proteins in H9 cells after virus infection and thus virus replication. Glutathione peroxidase in studies from 1988 (Li et al. 2019). The effects of Avarol have been further investigated and shown to completely inhibit the

synthesis of glutamine-transferred tRNA, which is essential for the production of viral proteases necessary for viral replication (Goh, Mok, and Chu 2020).

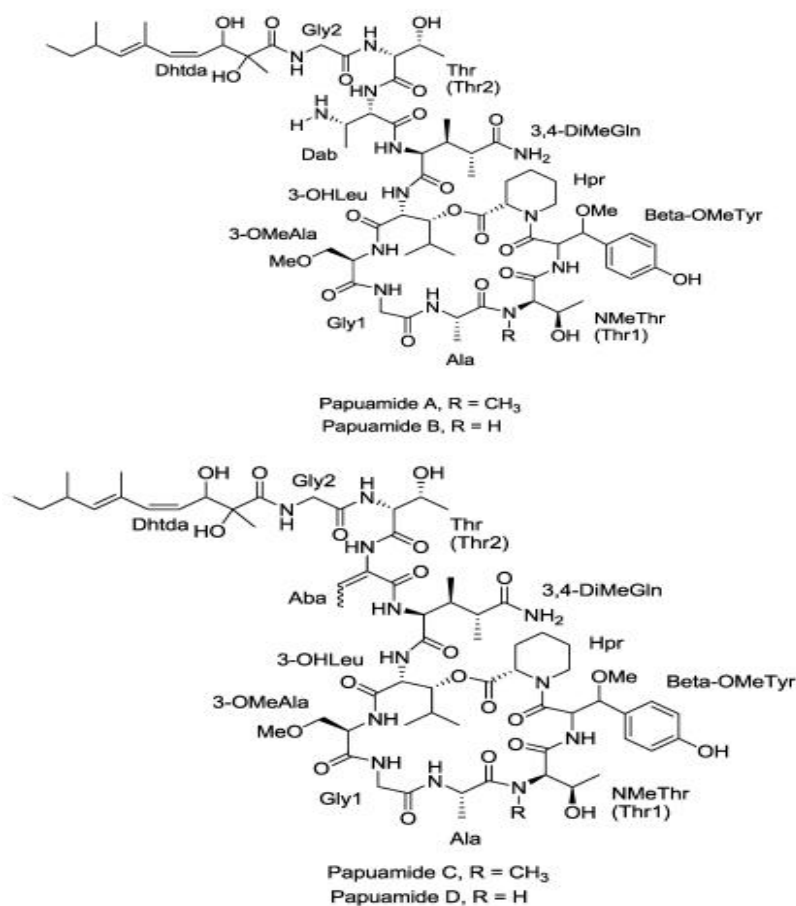


**Figure 6.2.1.1: Structure of avarol**

### 6.3. Cyclic Depsipeptides

#### 6.3.1. Papuamide A, B, C, and D

Antiretroviral and cytotoxic cyclic depsipeptides have been identified from the sponges *Theonella mirabilis* and *Theonella swinhoei* collected on the north coast of Papua New Guinea. Papuamides A and B were isolated from *T. mirabilis*, and papuamides A, B, C, and D were isolated from *T. swinhoei* by two groups, the National Cancer Institute and the University of British Columbia (Schobert and Schlenk 2008). Alanine, threonine, two glycine residues, homoproline, N-methylthreonine, 3-methoxyalanine, 3-hydroxyleucine, 3,4-dimethyl glutamine, 2,3-diaminobutanoic acid and amide bond 2,3-dihydroxy 2,6,8-trimethyl Deca (4Z, 6E) dienoic acid was all extensively measured NMR (Yu et al. 2018). Andjelic et al. conducted detailed mechanistic research on the anti-HIV activity of papuamides A and B. Inhibition of viral entry into cells are independent of CD4, gp120, chemokine co-receptors, and gp41, essential proteins involved in the viral entry process and the targets of most FDA-approved inhibitors (Seghal Kiran et al. 2018) (Zhao et al. 2018).

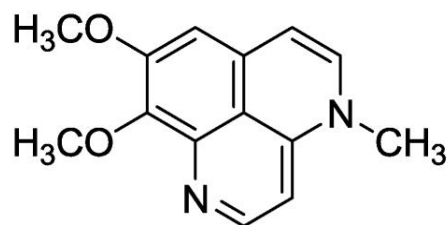


**Figure 6.3.1.1: Structures of Papuamide A, B, C and D**

#### 6.4. Alkaloids

##### 6.4.1. 4-Methylaaptamine

Coutinho is the sponge *Aptos* sp. We reported that the alkaloid four methylaptamin was isolated from the alkaloid for the first time. The preliminary activity of its crude extract to inhibit 76% of HSV1 replication in Vero cells (collected in Abrolhos, Bahia, Brazil) and at a concentration of 2.4 g / ml (Pech-Puch et al. 2020). Another investigation validated 4-methylaaptamine's anti-HSV-1 action, with an EC<sub>50</sub> of 2.4 M, which is even more effective than acyclovir's EC<sub>50</sub> of 8.6 M. 4-Methylaaptamine inhibited HSV-1 infection in Vero cells even 4 hours after infection, implying that important events of HSV-1 replication are inhibited. ICP27, an HSV-1 immediate-early protein that regulates splicing, termination, and nuclear export of viral transcripts, appears to be inhibited by the chemical, inhibiting viral replication (Pang et al. 2018).

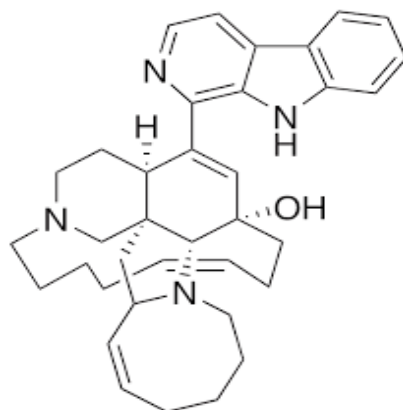


### 4-methylaaptamine

**Figure 6.4.1.1: Structure of 4-methylaaptamine**

#### 6.4.2. *Manzamine A*

A *Haliclona* sp. produced Manzamine A. Sakai and Higa discovered anticancer chemicals in the waters of Okinawa (Japan) in their search for antitumor compounds in marine species (Goh, Mok, and Chu 2020). The manzamine class of alkaloids has a unique complex polycyclic ring system coupled with a carboline moiety and has been reported to have a wide range of bioactivities, including antimicrobial, antiparasitic, antipesticidal, antiHIV1, and antiAIDS opportunistic infections. Manzamine A was isolated from the sponge *Pachypellina* sp. (Porifera, Demospongia, Petrosida, Oceanapiidae), which was obtained in Manado Bay, Sulawesi, Indonesia. In the same study, this chemical was found to have the first antiHSVII action at a concentration of 0.05 g/ml (Pech-Puch et al. 2020). Humphrey described the enantioselective complete synthesis of manzamine A. Manzamine A has been isolated in {an exceedingly|in a very} recent study from an undescribed sponge of the genus *Acanthostrongylophora* 5/6 inhabiting Manado Bay, Indonesia, and its significant oral and endovenous pharmacokinetic properties in rats have conjointly been described (Yu et al. 2018)(Zhao et al. 2018).



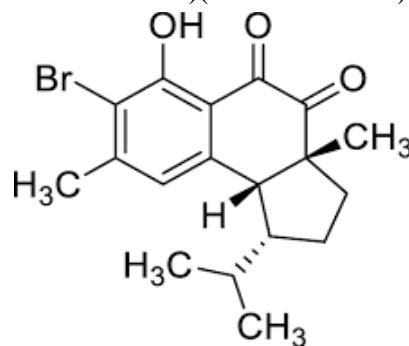
**Figure 6.4.2.1: Structure of manzamine A**

#### 6.5. *Phenolic Macrolides*

##### 6.5.1 *Hamigeran B*

This compound was isolated from the sponge *Hamigera tarangaensis* (Anchinoidae) of the Hen and Chicken Islands, New Zealand, at a 132 g per disc

concentration, providing 100% in vitro virus inhibition against both herpes and poliovirus. Low cytotoxicity. Several groups [81–83] have reported Hamigeran B synthesis (Schobert and Schlenk 2008) (Tian et al. 2016).



(–)-Hamigeran B (66)

Figure 6.5.1.1: Structure of hamigeran B

## 7. DISCUSSION:

The development of lead chemicals and drug candidates for antiviral medicines comes from marine natural resources. Nonetheless, bottlenecks hinder present marine natural product research and development. To begin with, obtaining lead compounds through screening procedures is tough. Second, fully synthesizing complex marine natural compounds is difficult. The most important thing to remember is that most active marine natural products are limited to in vitro cell investigations and a few animals in vivo and clinical trials because of the scarcity of natural products. The dramatic increase in global medication resistance has encouraged drug research and development organizations to look for novel antiviral treatments, particularly given the recent global outbreak. New coronary pneumonia cases have sparked interest unprecedented in antiviral medication research. However, there are numerous hurdles in exploring and developing new technologies. Many significant antiviral properties have been discovered in marine sponges. Marine sponges have been used to extract active molecules, and it is believed that marine microbes will play a role. It is a good supply of antiviral medicines, particularly natural antiviral that is unique, very potent, and low-toxic products.

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## CHAPTER-9

### THE IMPACT OF IN-MIGRATION ON SOCIAL AND ECONOMIC FACTORS WITH SPECIAL REFERENCE TO MAHARASHTRA

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**Abstract:**

*This article analyses how in-migration affects social as well as economic development. The world has witnessed the history of Migration since ancient time. Historically, it is recognized that in-migration and displacement occur within broader long-term social, security, political and economic contexts. In-Migration is an important channel of Social and Economic development for individuals and their offspring. The movement of people from one state to another state, especially from less developed to developed states, has a substantial impact in several dimensions. As the processes of in-migration deepen, these transformations increasingly shape our lives in our workplaces, in our homes, in our social and economic lives as we go about our daily routines. As a result of movements people are able to access information, goods and services from around the world because of the ongoing expansion in distance-shrinking technologies. Human mobility is supposed to be governed by a set of social, economic, political, cultural and personal factors and as such it is of interest from more than one angle. In-Migration has numerous positive social and economic effects but at the same time it has some negative effects too. This article targets to emphasis on positive factors and burning issues cooked due to migration. Here attempt have been made to provide data on all facets of migration.*

**Keywords:** *In-Migration, Social Development, Economic development, Human Mobility etc.*

**Introduction: -**

Migration is the geographic movement of people across a specified boundary for the purpose of establishing a new permanent or semi-permanent residence. Along with fertility and mortality, migration is a component of the population change. The term “in-migration” and “out-migration” are used for movement between areas within a country (internal migration). The parallel terms “immigration” and “emigration” are used to refer to moves between countries (international migration). There has been a basic difference in the processes of migration in developing countries from that of the developed countries. In developing countries like India, migration mostly takes place not due to the so called pull forces of the destination place as usually happens in case of developed countries, but because of poverty, unemployment, natural calamities and underdevelopment at the origin place. Migration in developing countries is still viewed as a survival strategy. Poverty and prosperity both are responsible for inducing migration. While the former is mostly true in developing countries, the latter kind of migration is found in developed countries.

In 2015, 244 million people, or 3.3 per cent of the world's population, lived outside their country of origin. The majority of migrants cross borders in search of better economic and social opportunities. Migration is increasingly seen as a contributor to development.

Migrants make important contributions to the economic prosperity of their host countries, and the flow of financial, technological, social and human capital back to their countries of origin helps to reduce poverty and stimulate economic development there as well. India has one of the largest numbers of internal migrants in the world. According to the Census data of 2011, there were over 450 million internal migrants in the country. 54 million of these are interstate migrants, residing away from their usual place of residence, while the rest are intra-state, moving within and across districts of the same state.

India is one of the fastest developing economy especially since New Economic Policy, 1991. Till 1990, India has gone through economic fluctuation and experienced upswing (Rarely) and downswing time to time. Maharashtra is one of the major state of India since 1960. It is most populous state after Uttar Pradesh with huge contribution in countries GDP. The economy of Maharashtra is driven by manufacturing, international trade, Mass Media (television, motion pictures, video games, recorded music), aerospace, technology, petroleum, fashion, apparel, and tourism. Maharashtra is the most industrialized state and has maintained the leading position in the industrial sector in India. The State is pioneer in small scale industries. Mumbai, the capital of state and the financial capital of India, houses the headquarters of most of the major corporate and financial institutions. India's main stock exchanges and capital market and commodity exchanges are located in Mumbai. The state continues to attract industrial investments from domestic as well as foreign institutions. Maharashtra has the largest proportion of taxpayers in India and its share markets transact almost 70 per cent of the country's stocks. These all facts attract the peoples of the countries to migrate from their original location to Maharashtra.

**Objective of the study: -**

1. To study impact of In-Migration on Social and Economic Factors.
2. To Elaborate and Analyze outcomes due to In-Migration.

**Research Methodology: -**

The Research approach used in this project is a 'Secondary Data Analysis'. The information existing in the following analysis is based on Government Surveys, Internet, Newspapers, Magazines and Books etc.

**A) Migration and Social Factors: -**

**I) Developmental Implications on In-Migrated area**

An Economic development and Social development is vital for any country or state. In-Migration is a decision that impacts the welfare of the household, the home community, and in the end the whole economy in various ways (Azam and Gubert 2006). The welfare implications of in migration on the origin are most often, though not always, sizable and positive. The main channels through which in-migration alleviates poverty are increased incomes from remittances, ability to smooth consumption, access to finance for starting a new business, as well as tapping on to the knowledge and resources provided by the international community of the migrant diaspora. Besides pure monetary gains, in-migration and remittances allow for higher investment in health care and education. Yet, not all impacts are positive: exploitation of in-migrants by unscrupulous recruiters or employers is reportedly widespread; separation from family can be stressful for in-migrants.

## II) Maharashtra as Tourism Destination

Maharashtra has ambitious plans to boost tourism as evident from its 2016 Tourism Policy. The current 11% tourism growth rate is mediocre and unambitious; it does not do justice to India's immense unrealized potential. Maharashtra can take the lead to contribute to transforming India into a highly competitive and attractive tourism destination. Since creation of Maharashtra, huge development is observed in Tourism sector as Maharashtra has historical background and therefore people around the world eager to visit various places such as Forts, Caves etc<sup>2</sup>.

**Table- 1.1**

Households (Rs.)	Income	% age of Domestic Overnight Visitors	%age of Domestic Day Visitors
(1)		(2)	(3)
Less than Rs.60,000		17%	16%
Rs.60,001 – Rs.1,00,000		21%	23%
Rs.1,00,001	–	19%	22%
Rs.2,00,000			
Rs.2,00,001	–	29%	28%
Rs.5,00,000			
Above Rs.5,00,000		14%	11%
<b>Total</b>		<b>100% (12938)</b>	<b>100% (11526)</b>

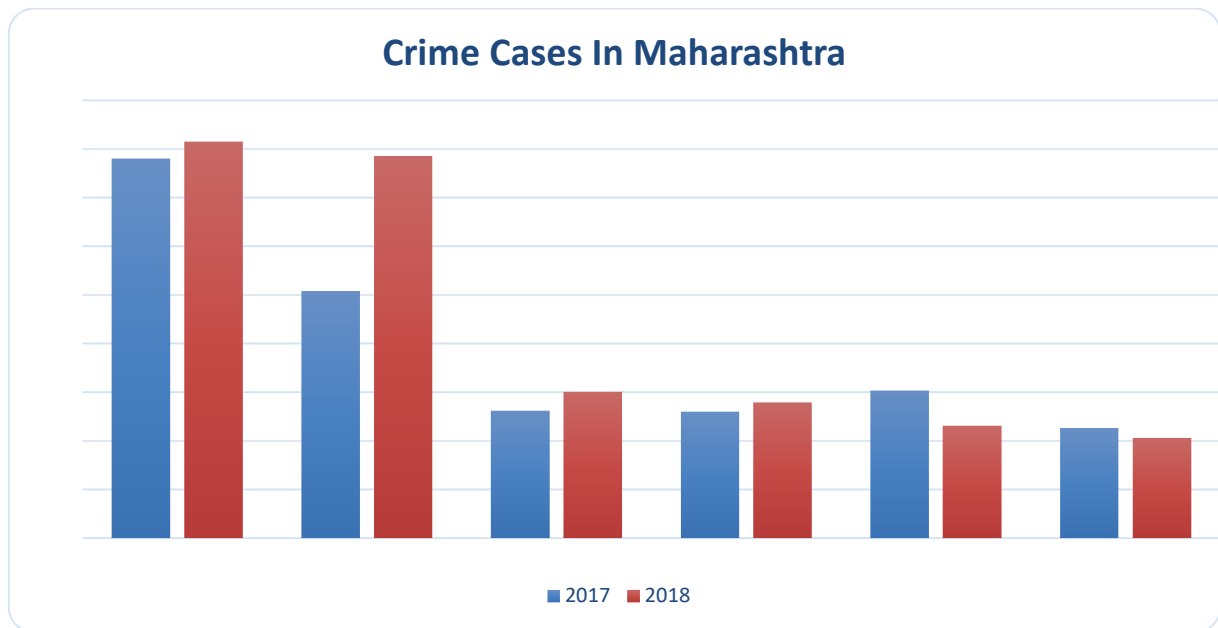
*Source: Final Report for Maharashtra – Tourism Survey, Ministry of Tourism, Government of India.*

The table above is indicative of the fact that majority of the domestic visitors touring Maharashtra have an annual HH Income from Rs. 2 Lakh – Rs. 5 Lakh.

Maharashtra is creating its own special packages to sell its advantages as tourism. Among states it tops in foreign tourist arrivals (20.8%) and is counted among leading states for domestic tourists (7.2%). Ancient and medieval Maharashtra included the empires of the Satavahana dynasty, Rashtrakuta dynasty, Western Chalukyas, Mughals and Marathas. There is no doubt that tourism sector has great contribution in Maharashtra's GDP in recent period.

## III) Crime

Maharashtra recorded the maximum number of crimes committed after Uttar Pradesh in 2019. Shockingly, the state has also recorded a maximum number of murders with rape or gang rape in the country, leaving behind states like Madhya Pradesh and Uttar Pradesh (UP), reveals the data released by National Crime Records Bureau (NCRB). Maharashtra had recorded 5, 09,433 crimes in 2019 and it was also at number two in the year 2018. Madhya Pradesh and Maharashtra accounted for about 9.8% and 9.4% respectively of total crimes in 2009.



Source: Narayan Namboodiri / TNN / Sep 5, 2020.

Most of the population is migrating towards Capital city Mumbai and historical city pune. As Out of total crime occurred during said period was mostly done by non-residents of Maharashtra. It is very sensitive data which showing another side of negative migration effect. Residents of Maharashtra are not socially safe as per above data. The reason behind this increase in crime rate especially outsiders in Maharashtra is unemployment, poverty, frustration etc. Due to increase in crime rate there is more burden on available defence system and it leads to failure of control crime occurring in the state.

#### **B) Migration and Economic Factors: -**

##### **I) Employment**

Migration leads to change in supply of labor force. The labor market critically depends on the skills of migrants, the skills of existing workers, and the characteristics of the host economy. Due to migration in Maharashtra supply of labor has increased more than expectations. It is observed and experienced that Maharashtra is most preferred destination for migration. Maharashtra has capital city like Mumbai where multiple employment opportunities are available. Hence Maharashtra is one of the state where most peoples are migrating and running their families. Most of street vendors are belonging to non-resident of Maharashtra.

Unfortunately, total unemployment rate of Maharashtra is 04.45 %. Though Maharashtra unemployment rate fluctuated substantially in recent months, it tended to increase through October 2020 - September 2021 period ending at 4.45 % last month. At the same time Labor Force Participation Rate is 44.37 as per September 2021 data.

**Table- 1.2****Work Participation Rate (%)**

	Persons	Males	Females
<b>Total</b>	42.5	53.3	30.8
<b>Rural</b>	48.9	53.9	43.6
<b>Urban</b>	33.8	52.4	12.6

Source: Census of India 2001 (State)

Even though ample of employment opportunities are available in Maharashtra still due to excess Migration rate cut throat competition created and there is adverse effect on local population.

**II) Capital Inflow**

Maharashtra and the National Capital Region (NCR) have cornered 49 per cent of the total foreign direct investment inflows into the country since April 2000, according to Commerce and Industry Ministry data. Maharashtra has Second highest FDI inflow i.e. 28% during fiscal year 2020-21. Maharashtra lies on the western coast of India. It is the third largest state in India, Occupying approximately 9.4% of the country's total geographical area. Maharashtra is bounded by the Indian states of Gujarat to the northwest, Madhya Pradesh to the north, Chhattisgarh to the east, Telangana to the southeast, Karnataka to the south, and Goa to the southwest and by the union territory of Dadra and Nagar Haveli and the Arabian Sea to the west and these states are main resource for Maharashtra in case of capital inflow.

Maharashtra has a good presence of industrial clusters, especially I.T, Chemicals, Textiles, Food processing clusters and offers lucrative investment opportunities in these sectors.

**Table- 1.3**

Rank	Country	Amount of FDI Inflows		%age with FDI for Maharashtra
		Rupees in Crores	U.S. \$ in Million	
<b>1</b>	Mauritius	94,069.58	20,892.93	39.06
<b>2</b>	Singapore	24,947.60	5,549.90	10.38
<b>3</b>	United Kingdom	23,644.93	5,284.36	9.88
<b>4</b>	U.S.A.	16,287.91	3,569.93	6.67
<b>5</b>	Netherlands	11,249.43	2,473.46	4.62
<b>Total</b>		170,199.45	37,770.58	70.61

Source: FDI Synopsis on Maharashtra by RBI as on 31.12.2011

Obviously, due to migration human capital is freely mobile but it is bearable up to certain point. In Maharashtra abundant amount of capital is available but human capital is available more than that and hence marginal productivity is near to zero even in urban areas.

**III) Fiscal and Monetary Policy**

Fiscal policy and monetary policy is crucial for any stable economy and it control economy in all perspective. As Maharashtra is one of the well-developed state in India it has

more importance for both policies. Maharashtra is most populous state after Uttar Pradesh and therefore any active government has to go through managing state development activities through these policies. As development of this state occurring more opportunities are made available and people migrate from different states of country and ultimately burden of government increases.

**Table- 1.4**

Year	Revenue	Fiscal	Outstanding Debt
	Deficit (-) )/Surplus (+)	Deficit (-) )/Surplus (+)	
<b>2018-19 (Actuals)</b>	0.45%	-0.87%	15.5%
<b>2019-20 (RE)</b>	-1.09%	-2.73%	16.1%
<b>2020-21</b>	-0.29%	-1.69%	16.2%
<b>2021-22</b>	-0.30%	-1.58%	16.6%
<b>2022-23</b>	-0.35%	-1.40%	16.6%

*Note: Figures for 2020-21, 2021-22, and 2022-23 are budget targets.*

*Sources: Maharashtra Budget Documents 2020-21 (MTFP Statement); PRS.*

Active government has to spare particular amount for migrated population and unfortunately resident of the state has to share their services from government. Sometime it is observed that local population is deprived of various services. But at the same this migrated population contribute in State GDP and helps in generation direct and indirect taxes as well.

#### **Result and Discussion: -**

As we have discussed above, we have observed that mixed backwash effects of Migration in Maharashtra. Migration leads to increase in poverty rate among the resident of state at the same it increases crime rate in the state. Somewhere it is experienced that human mobility contribute in state GDP as well. In case of economics aspects, Employment rate decreases and labor participation rate also deteriorates, at the other hand capital inflow also taking place due to migration. Government has to go through rope walking task of taking care of domestic as well as non-resident of Maharashtra. In short migration has both negative and positive sites. Unfortunately, many segments of economy has suffering due to human mobility but still it is required for human development because all over human development is more important than one specific segment of an economy.

#### **Conclusion: -**

Migration has thousands of years of history. For many economies migration is the reason for their development. As a result of migration people are able to access information, goods and services from around the world because of the ongoing expansion in distance-shrinking technologies. Human mobility is supposed to be governed by a set of social, economic, political, cultural and personal factors and as such it is of interest from more than one angle. It has various facets and need to be assessed from all angles.

In the lump, we should promote human mobility (Migration) actively for the correction of social and economic imbalance which is obstacle for development.

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## CHAPTER-10

### THE IGNORED WARNING SYSTEM OF BIRDS AS BIOINDICATORS

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Birds are beautiful creatures which cover all the habitats ranging from desert to snowy mountains. They play an important role in the lives of the humans in different capacities. Birds play important role in seed dispersal, pollination, pest control, agriculture, ecosystem and conserving biodiversity. They also take part in transform entire landscapes, keep coral reef alive especially by seabirds, who cycle nutrients and helping to fertilise marine ecosystem as coral reef. Without birds ecosystems may not exist. Birds help to maintain delicate balance between plant and herbivore, prey and predators. Birds also inspire humans by their technology of flight, various ideas for lives. Darwin's studied Finches in Galapagos land on shaping, his thoughts on evolution through natural selection theory. Birds are good messengers that tell us about health of our planet. They are wide spread and respond quickly to change in the environment and can be considered as good Bio indicators. The question is, are we willing to accept the warning that these wonderful friends of humans are giving? Are we ready to take corrective measures of the anthropological impact caused on the environment?

The conditions of the clean air, food, healthy plants, good nature, and safe places to raise young that make good home for peoples, a habitat good for birds is a good environment for people. In the recent years though due to urbanization, radiations from mobile towers, pollution, use of pesticides and insecticides in farms, replacement of ventilators with air conditioners in various houses, emission of harmful gases are considered the main reason that led to drastic change and decline in sparrow populations and they are replaced by another species of birds like pigeons. Urban areas provide relatively new sites, habitats to birds in which they can conserve other birds by providing artificial nest sites, net boxes; they are often called as 'Urban Birds'. They are adapted to urban environment like concrete areas of buildings and roads instead of natural farmland and woodland of gardens, parks and other green spaces. In early times birds invested their considerable time and energy to nest building and maintenance, but now a day surprisingly that nesting biology of birds has been rather neglected and they happy to live in concrete buildings on rooftops, houses, blocks of flats, balconies of flats.

Change in birds population are often the first indication of environmental problems. Birds play important role to maintain food chain but due to some anthropogenic activities this food chain i.e. tertiary consumers are replaced by another species of birds. It indicates that if one species is dominant over another, it affects number of recessive birds.

The most striking example is of Blue Rock Pigeons. The number of this bird is increasing to an alarming extent especially in the cities. As mentioned above the pigeons roost in the concrete buildings with ease. In addition, they are able to obtain food easily as many religious beliefs practiced provide food on daily basis. In addition, the leftover food

amount is substantial and available to them. Increase in numbers of pigeons not only affects the sparrows and other birds it also affects the human life also. Recently news channel Times of India showed that in Lajpat Nagar, Delhi, Flyover one woman was killed and her husband and daughter injured when their scooter was hit by a BSF bus while they were overtaking a parked car whose driver had stopped there to feed the blue rock pigeons. Birders and some ornithologists say that this feeding practice of pigeons is not only destroying their instinct to hunt, but also it is creating food security to help them breed. One more factor in support of these birds is the lack of carnivores. The raptors are not able to fly and hunt due to increased buildings and obstructions. The pigeons now have started creating nuisances. Litter during nest building, droppings in the balconies, irritating noises during the activities, entering houses at odd hours and disturbances during sleeping hours are major problems. Some health experts and ornithologists say that pigeons droppings and feathers are associated with respiratory disorders of humans and pigeons have become a pest and this is very bad news for other birds also. Fact is that humans are providing them food, shelter just because they love to do so their number is increased and natural balance disturbed.

The other example is opposite to this. There has been a drastic drop in number of house sparrows in the cities. These birds are known to live in close association to humans. The lack of nesting habitats due to loss of shrubs has caused problems of housing for these birds. The pavements, paver blocks and roads have reduced the land available for small seed producing plants reducing the food of these seed eating birds. The problem has reached such a level that we are now celebrating world Sparrow day on 20 March to create awareness among public to protect sparrows.

The parakeets once abundant have reduced in number in spite of availability of fruits in the urban areas. The major cause for this is cutting large trees which provide holes and crevices for nesting of parakeets. The old houses now considered as Heritage buildings did have holes constructed purposely to enable birds such as parakeets, mynas and owls to nest.

Migratory birds usually leave higher latitudes in winter and they migrate to move from areas of low resources to areas of high resources in nature, especially in search of food and nesting location. The Triveni sangam, is the union of Ganga, Yamuna and Saraswati at which Prayagraj is site of Mahakumbh. According to local community in Prayagraj, the tradition of migratory birds coming to Sangam is an old one. At this place every year a crowd of near about 80 million pilgrims arrive during Magh (Jan/Feb) mela and spend entire month in prayers. Coinciding with the huge gathering of pilgrims, the site welcomes flocks of Siberian Seagulls also. These birds migrate towards the India from mainland to escape the harsh Siberian weathers. (Down to Earth, 8 May 2020). Pilgrims who arrive in river to bath, they often feed the Seagulls as they flock in thousands. As increase in tourists, the boat operators have begun to lure the migratory birds with balls of flour. These anthropogenic activities attract the birds all around the boat, tourists feed them junk food and items that are packed with plastic which are discarded in the water carelessly. Birds get confused with plastic waste with food and fill their guts causing them to starve for long day and also harm to their chicks.

Seagulls gain muscles by eating fish and other insects that are rich in proteins but junk food, flour they are fed with becomes an big obstacles when they have to migrate back because this food provides fats, creating indigestion and other illness in birds bodies. Siberian gulls who migrate to Triveni Sangam in winter die because of eating plastic, junk food, their

habitat also change. Similarly, the Black headed Seagulls which migrate to Thane Creek, Mumbai are also fed by many visitors by offering them Chips, Wefers, Farsan (Times of India, 4 Jan 2017). Due to deforestation, cement concrete toxic waste down inflow of migratory birds in Thane. Some studies highlighted changes in migratory birds behaviour as Seagulls attacking humans who feed them.

The World Migratory Bird Day celebrates on 14 May, to raise global awareness about conservation of migratory birds. Let us treat them with care and love. After all birds are our guest and we were taught that 'Atithi devo bhava' meaning that 'Guest is equivalent to god'. So, we come to the question are we doing the right thing in feeding the pigeons and other birds, cutting trees and causing habitat destruction leading the change in the food chains and behaviours of some animals like birds. Are the humans going to take cognizance of the rising or dwindling numbers of birds? The birds seem to be warning humans by performing the role as bio indicators of human interference in the natural cycles. Are we going to stop changing food chains and nesting patterns? Are we going to make the corrections are the important questions which need to be addressed immediately?

## CHAPTER-11

### ISLAMIC BANKING – A WINDOW TO CSR

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#### **Abstract**

*A Bank is unequivocally the trustworthy custodian of money received from, or on behalf of, its customers. Interest, albeit the mainstay of modern banking, is strictly prohibited in Islam and hence there can be no banking system in Islam based on interest, whether given or taken. Although interest is an indelible part especially for the commercial banking system, many experts believe that interest is the de facto reason for Bank Failures and Systemic Excesses. The bank failures in the United States of America during the 1980s provided fuel for interest in equity-based proposals and the exclusion of the payment of deposits from the portfolio ventures of banks. The Islamic banking system goes further and advocates that loans made by banks should be equity-based and maintain social development a priority. Islamic Banking has the same aim as conventional banking except that it functions in tandem with the strict rules of the Shari'ah. This paper briefly has a look at the conceptual framework of Islamic Banking and also tries to peruse the Islamic laws and governing principles regarding various instruments and operations of Islamic Banking. Especially since even a cursory look at the tenets of Islamic Banking makes it abundantly clear that there is a clear sharing of principles between Islamic Banking and Corporate Social Responsibility (CSR).*

**Keywords:** Islamic Banking, Equity-based, Social development, Corporate Social Responsibility.

#### **Introduction:**

Banking is the nervous system that sustains economic development of every economy. And what with the ever increasing concern for corporate social responsibility and business ethics, the value systems incorporated in the banking system adopted by the economy carry far more significance than earlier. **Corporate social responsibility (CSR)** is a form of institutional self-integrated into a business model. It is a conscious effort by a business to monitor and ensure upholding of the law in action and in spirit, maintain ethical standards and follow international norms not simply for commercial gains but for serving the society as well. Today every commercial enterprise is integrated with every other element of society. It is therefore but natural that such interdependence calls for social accounting by the organisation wherein every individual stakeholder is looked upon as a partner in the collective progress of the society. Consequently, leading **financial institutions (FIs)** are setting up governance and management systems to integrate CSR into their operations, they are reporting on their CSR performance with independent evaluation and justification. They are also trying to offer an array of CSR products that address social and environmental concerns. They are also integrating CSR into their risk management systems and are developing methods for screening their investments against CSR criteria. There is a conscious effort made to project an endeavor-based image that is socially and

environmentally relevant, so that it results into a positive impact on business performance. Mercenary as this may seem, the entire process is humanitarian at heart. Financial Institutions that are oriented towards social responsibility undertake inclusive stakeholder involvement programs to solve intricate sustainability challenges, contribute constructively towards business strategy and keep themselves updated about the issues concerning stakeholders. Undoubtedly, the ability of Financial Institutions to uphold sustainability is suspect, but a handsome lot of financial institutions maintaining CSR norms are taking steps to promote sustainable practices in their operations not only towards their consumers but also towards the society at large. Financial Institutions that are cognizant of their social responsibility are treating sustainability as a sensible and sensitive corporate strategy and not as just a serviceable exercise to earn corporate points.

### **Discussion:**

Now let us have a look at what Islamic Banking is. **Islamic banking**, a banking system that advocates interest free financial exchange, is a banking system which supports profit sharing as a viable and moral alternative to charging interest. Islamic Banking religiously follows the principles of the Sharia Islamic Law, these principles having originated from the Holy Quran and the “Hadeeth”, a compilation of the noted sayings of Prophet Mohammad. Islamic Banks all over the world have ingrained these principles into their business. In Islamic banking, morally progressive activities are promoted. Impetus is given to efforts like entrepreneurship, trade and commerce as they involve individual effort. Societal development is consciously promoted. Earning income without risk— such as interest (‘Riba’) bearing transactions— and anti-social activities like gambling and speculation are prohibited.

The basic tenets of Islamic banking are as follows -

- Receipt and payment of interest (called ‘Riba’) is totally disallowed (haram).
- The business should be based on profit and loss sharing.
- Islamic Banking is often called Ethical Banking as it does not permit any form of investment in industries like gambling or alcohol production or adult entertainment. This is because the Sharia specifically relegates these activities as “haraam” (immoral).
- Ownership of products is a compulsion for Islamic Banks if they wish to lease or lend them.
- Islamic Banks avoid dealing in traditional bonds. Instead, they deal in instruments called Sukuk (Islamic Bond). This is because trading in debt is forbidden.
- Islamic Banks undertake financial inclusion by issuing interest free loans (Qard Hasan).

A close look at these tenets of Islamic Banking makes it abundantly clear that there is a clear sharing of principles between Islamic Banking and CSR. Especially when both regard the customer not as a source of finance but as a partner in growth, a bonding between the two concepts is quite obvious. Then again, both promote healthy business practices and are concerned with social ramifications of business endeavours. Conventional banking actually works on the concept of risk- transfer, whereas Islamic Banking prefers risk-sharing as a more humanitarian approach to banking. Mudharabah (profit sharing), Wadiah (safekeeping), Musharakah (joint venture), Murabahah (cost plus), and Ijar (leasing) are some morally

valued principles or rather concepts followed by Islamic banks. Now consider this mortgage transaction- the bank does not directly lend money to the client to purchase the property. Instead, the bank purchases the property itself and then sells the same at a profit to the client and allows him to repay the total amount in fair instalments. All this to avoid interest payment. What stands in favour of the client is that there is no penalty for delay in payment. As a measure of protection against default by the client, the bank ensures a strict collateral attachment. By an arrangement called 'Murabahah', the property under consideration is registered in the name of the Bank from the start of the transaction. This gives the client a semblance of assurance that on completion of the instalments he would get the property transferred to his name. This process of real-estate leasing is followed even for loans given for vehicles. Musharaka al-Mutanaqisa is a path-breaking approach to home loans and actually allows for a floating rate by way of rentals. The bank and borrower form a partnership entity, both providing capital at an agreed percentage to purchase the property. Once this is done, the property is rented out to the borrower who pays rent for it. The bank and the borrower will then share the proceeds from this rent based on the current equity share of the partnership. Gradually, the borrower buys the bank's share of the property in decided instalments. This continues till the entire amount of the bank's share is repaid and the partnership comes to an end. In the event of default in paying of rent and instalments by the borrower, the property is sold off and the amount received from such sale is shared by the bank and the borrower proportionately. The unique selling proposition of this method is that it does not prohibit floating rates (e.g. the base lending rate) decided by the current market rate, especially in a dual-banking system which also encompasses the traditional banking system. Some experts perhaps view this method as circumvention and some others as deliberation but none would call it unethical. As such, Islamic Banking – the very term may evoke mixed reactions perhaps due to its religious overtones. But if one goes beyond all prejudice and evaluates Islamic Banking for its fundamentals, one may discover a very close link between Islamic Banking and Corporate Social Responsibility. The World Business Council for Sustainable Development Regards Corporate Social Responsibility as ceaseless commitment by businesses to maintain ethics and make concrete efforts towards economic development and upgrading the quality of life of labour and the society. Hence, CSR depends on good initiatives of businessmen without any legal obligations. **Sadaqat** (charity) and **Awqaf** (endowments) are concepts encouraged in Islam albeit voluntarily, whereas **Zakat** and the complete exclusion of **Riba** (interest) are to be observed compulsorily. These concepts are a manifestation of the CSR initiatives of Islamic Banking. Undoubtedly, society requires material resources for which flourishing and competitive businesses are indispensable and in fact this necessity extends to philanthropy. CSR acknowledges both short-term profitability and social or environmental goals, but focuses more on the opportunities for competitive advantage from building a social value proposition into corporate strategy. The emerging concept of CSR goes beyond charity and requires the organisation to act beyond legal obligations and integrate social, environmental and ethical concerns into the business process of the organisation. A business organisation has a moral, not just legal, responsibility towards its stakeholders and the society at large. The triple bottom line (**people, planet, profit**) approach to CSR emphasizes an organisation's commitment to operating in an economically, socially and environmentally sustainable

manner. Consequently, CSR is now seen as moving away from a ‘shareholder alone’ focus to a ‘**multi-stakeholder**’ focus. This would necessitate addressing the concerns of investors, employees, business partners, customers, regulators, supply chain, local communities, the environment and the society at large. Now let us have a worldview of the principles that lie at the base of Islamic Banking. Islam, as a way of life, encompasses all aspects of human life (economic, political, psychological, cultural, social, etc..) and is full of exhortations guiding human beings (individually as well as collectively) on how to deal responsibly with each other on all aspects in a manner that is conducive to achieving **Falah** (prosperity, well-being, welfare, happiness, success, growth, development, etc..). The Islamic worldview applies the tenets of the Islamic Shari‘ah and relegates materialistic endeavors to a secondary appendage, especially in achieving **Falah**. The Islamic Shari‘ah (way, law, guidance) which is derived from the Qur’an, the Sunnah (tradition) of the Prophet Mohammed and the Ijtihad (human reasoning and interpretation) is a complete guide to the social and moral responsibility to be upheld by individuals not only in corporate life but in personal dealings too. The main objective (Maqassid) of Islamic Shari‘ah is Social Responsibility which covers all aspects (economic, political, social, psychological, religious, cultural, etc..) of human life. Consequently, Islamic Banks in particular and in fact all Islamic institutions in general conduct activities that are conducive to brotherhood, social equality and equitable distribution. Corporate Social Responsibility (CSR) and Islamic Financial Institutions (IFIs) seem to have an obvious hand-in-glove fit, given the faith-based ethos of Islamic finance, which gives prominence to concepts based on hard work, thrift and low or no indebtedness. The Islamic view of society is obviously completely in sync with the principles of Corporate Social Responsibility. Indeed, values and principles that have been central to Islam since the time of the Prophet Mohammed may serve as a foundation for principles of corporate social responsibility especially since they are similar to those followed in the West. Some practices followed by Islamic banks –

- Wealth and profit maximization for investors within the limits of the Shari‘ah.
- Just wages and salaries for employees without discrimination.
- Avoiding Riba (interest), Gharar (excessive uncertainty) and other anti-social dealings.
- Making concrete efforts to eradicate illiteracy and poverty from society.
- Undertaking environmentally conscious activities with social inclusion.

Now, let us consider the performance of Islamic banking worldwide. Global Islamic banking assets with commercial banks are estimated to have reached US\$1.72 trillion in 2013, according to Ernst & Young’s latest World Islamic Banking Competitiveness Report 2013–14, launched at the World Islamic Banking Conference in Manama, Bahrain. In 2012, global Islamic banking assets with commercial banks reached US\$1.54 trillion. The report held forth that six rapidly growing markets including **Qatar, Indonesia, Saudi Arabia, Malaysia, UAE and Turkey (QISMUT)** represent **78%** of the international Islamic banking assets with commercial banks, excluding Iran. This report takes stock of both purely Shari‘ah following Islamic banks as also conventional banks. In fact, Bahrain and Malaysia among other countries are poised to act as new reference centers of Islamic Banking to fuel the next phase of industrial development. According to the report, Islamic banks today reach out to over 40 million customers worldwide, a thronging majority of whom are residents of QISMUT. Unfortunately, Islamic banks do not find it convenient to remodel themselves

according to customer requirements. And the fact is that innovation as per customer requirement is the key to successful operation. This is where conventional banks score over Islamic banks. Upgradation or replacement of the core banking system is high on the priority list of many banks. The Basel 3 and Islamic Financial Services Board guidelines have advocated a dramatic change in the business mix and the resultant capital planning to make collaboration easy for banks with mobile providers so as to make mobile banking easier and promote more and more financial products. Islamic banks have to diversify operations and approach to build regional brands and become a mainstream form of banking in their home markets. Many leading Islamic banks are planning to undertake large scale operational reformation. Let us now consider the Indian scenario. Islamic finance has its roots in the Islamic Shari'ah and is based on risk sharing. The countries which have adopted Islamic finance have done so because it makes good business sense. Islamic finance prohibits risky financial products like derivative contracts of the kind which led to the 2008 sub-prime crisis. The interest-free solutions of Islamic Banking actually are a better alternative to capitalist financial systems which carry high risks. In fact, these could provide a solution to chronic debt problems of farmers, labourers and other marginalized groups. Islamic Banking can therefore prove to be instrumental in bringing about financial inclusion.

**Conclusion:** Islamic Banking puts into practice what Corporate Social Responsibility advocates and that too in all spheres of life. Yet, its acceptance in India is still at bay.

The future of Islamic finance in India depends on-

- Internal acceptance of Islamic Banking in the economy
- Indian participation in the global Islamic financial scenario.

Accepting Islamic finance can help India in accessing capital from Islamic nations worldwide and the Muslim populace. Islamic finance is a concept that is here to stay and for India to accept.

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## CHAPTER-12

### A REVIEW ON CRISPR AND ITS APPLICATIONS IN PLANT DISEASE RESISTANT AND INCREASING YIELD AND OTHER ASPECTS

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**Abstract:**

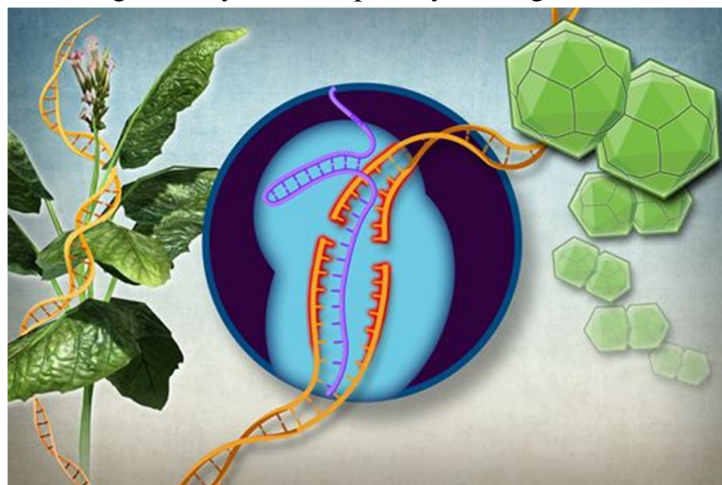
*The organism adaptation to a specified environment has changed in the past few generations. The prokaryotic and eukaryotic genome has been evolved up to an extent of new traits induced genome. The restriction, modification, mutagenesis can be performed using the new bioengineering technology termed as CRISPR. Clustered Regularly Interspaced Palindromic Repeats (CRISPR) or Cas9 protein is the newest and greatly innovative technology which is considered to be the most current state of the art method for genomic editing in cell culture and organism. It is more popular because of its easy design and easy operation. Using this system, researchers can perform site-directed genome modification at the base level furthermore, the technology is extremely versatile and allows genome engineering. Cas9 being a programmable gene can cure any disease. Recently the biggest of the work is done in the field of agriculture with the help of CRISPR editing and that is making disease resistant plants and modification of any targeted genome of plants is possible. This is leading to formation of genetically improves plants for the growth of sustainable agriculture production. Because of this editing breeding of resistant plants have also become extremely easy and fast, because of this these genes edited plants can be made as a standard method or tool for new era.*

**Keywords:** CRISPR, genome modification, guide RNA, sustainable agriculture, genome engineering.

#### 1. INTRODUCTION:

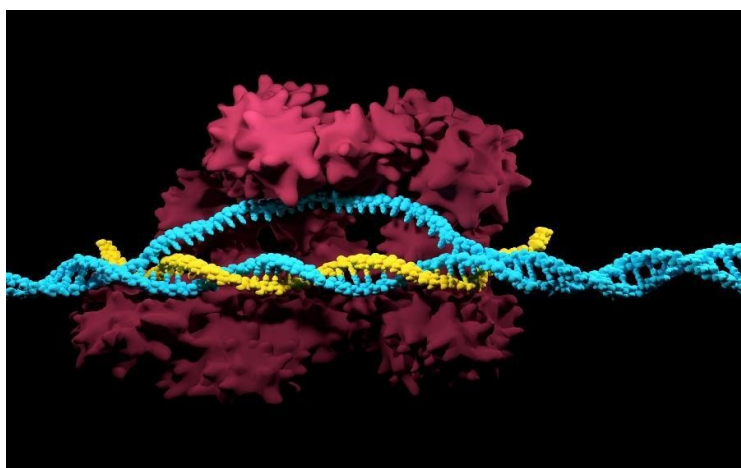
Gene therapy has made a remarkable development with the introduction of CRISPR (Clustered Regularly-Interspaced Short Palindromic Repeats) technology as a base. This has given molecular biology a distinctive turn as a genome-editing tool and a bulkier immune system in prokaryotes. The cas9 protein can make varied changes being specific to the target attained thereby potentially increasing the research genome. DNA is seen as a transfigured pace of biotechnological research in hereditary diseases and other genomes specific targeted studies. [1] Genomic editing on targeted bases using engineering nuclease has rapidly undertaken the mainstream work method by biotechnologists. The adoption of this CRISPR has led to never-ending demand of RNA-guided nucleases as the Cas9 protein and else. The editing pattern has led to being more satisfactorily efficient in easily modifying basic genes and has proved as an easy application method. Traditionally modifying the gene has never resulted biologically beneficial whereas this modern-engineered method has led on a

cutthroat competition within the scientists to use it for a more appropriate cause. This amazing technology can make alterations in the heterogeneous genes in transforming into endogenous genes creating a self-synthesis capability of the genetic material. [2]



*FIGURE 1: CRISPR as a genome-editing tool.*

The ability of a particular gene to be so precise with modifying the genomic sequence and regulate the gene expression patterns in a specific site holds a much heavier part in plant biotechnology. Genomic engineering technology has been such highly specific and efficiently reliable for the modification in advancement of the genomic pace. [3]



*FIGURE 2: CRISPR sequenced DNA strand in association with Cas9 protein.*

#### **PATENT BATTLE OF CRISPR:**

The workhorse CRISPR came to be known in 2012 under both science and ethical battle under public interest. The intellectual disputes in the patent of CRISPR also had led a war between two originators the technology, Jennifer Doudna (UC Berkeley) and Emmanuelle Charpentier (Max-Planck) as one and Feng Zhang (Broad Institute) as another. The patent disputes were between three groups the Jennifer Doudna (UC Berkeley) and Emmanuelle Charpentier (now at Max-Planck, but at Umeå University, Sweden, at the time of her contribution to the invention), Feng Zhang (Broad Institute), and Virginijus Šikšnys (Vilnius University, Lithuania). The patent was first filed by Jennifer Doudna and Emmanuelle Charpentier while Virginijus Šikšnys was among the first three to file the patent. But Feng

Zhang took a risky pact by fast processing via U.S.P.T.O (The United States Patent and Trademark Office). Since it reached first to the patent council before others the disputes were started. [4][5]

The result for the patent was announced in late 2019. The 5year battle came to an end in favor of UC Berkley team awarding them the patent for CRISPR. According to the statement given by UC Berkley, ‘the molecular technology covered by the patent includes single guide RNAs combined with the Cas9 nuclease to cut DNA in any cellular or in vitro context.’ [6]



*FIGURE 3: CRISPR being used as genetic scissors.*

#### **CRISPR-Cas9:**

The prokaryotic organisms evolved into several defensive mechanisms that help them survive and protect themselves from viral predators. Thereby the CRISPR-associated Cas9 protein here plays a great adaptive immune system which memorizes the infections caused by invading the short sequences of the genome termed as spacers into the CRISPR locus. Spacers here that are interspaced with repeats are the small guide CRISPR RNAs or crRNAs. These are employed by the Cas9 proteins to target the invading sequence specifically upon the most frequently occurring infections. This has broadened the area for research and new avenues in genomic editing in a broad range of cells or organisms which has got high potential in therapeutical applications. [7] The CRISPR based specificity property of genomic editing is not just limited to bacteria but also mammals. It is also relevant as a potential gene-editing weapon. The modular design is a specialty of this technology. [8]

The CRISPR/Cas9 system is a prokaryotic nucleotide linked in long chain based adaptive immunity of a system which activates selected microbes to respond to eliminate foreign gene material via transduction, conjunction and transformation are stimulus-based define mechanism that identifies passenger DNA and protects from genome invaders. Cas9 is a programmable RNA guided nuclease is the most preferred genome editing tool out of all Cas proteins available. [9] This technology allows to manipulate the genome in a virtual manner providing very precise and accurate results with just a short guide RNA. [10]

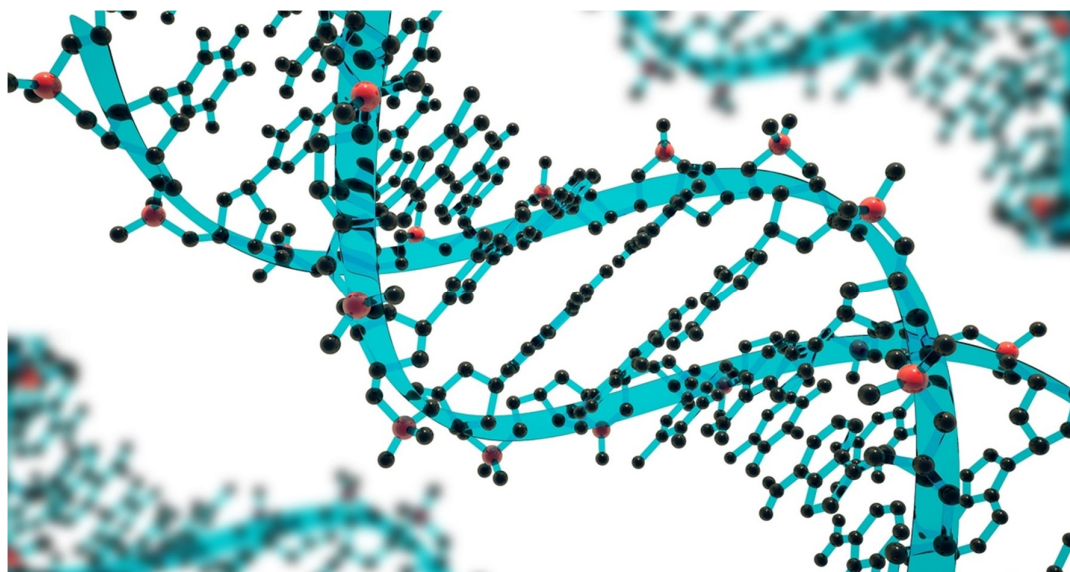


FIGURE 4: The CRISPR gene in the whole genomic sequence.

#### APPLICATION IN PLANT DISEASE RESISTANT AND INCREASING YIELD:

*Ceratitits capitata* (medfly) is an agricultural pest overrunning through more than 260 crop species counting fruits, vegetables, and nuts. [12] Wild populations are contained by the Sterile Insect Technique (SIT), based on the repeated release of large numbers of these sterile males into infested areas. *C. capitata* was the first non-*Drosophila* insect species in which transposon-mediated germline transformation was established. Various transgenic strains are being used to improve the work of SIT and other pest control plans.[13] For the generation long-lasting and genetic changes in gene function, the novel CRISPR gene editing system with its adjustable and simple parts provides a favorable tool for reverse genetics also in insects and to imply scalable and reproducible pest control strategies.[14] Cas9 endonuclease recognizes a specific genomic region based on sequence complementary of a prefabricated chimeric single guide RNA and initiates double-strand DNA breaks at the targeted site. Double Strand Breakup activate non-homologous end-joining (NHEJ) or homology-directed DNA repair (HDR). [15] [16]



FIGURE 6: Application of CRISPR in agriculture.



There are a lot of plants which are affected by the different types of pathogens and effect the worldwide food production scale by a hit. Just to conquer this problem many scientists came up with the idea of using Cas-9 gene editing method for solving this food problem. By using CRISPR gene editing, many new ways for changing the genetic makeup of the plants would be possible. Even if we ignore the limitations and breeding problems which will be caused due to gene editing, this method is still quite useful than traditional methods of breeding and using pesticides. Earlier also, crops such as cotton, tomato, potato, orchids and economically important fruits and vegetables have been edited with the help of gene editing, but if we use CRISPR instead, other problems which along with it can still be solved. CRISPR can be used for increasing the bio-tolerance yield and most of the experiments are done on rice as it is the most studied plant. Using sequence specific nucleases (SSNs) has brought large changes in modification of genome studies in agriculture field. [17]

The final technique uses injection of plasmids encoding the single guide RNA into transgenic lines where Cas9 is indicated precisely in the germline under the vasa or Nanos promoters. These methods avoid potentially problematic somatic mutagenesis by curb Cas9 expression to the germline cells. Demonstrated high rates of mutagenesis in the G1 offspring obtained from flies injected with plasmids encoding single guide RNAs, but a notable part of the injected flies was infertile. With the use Nanos promoter to drive Cas9 expression, higher rates of fertility are achieved and generate high rates of mutagenesis in G1 offspring. This leads to the stoppage of the problems caused by the *Drosophila*. In the same way other small pests can be genetically corrected and no harm will be caused. [17]



*FIGURE 7: Working of CRISPR-Cas in healthy seed production.*

#### **OTHER ASPECTS OF APPLICATIONS OF CRISPR:**

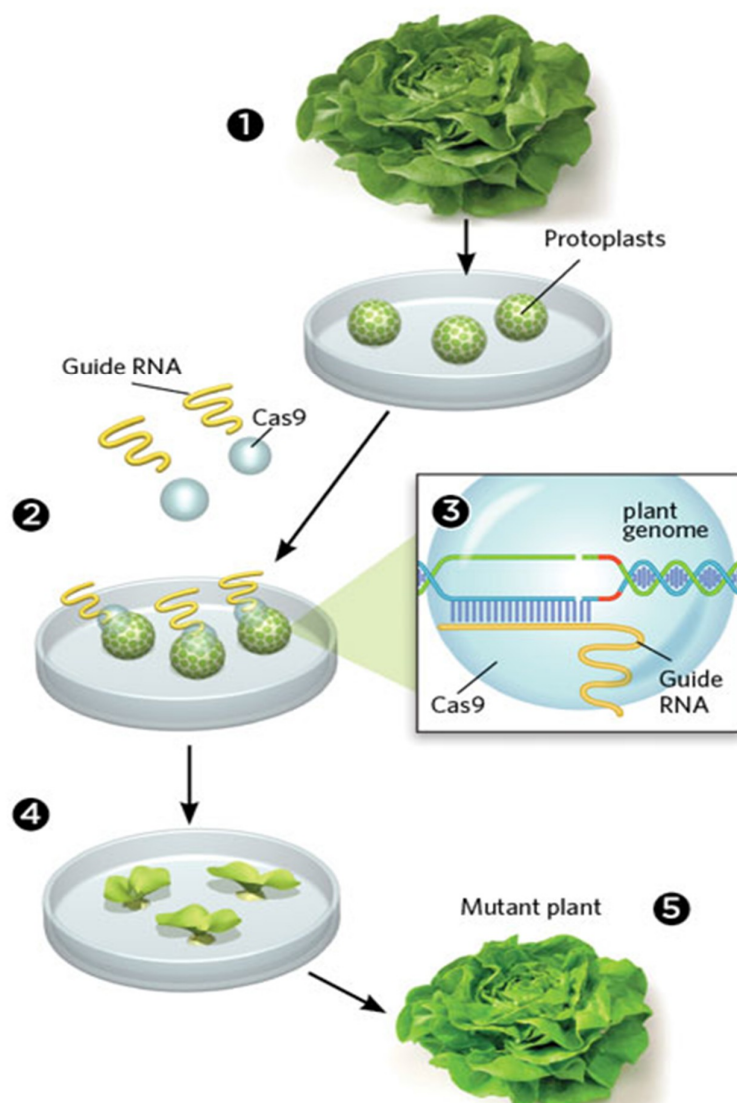
CRISPR can be brought about to successfully modulate an arrangement of disease-causing genetic elements. The discussion about the diverse roles that CRISPR may be playing in targeting HIV and eliminate the infection. When the Cas9 nuclease is coupled with few small guide RNAs they can target the provirus to mediate excision of the integrated viral genome. Besides an altered nuclease-deficient Cas9, fused to transcription activation may induce targeted activation of pro-viral gene expression allowing their demise. [11]



*FIGURE 5: CRISPR applications.*

**1. Application in cancer:**

Cancer is characterized by various genetic and epigenetic change. The ability to withdraw such mutations requires immense promise for preventing cancer. Lately, because of high efficiency and accuracy of the CRISPR genome editing technique has been used in cancer therapeutics. A number of studies used CRISPR-Cas9 as straight target Cancer cell genomic DNA in animal cancer models which have shown a wide potential in expanding our anticancer protocols. [18]



**FIGURE 8: CRISPR Cas 9.**

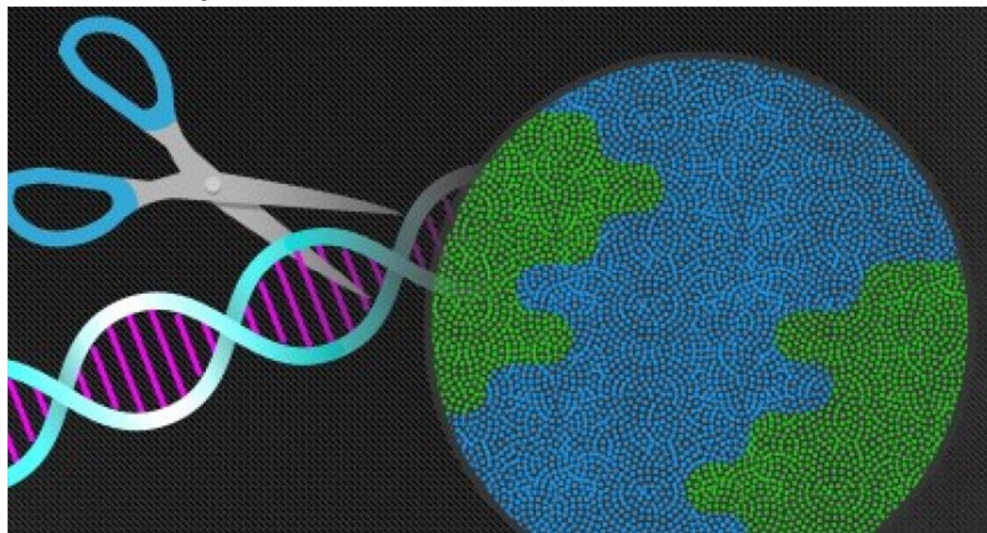
The patients for whom chemotherapy, radiation therapy and other treatments have failed will be enrolled. The T cells will be extracted from the blood of the enrolled patients, and later by the use of Cas9 technology which puts together molecular guide with an enzyme which is able to identify certain type of genetic sequence on the chromosome and then slit the chromosome at that particular spot. Later those genes start to code for PD-1 protein which checks on the cell capacity to launch an immune response when attacked. In this way the healthy cells are prevented from being attacked. These gene-edited cells will be cultured in lab and then will be made to flow in the bloodstream of the patient preventing cancer from spreading. This technique is now affiliated with FDA for treatment of lung cancer. [19]

## 2. Application in HIV:

The Human Immunodeficiency Virus/ Acquired Immunodeficiency Syndrome (HIV/AIDS) is a global health problem. Acquired Immunodeficiency Syndrome (AIDS) is caused by the HIV virus. [20] These days highly active antiretroviral therapy or ART is being



used which makes the HIV virus to be suppressed which lies in dormant state in the host but still can show up again anytime. The new study claims that it can edit the HIV-1 genome from expressing with the help of CRISPR technology. It is found that CRISPR can efficiently cleaved and mutate LTR target sites, and more importantly, it is also able to remove internal viral genes from the host cell chromosome. [21]



*FIGURE 9: CRISPR used to destroy HIV.*

The CRISPR can be used by human cells for intracellular defense against foreign DNA or viruses. By using HIV-1 virus infection as a model the results signify that CRISPR distorts latent viral genome and provides long-term a malleable defense against any new viral infection and replication in the human cells. By this study we came to know that the CRISPR can be efficiently metamorphosed into HIV reservoir cell types and nourish their resistance to HIV-1 challenge.[22] In some research it was found that complementing Cas9 activators with latency-reversing compounds can enhance latent HIV-1 and promote viral gene activation. From this we come to know that CRISPR potentially have effective tools for effect latent HIV-1 expression and can be used with antiretroviral therapy by which we can have improved therapies for HIV-1 infection.[23]

### **3. Application in Somatic gene editing:**

Studies related to genome sequencing have identified that a large collection of genetic transfiguration leads to cancer. But there is no determination how the process of tumor genesis takes place. Rapid functional analysis of the genes can be done with the help of CRISPR when it is combined with little varied version of KRAS protein Kras<sup>G12D</sup>. This leads to quick somatic genome engineering approach which leads to functional characterization of cancer genes in the tissues like using the mouse models. [24]



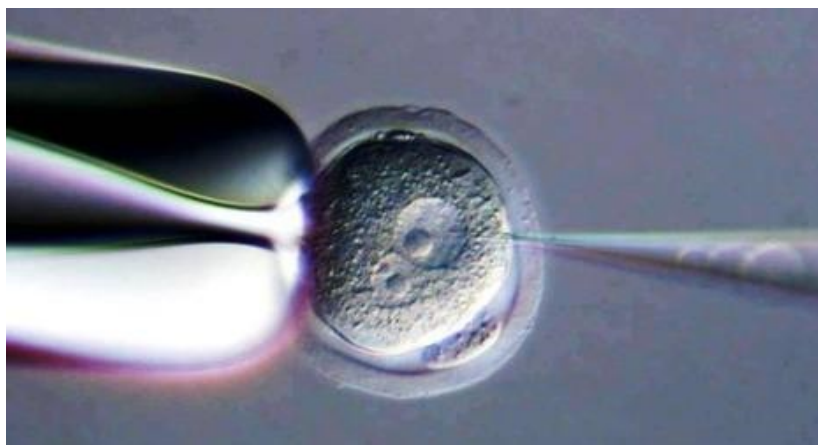


FIGURE 10: Targeted gene knock-in in somatic cells.

These days CRISPR has been used successfully to produce a large number of gene-targeted animals. These animals are generated by co-injecting the Cas9 mRNA and single-guide RNA (sgRNA) in the blastocyst which result in mosaicism. More than two rounds of breeding is performed to get identical genotype and phenotype. For this reason, as a donor gene targeted somatic cells can be used for somatic cell nuclear transfer (SCNT) which will lead to the formation of gene-targeted animals which will have single and identical mutations leading to ease in their identification. [25]

### 5. Application in Manipulating bioactive compound production:

CRISPR is been well studied in model plant species for target-based genome editing. But very few studies have been reported to be practiced on the plant species whose entire genome sequence is not present. At the same time no studies are done for the manipulation of metabolic pathways by the use of CRISPR. In a study done on *Papaver somniferum* L. (Opium Poppy). It has a gene 4' which manages the biosynthesis of benzyl-isoquinoline alkaloids (BIAs). After editing with the Cas9 and sgRNA transcription they were able to reduce the formation of these benzyl-isoquinoline alkaloids. From this it was concluded that CRISPR can be used to regulate BIA metabolism and biosynthesis.[26]

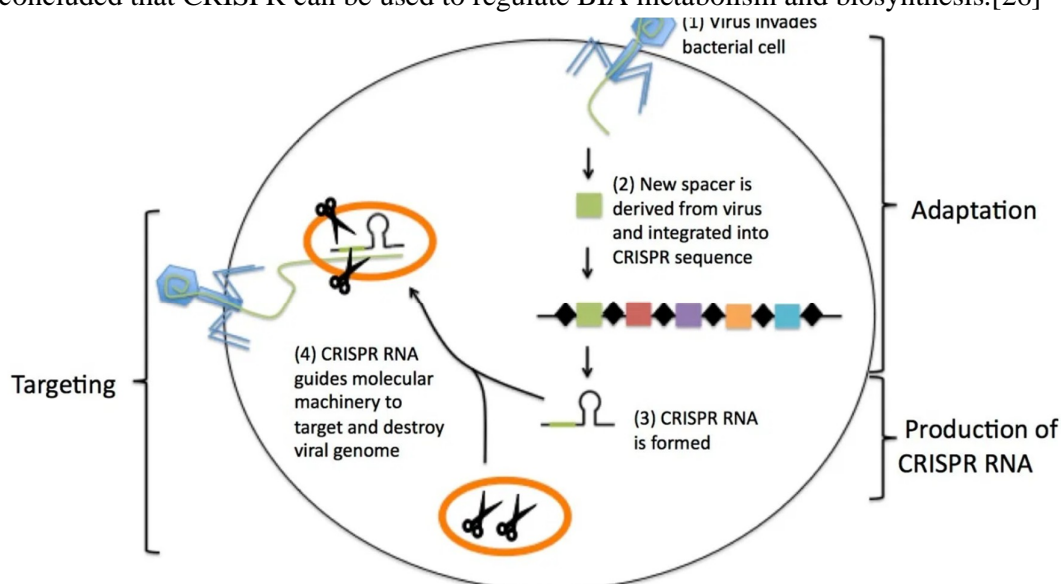


FIGURE 11: CRISPR working.

Filamentous fungi have remarkable bioactive compounds such as lovastatin and paclitaxel which are approved by FDA as drugs to be used for hypercholesterolemia and cancer treatment. As the overall yield of these compounds do not meet the global need, so their production can be triggered with the help of fungal genome editing. Molecular regulatory mechanisms combined with Cas9 systems will lead to the improvement in the overall production of lovastatin and taxol to the industrial scale. So, by elucidating the normal pathway of fungi the production of important bioactive compounds can be done. [27] In this way the bioactive compound production can be manipulated using the CRISPR technology.

#### **6. Application in the treatment of genetic disorders like Cystic fibrosis:**

Cystic fibrosis is a hereditary autosomal recessive disease which is believed to be raised from abnormal mucus plugging exocrine ducts. The discovery of the Cystic fibrosis causing gene demonstrated the basic defect in the cAMP-regulated chloride channel. Cystic fibrosis dummy are created in 4 species that are mice, rats, ferrets, and pigs to intensify our grip on the Cystic fibrosis. Sheep is particularly apposite animal to dummy for Cystic fibrosis in humans as they have resemblance in lung anatomy and development in the two species. [28]



*FIGURE 12: CRISPR Development*

After this discovery door for research and using gene therapy was considered as an option. [29] By the use of CRISPR gene editing is done in Cystic Fibrosis Transmembrane Conductor Receptor (CFTR) by homologous recombination in the stem cells of the patients. The corrected allele is successfully expressed and the study shows that there is a single-gene hereditary effect in the patients and can be treated. [30] CRISPR is considered as a very promising tool for the process of gene editing and provides very easy means for gene editing and DNA sequence alterations. Life expectancy has been increased in this case by combining gene editing with various other methods of treatment. [31] After the discovery of the CRISPER Cas 9 protein, it's easy to correct the faulty CFTR gene. CRISPR was used to correct F508 CFTR mutations in intestinal stem cells leading to Cystic Fibrosis, which may lead to some mutations. [32]

**7. Application in the treatment of autoimmune disorder such as Rheumatoid arthritis:**

Autoimmune disease is caused when one's own immune system starts to attack their own body tissue cells. Mostly the introduction of immunoglobulin was done for the process of treatment of autoimmune disease but the mechanism of action is unknown till now. This method has many side effects such as fever and muscle aches, headaches, nausea and vomiting, dizziness, and tachycardia. The cost of this technique is very high. [33] Rheumatoid arthritis is one of the most damaging autoimmune disease which lead to many problems in the life of patients. Most of the therapy fail due to the heterogeneity of the disease. Regulatory T cells combined with CRISPR and Cas9 leads to the solve of the problem of this genetic disorder. [34] The beginning of Crispr technology was a dormant start but has been revolutionized since then thereby involving diverse species reviewed in a positive manner. The technology has resulted in being promising from basic medical research to cure therapy for diseases like cancer, HIV and other chronic diseases respectively. The technology is still having many challenges and is yet to be discovered in a wide area of genome. Also, the precision quality of the targeted DNA's and guide RNA's are to be made efficient. [35] Thus CRISPR has become an encouraging part of the genetic world especially in the field of medicine.

**CONCLUSION AND FUTURE ASPECTS:**

CRISPR is now being used in the most common to most advanced fields. It is doing miracles in the field of medical science, helping us in fighting immunological diseases, genetic disorders and even in the manipulation of bioactive compound production. Use of CRISPR has its own POS and cons, completely dependent on the way you want to use it.

CRISPR has emerged as a substantial Gene manipulation technique with low cost and high efficiency. It can be used as a good catch in using stem cells in the regenerative medicine field. It can even be used to modify or manipulate any prokaryote to higher mammals. [36] But there are many debates which tell that Gene editing done by CRISPR cannot be transferred from the genetically modified person to their children and not very reluctant at the same time. in many places the crime justice systems do not allow the usage of this technique. As this technique is mostly used these days for the diseases which were previously immutable, there is less chance that they can be cured, so the volunteers suffering from these diseases may end up heartbroken at the end of the treatment which can even trigger their death fast. This technique can even be used to enhance the gene of one's own interest which may lead to discrimination in the field of sports. In this way CRISPR can be exploited or used in the future. [37]

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## CHAPTER-13

### AN OVERVIEW ON INDIAN DIVINE HERB: SANJEEVANI (SELAGINELLA BRYOPTERIS)

*Prerana Dhananjay Jadhav*

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#### **Abstract**

*According to Hindu mythology, the plant Sanjeevani that is Selaginella bryopteris is a miracle herb that has the power to infuse life, to cure any malady. In Ramayana, the Hindu epic is believed to be used to treat unconscious Lakshmana in the battle with Demon king Ravana. Selaginella bryopteris has been used traditionally by local people to treat many health issues including jaundice, stomach-ache, heatstroke, menstrual irregularities, and urine disorders. It is also used as a tonic to improve fitness. The plant contains a variety of phytochemicals such as bioflavonoids, alkaloids, carbohydrates, steroids, tannins, cardiac glycosides, amino acids etc. The recent studies explore the anti-bacterial, anti-fungal, anti- protozoal; anti-inflammatory wound healing properties. Thus, the present review article encompasses the general information on biomolecular activities, traditional and therapeutic uses and mythology behind this Devine herb.*

**Keywords:** Sanjeevani, Selaginella bryopteris, Miracle herb, medicinal plant, pharmacological activities.

#### **Introduction:**

*Selaginella bryopteris* is an endemic plant of India and Nepal [13] [17]. It is commonly known as Sanjeevani which literally means something that offers life (Jeeva-life) [15]. It is the most mysterious plant in Indian mythology since having the potentiality for resurrecting the life [16]. It is a pteridophytic lithophyte that grows in dry, rocky, hilly tropical areas. [1] [17]. the plant is able to survive even without water [14]. In such dry conditions, the fronds curl, become folded, dry and virtually dead, look like fists hence also called “Pittakala mokka” [1] [17]. In the presence of moisture, it rehydrates back [17] and resumes full physiological activities [10]. The plant grows laxatively, forms a lush green velvety carpet like landscape during the rainy season and forms green pads on the rock, and during summer, it shows a high degree of extreme desiccation [1] [17]. The plant undergoes several dehydration and rehydration cycles, which ensures its survival; this is based on the rapid induction of protective mechanisms [10].

It is considered a divine plant [2] due to its alleged potentiality for resurrecting life and is said to be used to cure Lakshmana in the Ramayana, the great Hindu epic [2] [15] [16]. The herb belongs to the group of ferns known to belong to the Carboniferous period, about 300 million years ago which were the first vascular plants on the earth [3] [16]. It is a xerophytic plant that is reported to grow on the Arawali mountain running east to west [14] [17] also reported to be found in Kailas and Rishabh mountain in the Himalayan region, Dronagiri hills and Garhwal in Uttaranchal [17].

The *Selaginella bryopteris* shows the presence of tannins, saponins, triterpene and many other secondary metabolites [3]. Also, it stores a large number of bioactive compounds such as bioflavonoids, alkaloids, benzenoids, carbohydrates, chromones, coumarins, ligands, quinoids and steroids attributed to its disease curative potency [5]. The herb infusion is used to cure many health problems. It is also used as a tonic for regeneration of energy and validity [1] [4]. The herb also possesses antimicrobial activity, anti-inflammatory activity, antiprotozoal activity [1] [7] anti-hyperglycemic activity, anti-depression activity [7]. It can cure stomach aches [1]. Also have wound healing activity [11]. The present study has been undertaken to enliten the importance of *Selaginella bryopteris*.

**Classification:**

*Selaginella bryopteris* (L). Bak.

Kingdom – Plantae

Division –Lycopodiophyta

Class-Isoetopsida

Order-Selaginellaceae

Genus-*Selaginella*

Species- *bryopteris* (L) Bak.

**General characters:**

*Selaginella bryopteris* is also known as a spike moss plant as it grows on rocky surfaces. The plant usually has a dichotomously branched stem with small microphylls that are generally alternate, opposite, or arranged in whorls, with a single vein. Sometimes, microphylls are dimorphic that is of two sizes with legules. Legules are scale-like structures that grow near the base of the upper surface of each leaf. Usually, for the lycopods, each microphyll contains a branching vascular trace. Roots are borne on the wiry rhizophores, arising from forks in stems. Sporangia are borne in axils of fertile leaves (sporophylls). The plant is heterosporous so it possesses microspores (small) and megaspores (large). The gametophytic generation arises inside the megaspore. [15] [16] [17]

It is a Xerophyte herb having a prostrate stem, creeping on the rock surface, stoloniferous 6-25 cm in size and is differentiated into nodes and internodes.it is erect or suberect, profusely branch and possesses the rhizophores confined to the base [17]. Leaves are isomorphic, Green, distant, ovate. lanceolate, on the main stem. On other branches, leaves are heteromorphic, contiguous and ascending. Spike is short, at the tip. Sporophylls are uniformovate, acuminate. microspores are yellow in colour and are granulose while megaspores are dull yellow in colour and veruicoid [17]. The *Selaginella bryoptrteris* is fertile in the period of July to September [17] and basic chromosome no is  $n=10$ [16] [17].

The plant grows luxuriantly during in rainy season exhibiting a lush green velvet landscape. At the time of summer when there is a shortage of water plants undergo extreme desiccation [15]. This Plant Sanjeevani has been reported to possess the highest degree of drought resistance [16]. In an adverse condition like summer, its fronds curl and become dry and virtually dead hence looking like a closed fist. so often known Unani as ‘Punjemariam’ or ‘Hathazori’. The dry plant when left in water, it unfolds its fronds turn green and come back to its active life [1] [10] [12] [15] [16]. The herb can be used as an indicator of atmospheric humidity since its leaves curled up in dry conditions and retain their original colour and shape when water is available [17]

**Distribution:**

It is found in India and Nepal [3] [13]. In India, it is distributed in Uttaranchal, UP, MP, Tamil Nadu, Karnataka, Bihar, Odessa, Maharashtra, Kerala and AP, Telangana [1][3] [13]. It is reported to be distributed in Kailas and Rishabh Mountain in the Himalayan region, and also from Dronagiri hills Joshimath and Kumaon and Garhwal in Uttaranchal. Some studies reported the species from Arawali mountain terrains running east to west [14] in MP from Nimar Saputara hills mainly Hoshangabad, Amarkantak, Jabalpur, Mandla, Chindwara, Betul and Sehore regions is found [14].

**The mythology behind ‘Sanjeevani’:**

The popular word Sanjeevani literally means “one that infuses Life”. In Hindu Mythology this plant is mentioned as a Miracle herb that has the power to cure any melody. It is believed that it can even revive the dead person also. According to the world-famous epic of Hindi poet *Tulsidas*, there is popular belief is that this wonder herb Sanjeevani booty gave life to the *Lakshman* the younger brother of Lord Shree Rama, in the battle with Ravana, the King Demons. The *Lakshmana* was wounded by Ravana, fell unconscious near death. The beloved disciple of Lord Rama, the *Hanuman* approached the Lankan Royal Physician, *Sushena* for advice. *Sushena* asks *Hanuman* to bring four plants from Dronagiri Hills viz. *Mruthasanjeevani* (Restorer of life), *Vishalyakarani* (Removal of arrows), *Sandhanakarni* (restorer of Skin) and *Savasnyakarani* (restore of Skin colour). *Hanuman* couldn't identify them from the multitude and lifted the entire hill and brought it to the battlefield. *Lakshmana* was revived from near death back to life. It is also mentioned in Ramayana the Sanjeevani Booty is a unique property of Bioluminescence that glows in the darks emits light.

Chemical composition –the studies revealed the presence of bioactive compounds such as bioflavonoids, Alkaloids, Amino-acids, Carbohydrates, cardiac glycosides, flavonoids, Steroids, tannin, terpenoids, reducing sugar [1][4][8] [11] [13] [14] [15]. The resurrection plants generally show various adaptations to prevent the death of tissue during adverse conditions like osmotic stress and dehydration. *Selaginella bryopteris* also contain several types of sugar acids and a sugar alcohol that protect themselves from the detrimental effect of cell destruction [17]. This herb shows remarkable variation in the chemical composition of the species in North East India contain two Known three new bioflavonoids, whereas in southern India eleven known and one new bioflavonoid were isolated [14].

**Special ecological features:**

*Selaginella bryopteris* (L) Bak. Plays a significant role in soil conservation, humus and soil formation. It naturally produces a dense underground network of stoloniferous long, creeping rhizomes which holds the soil and water to form a dense velvety green carpet like structure. It protects the soil from direct rain showers and also checks the flowing rainwater. They also trap the smaller fallen leaves, grass and other biodegradable materials useful for humus formation [17]. Also, plants can be used as a humidity indicator [17].

**Traditional uses of Sanjeevani:**

Traditionally the plant is used by soaking it in water overnight preferably in the earthen pot [13] [15] and then filtrate is then taken orally to cure heat stroke and burning sensations during urination, menstrual problems and also help to reduce labour pain during pregnancy. It is also used to cure jaundice [7] [14] [15]. Some tribal people use the dry plant



with tobacco for hallucination [14] [17]. In India, it is used as a major ingredient in local pills for the treatment of spermatorrhoea, venereal diseases, constipation, colitis, indigestion and urinary problems like diuretic [7] [17]. The local indigenous people of Songhati, Sonbhadra, UP, used the herb paste orally to cure beriberi, dysentery and for rejuvenating when used with cow milk [7] [17]. Tribal communities mainly used it as a strength tonic in improving fitness and extending lifespan [14]. The Gond tribes in Madhya Pradesh used *Selaginella bryopteris* as a strength tonic [7] [17]. The tribal women of Gond, Bhill, Korlu, Mauria, Maria, Baigas, Bharia, Bhatara, Paria, communities of Pachmarhi in Madhya Pradesh use this Sanjeevani to cure gynaecological problems, in treating gonorrhoeas, and other venereal diseases, like spermatorrhoea and leucorrhoea [14]. It is also used to cure disorders related to liver and epilepsy [17]. In hilly tracts in Nagaland state in North Eastern India, tribal people were found to use this herb for the same purpose [14].

#### **Therapeutic studies of *S. bryopteris*:**

**Antibacterial activity-** The experiments were carried out by using the agar disc diffusion method. The methanolic extract of *S. bryopteris* was reported to show antibacterial activity against *Staphylococcus aureus*, *Neisseria gonorrhoea*, *Escherichia coli*, *Bacillus subtilis*, *Pseudomonas aeruginosa*, *Streptococcus pyogenes* [2] [3] [15] *Staphylococcus epidermidis*, *Salmonella typhi* [12]. The experiment also performed with the synthesis and characterization of silver nanoparticles showed promising antibacterial activity against the human pathogens *S. aureus* and *E. coli*. [5].

**Antifungal activity-** The silver nanoparticles obtained from *S. bryopteris* also showed the antifungal activity against *A. niger* [5]. In another experiment, antifungal activity was performed by the agar disc diffusion method and showed high activity against *Candida parapsilosis* and *Aspergillus niger* [2].

**Antiprotozoal activity-** in the study, a series of eleven bioflavonoids had been investigated for their antiprotozoal activity. The experiment was performed by using in vitro assay against the K1 strain of *Plasmodium falciparum*, *Leishmania donovani*, *Trypanosoma bruceirhodesiense* and *Trypanosoma cruzi*. 7,4',7'' tri-o-methylamentoflavone was reported to possess the highest protozoal activity which exhibited on I C 50 of 0.26 $\mu$  M with no significant cytotoxicity evaluated using L-6 cells. 2, 3 dihydrohinokiflavone reported to show the strongest activity against *Leishmania* C I C 50= 1.6  $\mu$  M. whereas no significant activity was detected for the *Trypanosoma*. Also, no significant activity was found against the *Plasmodium* species [6] [15].

**Anti-stress cell death-** The cells when pre-treated with *S. bryopteris* extract for an hour, was reported to be protected from oxidative stress (H<sub>2</sub>O<sub>2</sub>.) induces cell death. The pre-treatment also showed the protective mechanism against ultraviolet (U.V.) induced cell death. The heat-induced growth suppression also had been overcome by this pre-treatment. The chemical analysis showed the presence of hexose and proteins which could be responsible for antistress and antioxidant activity [1] [15].

**Anti-hyperglycaemic activity-** In the experiment, the aqueous extract of *S. bryopteris* was administrated orally for 26 days. The results were reported to reduce the glucose level, creatinine, urea and uric acid in swiss albino mice upon intraperitoneal administration of Alloxan [15].

**Anti-inflammatory activity-** The ointment obtained from *S. bryopteris* was found to exhibit wound healing potential. The in vivo wound healing activity of the ethanolic extract was evaluated by using an excision wound model. The extract was applied topically on rats by preparing ointment. The antioxidant activity of the extract was observed by measuring the level of the oxidative enzyme. The result exhibited sufficient insights on the healing processes with normal recovery stages restored oxidative enzyme levels [11].

#### **Other activities:**

Other reported pharmacological activities include relief from heatstroke and burning sensation during urination [7], memory enhancement and antidepressant activity [7] relief from stomach ache [7]. This herb also possesses chemo-preventive and anti-carcinogenic properties, showed the genoprotective effect against methyl-isocyanate-carcinogenicity [14]. It could be an effective herb in preventing neurodegeneration [17]. The bioflavonoid hinokiflavone derived from the *Selaginella bryopteris* was found to be effective against HIV-infection [16]. Silver nanoparticles from *S. bryopteris* were found to show anticoagulant properties by enhancing the clotting time and also exhibited mild antiplatelet activity by inhibiting platelet aggregation [5].

#### **Conclusion:**

From the present review article, it can be concluded that *Selaginella bryopteris* is a resurrecting herb with so many medicinal properties and therapeutic uses. Traditionally this plant is used by local people to cure heat stroke, burning sensation during urination, jaundice and to reduce labour pain. Stomach ache, gynaecological/ menstrual problems, also used as a tonic. The plant also showed antimicrobial, antiprotozoal, anti-inflammatory activities, wound healing properties. This plant is also reported to possess drought resistance property so can be engineered genetically to improve resistance in other sensitive plants.

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## CHAPTER-14

### ETHNOBOTANICAL STUDY OF MEDICINAL PLANTS USED TO TREAT ULCER DISEASE IN ERODE DISTRICT, TAMILNADU, INDIA

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#### **ABSTRACT:**

*India is a versatile emporium of medicinal plants. Medicinal plants, also called medicinal herbs, have been discovered and used in traditional medicine practices since prehistoric times. Medicinal plants have been used in virtually all cultures as a source of medicine. Assurance of the safety, quality, and efficacy of medicinal plants and herbal products has now become a key issue in industrialized and in developing countries. The rapid multiplication of harmful microbes led to many diseases in human. Products derived from plants may potentially control microbial growth in diverse situations. The medicinal plants have become an intent source for new drug and also a cure for various diseases. It also said to be exhibit promising results in the treatment of ulcer disease. Therefore, our study aimed to illustrate the medicinal plants used for treating ulcers in Erode district, Tamil Nadu, India. Presently, there are 36 medicinal plants belonging to 34 genera and 30 families are reported for the medicinal uses against ulcers. Different plant parts were analyzed for their therapeutic uses and the highly utilized plant parts are found to be flower and leaves. The Ethno medicinal plants with high UV and RI values might give some useful leads for further pharmacological investigation.*

**Keywords:** Erode district, Ulcer disease, Medicinal plants, Traditional medicine.

#### **INTRODUCTION:**

In conventional medication, plant is required as a vital component to treat numerous diseases caused by virus, fungi, bacteria in human [1]. The World Health Organization (WHO) has stated that about 80 % of the world populations in developing countries depends on plant for their essential health care due to poverty and lack of accessed modern medicine [2]. India has nearly 8% of the evaluated biodiversity of the world all over 1,26,000 species [3]. It is considered as one of the 12 mega biodiversities with two hotspots in the North-Eastern region and Western Ghats [4]. This is due to its diversified geographical and climatic conditions [3]. Ethnomedicines paved the primary fundamental for all modern drugs and the significance of the conventional information on medicine is being utilized throughout the world [5]. Ethnomedicinal practices are chosen generally because therapeutic plants are more affordable, promptly accessible and dependable and they are considered to have less side effects than current medications [3]. Typically, this data has been passed from generation to generation which has being experimented by the Indigenous set of people of distinct areas [6]. Ethnomedicinal survey gives a preferable source of data with respect to valuable medicinal plants that can be directed for taming and the management [3]. Peptic ulcer is an acid actuated deep lesions of digestive tract that is generally situated in stomach or proximal duodenum [7]. The formation of peptic ulcer due to the imbalance between protective factors

and aggressive factors [8]. The ulcer is mainly classified as gastric ulcer, duodenal ulcer. Peptic ulcer is an interminable disease influencing up to 10 percent of the world population [9]. This survey focused on the medicinal plants used for treating ulcer.

**STUDY AREA:**

Erode district is divided into two revenue divisions namely Erode and Gobichetipalayam, it consists of 10 Taluks. Erode district lies between 1036 and 1159 north latitude and between 7649 east longitudes. This district shapes the meeting point of Western Ghats and Eastern Ghats isolated by River Bhavani. The climate is usually dry and characterized by good rainfall [9]. In Erode district, hills such as Kathiri hills, Elanji hills, Eratti hills, Hasanur hills and Pavalamalai hills are the main hotspots for the availability of medicinal plants [3,5,10]. The major occupation of this people are farming and cattle rearing [2].

**METHODOLOGY:**

In this study area, the Ethno-medicinal study information was obtained from Nattu Vaidiyars and local traditional healers. The medicinal plants used for ulcer are identified with help of floristic treatises published by presidency of Madras Gamble (1915-1936), Flora of Tamil Nadu (Mathew, 1991) [11]. The gathered information is the plant local name, family name, botanical name, plant parts used and mode of formulation for curing ulcer [12].

**DISCUSSION:**

In this Ethnobotanical study, totally 36 medicinal plants are reported for their therapeutic uses against ulcer. Different parts of the plant were used as medicine by the traditional healers, specifically leaves are used. In table 1, each plant species are listed with botanical name, local name, parts used and mode of formulation. These medicinal plants belonging to 30 families are depicted in table 2. Among these 30 families, Malvaceae and Moraceae species are highly used for medicinal preparation.

**BASED ON PARTS USED:**

Different parts of plant are used as a medicine such as leaf, root, flower, tuber, seed, stem, fruit, tuber and whole plant. The most utilized part to treat ulcer in Erode district are leaves (29%) and flower (14%). Other plant parts are utilized additionally however nearly less. The minimally used part for treating ulcer is tuber (7%). The percentage of plant parts used to treat ulcer was shown in figure 1.

**BASED ON MODE OF FORMULATION:**

The most significantly used formulation was paste (21%). Other modes of formulation are Powder, Decoction, Juice, Tea, Raw, Oil and Extract. The percentage level of plant parts used to treat ulcer was shown in figure 2.

**CONCLUSION:**

Medicinal plants in Erode district plays an important role in primary health care of the tribal people. In this Ethnobotanical study, 36 medicinal plants are reported which belongs to 34 genera and 30 families. The present study shows that the medicinal plants have greater potentiality to cure ulcers. Traditional healers use wild plants for the preparation of herbal medicines which are collected from nearby hills. Traditional herbal remedies which are in current use by informants of study region need further consideration on transmission of this information to next generation.

**Table 1: Classification of plants**

Sl.no	Botanical name	Family name	Local name	Parts used	Mode of application
1	<i>Abutilon indicum</i> G. Don.	Malvaceae	Thuthi	Leaves, seeds	The juice decoction of leaves taken internally treat ulcer. Paste of seeds applied externally.
2	<i>Aegle marmelos</i>	Rutaceae	Vilvam	Fruit, Leaves	Pulp of unripe or half fruit made into 3gram powder, which is given internally. A paste made from about 100gram of the leaves is mixed in a cup of water and administered orally once a day for 3days.
3	<i>Amaranthus spinosus</i> Linn.	Amaranthaceae	Mullu Keerai	Leaves	Leaf paste along with lemon juice is taken with food to cure stomach ulcer.
4	<i>Ammannia baccifera</i> L.	Lythraceae	Kalluruvi	Leaves	The leaves or ashes of the plant mixed with oil are applied externally.
5	<i>Andrographis paniculata</i> Nees..	Acanthaceae	Nilavembu	Whole plant, flower	5-10ml of whole plant juice and 5-100ml decoction of flower taken orally.
6	<i>Argemone mexicana</i> L.	Papaveraceae	Brammathandu	Leaves, Roots, Seed	Raw leaf juice and root paste applied externally. The pounded seeds mixed with mustard oil are applied externally.
7	<i>Artocarpous heterophyllus</i>	Moraceae	Pala	Leaves	The ashes of leaves with or without oil are used to treat

					ulcers are applied topically.
8	<i>Artocarpus integrifolia L.</i>	Moraceae	Palamaram	Flower	50-100 ml of flower decoction taken orally.
9	<i>Azadirachta indica A. Juss.</i>	Meliaceae	Vembu	Flower	2-4 gram of stem bark powder decoction applied topically.
10	<i>Bauhinia purpurea</i>	Caesalpiniaceae	Mantharai	Roots, Barks, Flowers	The raw root, barks and flowers are mixed with rice water, are used in poultice form to treat ulcer.
11	<i>Bougainvillea spectabilis Willd.</i>	Nyctaginaceae	Kagitha poo	Flower, Leaves	Fresh or dried flowers and leaves, dipped in boiled water and it is orally taken as a tea.
12	<i>Caryota urens</i>	Arecaceae	Kontalpanai	Seed	Porridge prepared from the seed flour which is used to treat ulcers.
13	<i>Cayratia carnosa</i>	Vitaceae	Kattuppirandai	Leaves	The juices of the leaves, combined with the juice of young pineapple are taken orally.
14	<i>Coccinia indica</i>	Cucurbitaceae	Kovai	Root, Leaves	5-10 ml of root juice and 3-6g of leaf powder are applied externally.
15	<i>Dioscorea bulbifera L.</i>	Dioscoreaceae	Kaatu seerakavalli	Tuber, Root	Tuber paste and Root juice applied topically
16	<i>Diospyro sebenum</i>	Ebenaceae	Ceylon ebony	Bark	Bark preparations are applied externally to treat ulcers
17	<i>Drosera spatulata</i>	Droseraceae	Alugini cedi	Leaves	Dried leaves are made into powder

	<i>Labill.</i>				and taken orally in the form of tea
18	<i>Enicostemma hyssopifolium</i> (Willd.) Verd.	Gentianaceae	Vellarugu	Leaves	Leaf juice mixed with cow milk is taken orally to cure ulcer.
19	<i>Euphorbia antiquorum</i> L.	Euphorbiaceae	Chatura Kali	Stem	The stem fried, powdered and sprinkled over old ulcers promote healing
20	<i>Ficus religiosa</i>	Moraceae	Arasu	Bark	Ethanol extract of bark applied externally on unhealthy ulcers.
21	<i>Gloriosa superba</i> L.	Liliaceae	Senkanthal	Tuber	Paste made from the tuber is applied externally.
22	<i>Grewia tiliifolia</i>	Tiliaceae	Dhamani	Leaves, Bark	Fresh leaves are made into a paste and applied externally. 50-100ml of bark decoction taken internally per day.
23	<i>Ipomoea batatas</i> (L.) Poir.,	Convolvulaceae	Sakkaraivalli kizhangu	Leaves	50ml of leaf decoction is taken orally on an empty stomach.
24	<i>Ipomoea obscura</i> K.Gawl.	Convolvulaceae	Chirutali	Leaves	Paste of the leaves combined with the leaves of <i>Argyrea Mollis</i> and alcohol, is applied externally.
25	<i>Madhucha longifolia</i> L.	Sapotaceae	Illupai	Seed	The oil extracted from the seed applied topically. The cold infusion prepared from the flowers are given orally in dose of 30-40ml.



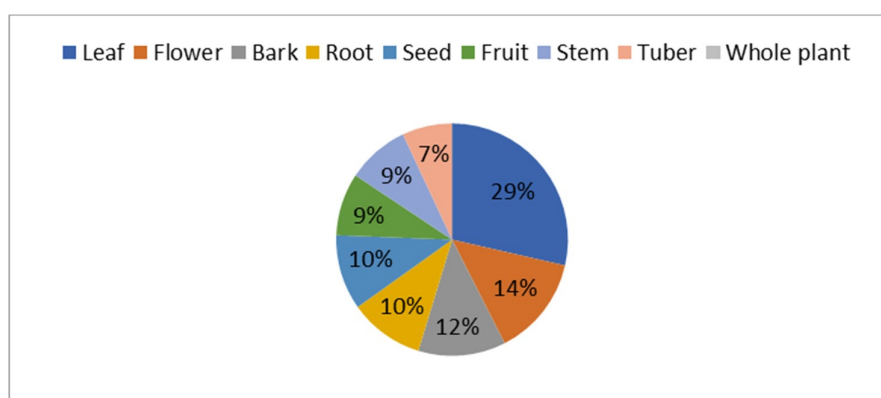
26	<i>Opuntia dillenii</i> Haw.	Cactaceae	Kalli	Fruits	Fresh fruit juice are taken internally to treat ulcer
27	<i>Oxystelma esculentum</i> R.Br.	Asclepiadaceae	Anaitta vitakkoti	Leaves	Leaves are crushed into a powder, which is used as stimulant poultice for curing ulcer.
28	<i>Pongamia glabra</i> Vent.	Fabaceae	Pongum	Seed	A thick brownish oil is extracted from the large seeds applied topically.
29	<i>Randia dumetorum</i> Lam.	Rubiaceae	Karamul	Fruit	Fruits are made into powder, 0.5g - 1.0g of powder taken for the preparation of decoction and which is given internally.
30	<i>Sida acuta</i> Burm.	Malvaceae	Ariva-mooku keera	Leaves	Poultice made from the boiled leaves is applied to cure ulcers
31	<i>Solanum nigrum</i> L.	Solanaceae	Manathakkali	Leaves	Leaf juice is consumed to cure stomach ulcer
32	<i>Stahytarpheta indica</i>	Verbenaceae	Seemai nayuruvi	Leaves, Stem	The leaf and stem extracts are prepared in the form of tea bag (before being consumed). This helps in curing ulcers
33	<i>Synadenium grantii</i> Hook.f.	Euphorbiaceae	-	Leaves	The fresh leaves (100g) were collected, washed with water and made into a paste with a little quantity of water.

					Then the paste was squeezed and the juice(12.5ml) was collected and taken internally.
34	<i>Tephrosia purpurea Pers.</i>	Fabaceae	Kolingi	Leaves	The leaves are grinded and mixed with salt and coconut (Cocos Nucifera) as a topical treatment.
35	<i>Thespesia populnea Cav.</i>	Malvaceae	Poovarsu	Stem, Bark, Leaves, Flower	50-100ml stem bark decoction taken orally. Raw leaves and flower are taken orally.
36	<i>Wedelia biflora Dc.</i>	Asteraceae	Manjal karisalankanni	Leaves	The leaves are used for preparing poultice for treating ulcers

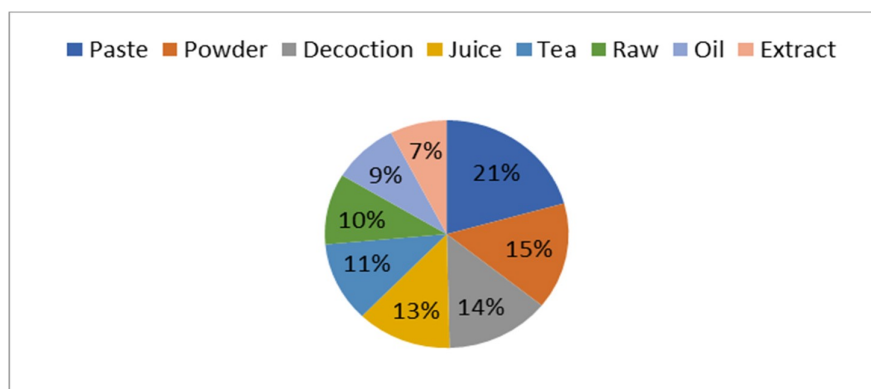
**Table 2: Number of plants and families used by local people in kanyakumari district**

Sl.no	Families	Number of plants
1.	Acanthaceae	1
2.	Amaranthaceae	1
4.	Asclepiadaceae	1
5.	Arecaceae	1
6.	Asteraceae	1
7.	Cactaceae	1
8.	Caesalpiniaceae	1
9.	Convolvulaceae	2
10.	Cucurbitaceae	1
11.	Dioscoreaceae	1
12.	Droseraceae	1
13.	Ebenaceae	1
14.	Euphorbiaceae	2
15.	Fabaceae	2
16.	Gentianaceae	1
17.	Liliaceae	1
18.	Lythraceae	1
19.	Malvaceae	3

20.	Meliaceae	1
21.	Moraceae	3
22.	Nyctaginaceae	1
23.	Papaveraceae	1
24.	Rubiaceae	1
25.	Rutaceae	1
26.	Sapotaceae	1
27.	Solanaceae	1
28.	Tiliaceae	1
29.	Verbenaceae	1
30.	Vitaceae	1



**Figure 1: Use of medicinal plants according to the parts**



**Figure 2: Use of medicinal plants according to method of preparation**

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## CHAPTER-15

### DIGITAL INDIA-IMPACT ON THE SOCIETY

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#### **ABSTRACT: -**

*In today's digital world we see the advancement of many technologies. At the same time, new ideas are emerging and they are showing good results. Digital India is the kind of information that you can get right away with whatever you ask for. This paper collects information through government websites like newspapers and magazines etc. for better and better data. This is a paper to know the good things of Digital India. The only way to empower people is to make progress. Making many positive changes in their lives.*

*Digital India is the dream project of Hon'ble Prime Minister Shri Narendra Modi. The Digital India program is aimed at creating new developments in every field through this project, creating a highly transparent and responsive system and achieving the previous goals of this concept. This project will not only make the Government of India stronger but also the Government of India's economy will be digitally strong and will lead to the restructuring of India. Attempts are being made here today to provide all the necessities that every nation needs, as well as to provide them with different good services and equal benefits. A lot of efforts are being made to achieve the goal of fully digitalizing the nation to increase the capacity of information technology in government departments. There is a need to connect and distribute digitally among the people as well as to make the citizens aware and as a responsibility of the society as well as to integrate government programs and services.*

**Keywords:** *Development, Digital, E-governance, Government, Internet access.*

#### **Introduction: -**

Hon'ble Prime Minister Modi has an idea to transform his nation and create different opportunities for all and the Hon'ble Prime Minister is working hard to make that idea come true. His dream is to empower every citizen using digital technology. And using this technology they try to connect every citizen with each other as well as try to solve those problems by sharing information about the other problems that they are facing using digital technology. Digital technology is essential for the economic growth of the country as well as for the rapid growth and empowerment of citizens around the world. Using digital technology in government offices in daily life can save time and digital technology should not be limited to government offices but should be used from small shops to big malls. As such, digital technology is part of the mobile application and is very easy to use. Although Digital India is India's next big challenge, if we continue to develop as it is, it can certainly transform rural and urban areas. Today, the whole world is aware of this, but it needs to be transformed into a techno-knowledge service. Digital India is an inspiration as well as a step

of the government that we find something and it can be made available to us with a single click. Linking the Indian economy to such an India is the focus of the program or the government. Innovative Ideas seeks to make the program equally accessible through various schemes like Digital Locker, e-Education, etc. and nationwide scholarship portals.

Today our country has taken a big leap in the field of science and technology. Our country is emerging as a strong economy. Information and communication technology is a result of the changes that have taken place in the development of Indian society. Digital India is the dream of Hon'ble Prime Minister Shri Narendra Modi. One of the initiatives of this government is to mobilize the citizens of India and reduce the workload on government departments. The main objective of this initiative is to provide the necessary services to the remote areas through internet facilities as well as to enable them through digital knowledge and to transform the economy. Digital India aims to empower our country as well as sustain knowledge and economy in the society. Digital India, a well-intentioned transformation of the country, is one of the programs. Government services are available to the people electronically and they are brought to the notice of the people and the responsibility of mandatory delivery of government services electronically can also be used through digital technology. This technology will have a positive impact on people living in rural areas and will attract people living in urban areas to invest in manufacturing industries. Everyone knows that new ideas are the result of the progress of the country. Today, the situation of most of the citizens of the country seems to have improved. But to make it even better, Digital India is being implemented. The main objective behind this concept is to make India a wise, digitally strong and strong economy. India wants to be fully digitalized through this initiative. And that is why this paper has tried to understand and explain Digital India. We never thought that the world we live in today would change. But the changes that the nation and we want have been well illustrated by the Digital India initiative.

#### **Importance of digitalIndia: -**

The Digital India campaign has connected many nations of the world. From anywhere in the world, it will be easier to communicate with family members. The campaign will also boost the country's economy. The campaign allows the world to share its thoughts with the world through social media and improved technology, as well as every citizen who uses the Internet. Through this scheme, India can definitely move ahead in the field of science and technology, as the countries where science and technology are used are developed. Apart from this, online government facilities can also be made available in remote parts of the country under this campaign which will definitely benefit the general public as well. Under this campaign, all the services available to the common man can be distributed digitally, so that the help given by the government to the citizens will reach the right place and this will also reduce corruption a lot. At the same time, the government can keep a close eye on all transactions. Under the Digital India campaign, we can educate the constituents in India by providing them with digital literacy i.e. laptops, smartphones, tablets and other electronics in places where educational facilities are not accessible. Under this campaign, most of the work can be done at home. Some important documents can also be obtained online, as well as the facility to keep all those documents in the online locker can also be provided through this scheme. This will keep all important documents and data safe.

**Scope of digital India: -**

Under the Digital India campaign, technology develops and grows exponentially. If this campaign is used more, this product can be increased and pollution can be reduced. The campaign has done a great job in diversifying the international market. Technology is essential in practically every business, and it is developed through technology. Entrepreneurs and researchers strive to make their business successful through Digital India. Digital India aims to build infrastructure for the people, deliver services to the masses electronically, and implement the scheme by 2019.

1. Digital India is an initiative to bring together many different schemes.
2. Not every citizen of the country accepts this change immediately. Therefore, to make Digital India central to enable the changes that have taken place and are to take place.
3. Many remote areas do not have access to education, which has led to an increase in illiteracy in India. To enable India in terms of education through Digital India from this perspective.
4. India is a multi-cultural country, so it belongs to all the states. We want to move forward by bringing all these together. To make this possible through Digital India.

**Challenges of digital India: -**

Digital India is a new venture. Therefore, there may be some difficulties in its implementation. India is a country steeped in diverse customs and traditions. The customs, laws and traditions of each state are different in this country. And the mission is to integrate technology and language across the country. So this is the biggest challenge facing this campaign. The goal of Digital India is very big. With this, the whole country has a big task to develop digitally. And this task is not easy, it requires the involvement of government departments and coordinators in all the states. This mission is likely to be incomplete without government support in the country. An important pillar of the Digital India program is the need to use the Internet everywhere. But in some parts of India, the internet is still out of reach. The illiteracy rate is high due to lack of access to education as most of the places in India are in remote and inaccessible areas. Due to this high illiteracy is the main obstacle in the implementation of this campaign. The place we live in now is considered to be the world of internet. But cybercrime is rampant here. As a result, it is not easy for the citizens to work with faith in the Digital India campaign. For that, it is important to properly authenticate and secure all the documents that are kept on the Internet. There needs to be some rules for that.

The most important thing to make the whole of India a digital India is that the Internet should reach the corners of the country, and it is not an easy task. E-commerce is considered to be a very important topic in the Digital India campaign. And without cyber security, the Digital India campaign is less important. Digital India is a scheme of India in which many different companies have shown interest. But there are many laws and challenges in this campaign and the most important factor is the trust of the people. India's cyber security system has shown some of the work of Digital India, which has not been implemented till date. And in all these circumstances, establishing infrastructure as well as security is certainly a challenge for the Government of India.

### **Opportunities of digital India program-**

Although Digital India has faced many challenges while working in these programs, there are some ways in which this campaign can be given the right shape. Digital India is an important work plan for the entire country.

1. Corruption is rampant in India, and the Digital India program will definitely put an end to this corruption
2. Digital India also has a lot of significant work to do in terms of environmental protection.
3. The use of internet in daily life will definitely benefit every citizen of India. People living in remote areas living in villages will be able to increase their knowledge by using the internet. You will know the things that are necessary to live life.
4. The Digital India campaign will benefit every citizen of the country by having a personal bank account. The facilities that can be provided to the citizens by the government will be deposited directly in the person's bank in the form of money.

### **Benefits of digital India programme-**

No change in the country can take place without revolution. The Digital India program is one of them. It is a mission to make the people of India safe, educated and capable. The Digital India program has a lot of benefits, that's all.

1. The Digital India scheme will benefit all people. All government services will be made available to the citizens of the country through internet. In addition, those who cannot afford to go to school or college or cannot afford to pay school or college fees may have access to education through the Internet through Digital India. Digital India will enable all citizens to be enabled in different services and also give good advice to the people about health services
2. Digital India transactions will not be done in a secret way. All data will be filled online through this scheme. So certainly of transparency between society and the government. And all of this, the citizens of the country will be overwhelmed by the government.
3. The Digital India scheme and e-governance will end corruption in the country. And it will help get government jobs done faster.
4. This scheme will enable the citizens of the country to keep important documents safe. Also, there is no need to carry documents with you to other places. Digital wool facility will be provided to the people through Digital India Abhiyan. In which their important documents like PAN card, Aadhar card, passbook, passport etc.
5. The Digital India scheme will help in completing time consuming tasks quickly and easily. For example, if you want to open an account in a bank, you have to stand in line for a long time, but opening an online account through Digital India saves you the time of standing in line and also reduces the hassle. Also, you can open an account at home without going to the bank, which saves your time and also the time of the bank employees. We can do the same thing in other places too, so that the paper will be less and the time will be less.
6. Through the Digital India campaign, people can grow their business, buy the tools they need for their business online. This eliminates the need for traders to travel far to purchase equipment. They get the tools they need and save time.



**Literature review: -**

Digital articles and many research papers provide detailed information about the role of India and the outcome of this project in India. In 2016, Rani concluded that Digital India provides a kind of opportunity to our country. Digital India provides opportunities for the development of industry in our country as well as for them to use new technologies. It also said that many of the services that projects require, as well as transformative processes, may be essential to achieving their objectives. According to him, a developing country like India needs to go digital. With the use of advanced technology and facilities, businesses can certainly thrive. Many industries in India have supported the Digital India campaign and have put their trust in it. This campaign is very important to take the country towards development. (1)

In 2015, Gupta and Arora studied the Digital India campaign. And their study showed that in areas where it is very important to start a Digital India scheme, where there is a need to provide services, these schemes have definitely been launched. Digital India has launched a number of schemes to boost agriculture and entrepreneurship in many rural areas. In addition to this, some special schemes have been formulated for the empowerment of women in rural areas. In this, the citizens of rural areas and the younger generation are being motivated for education, the importance of education is being explained to them. At the same time all the educational facilities are being extended to the villages. (2)

In November 2016, Himanshi Goswami from his study tried to explain how the Digital India scheme is a challenge and an opportunity. Digital India is both a challenge and an opportunity. According to him, India is a country steeped in different cultures. Every state in India has different traditions. Therefore, the culture factor may be an obstacle for them to implement the Digital India scheme all over the country. He also said that the goal of Digital India is to make our country financially viable. If we continue to plan accordingly, one day India will become a superpower. (3)

**Research methodology and data collection: -**

Sources of data collection: -

Reports and research papers wear referred, combination of data collected from primary as well as secondary sources.

**Vision of digital India: -**

It focuses on many aspects of Digital India. Some of these areas are as follows.

1. An utility of Digital India is, which tries to provide the correct facility to each citizen. It has a high speed internet facility. Mobile phone and bank account also provide access to the shared private space with the same security center and sharing the right private space with the same
2. The amount of documents requested by the citizens in government offices will be made available to them online or through mobile. And this work can continue indefinitely. As a result, citizens will not have any difficulty in submitting such documents. In addition, the provision of cashless electronic transactions will facilitate business and connect geographical systems of development schemes.
3. Making literate in rural areas is Digital India's goal.
4. The main vision of Digital India is to provide digital infrastructure to every citizen of the country. These include internet facilities, mobile phones, bank accounts.

5. All transactions will be cashless through Digital India campaign. Citizens will get services so that they will not be asked to submit documents anywhere, all the required documents will be available to them on the internet with a single click.
6. Another important vision is to empower the people of the village. Access to educational facilities in remote areas is difficult, but it has been made easier through Digital India. Through computers, laptops and other electronic devices, people in rural areas can be digitally literate without any interference.

**Conclusion: -**

At this stage of the work of Digital India or when considering the implementation of Digital India, the task of the program will be to consider the recommendations of the Council on Government Policies. The political hierarchy of the Government of India presupposes co-operation and collaboration in this program at the highest level. All components of the Digital India program mentioned in this paper combine all OECD recommendations. Therefore, this Digital India program will be a new, modern network within the framework of the law. The Digital India campaign is of course necessary to achieve the desired objectives but it is important to consider the percentage to which these results will be achieved. It is not easy for the Digital India scheme to overcome the historical and cultural classes that have been created in the country, as well as the different cultures and traditions. But considering the present, a good initiative like Digital India is essential for the country. Although there are definitely many difficulties in implementing this program, the Digital India program should start immediately. The vision of Digital India program is very big and it is a necessary way to develop the country. Each of the nine pillars that are essential in Digital India faces some challenges in implementation, but the focus needs to be on the development of the country so that this program can be started and completed as soon as possible. The Digital India campaign is not limited to health, education, and financial services. It is important to note that agriculture can also help improve the economic situation. The nation cannot be developed by industrial development of the country alone. As India is a developing country, it is just as important for the growth of rural areas as it is for industrial development. Villages in remote areas need to be provided with the basic services they need along with education and only then can the country be developed. Digital India is just the beginning, and if implemented properly, it will revolutionize. Our country India is making progress in various fields. And the reasons are the same. Digital India is very innovative. And that is the dream of Prime Minister Shri Narendra Modi. Accordingly, Digital India is a great weapon to make our country digitally strong.

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## CHAPTER-16

### ENZYME TECHNOLOGY FOR POLLUTION CONTROL

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#### **ABSTRACT**

*Enzymes are integral assets that assist with supporting a perfect climate in more ways than one. They are used for natural purposes in various ventures including agro-food, oil, creature feed, cleanser, mash and paper, material, calfskin, petrol, and strength substance and biochemical industry. Proteins likewise help to keep an unpolluted climate through their utilization in squander the board. Compounds have an incredible possibility to adequately change and detoxify dirtying substances since they have been perceived to have the option to change toxins at a recognizable rate and are conceivably reasonable to reestablish contaminated conditions. Compounds are utilized to make and work on almost 400 regular purchaser and business items. They are utilized in food varieties and drinks handling, creature nourishment, materials, family cleaning and fuel for vehicles and energy age. The most delegate chemicals engaged with bioremediation incorporate cytochrome P450s, laccases, hydrolases, dehalogenases, dehydrogenases, proteases, and lipases, which have shown promising possible debasement of polymers, fragrant hydrocarbons, halogenated compounds, colors, cleansers, agrochemical compounds, and so on Examination headings in compound innovation and their significance for future advancement in natural biotechnology are discussed about in this section.*

**KEYWORDS:** *Pollutants, Enzymes, Environmental pollutions, Bioremediation.*

#### **1. INTRODUCTION**

Two or three substances with high dirtying potential are open in the climate and effect soil, silt, water, air, microbial living things, plants, creatures, and people. They might be appropriated in one or every single natural compartment [1]. An outline of the most eminent and perpetual poisonous substances. Dirtying substances are constantly present as blends of various standard mixes similarly as of ordinary and inorganic ones. The beginnings and wellsprings of contamination are stand-out: current exercises like mining and metal managing, petrochemical and present day structures, industry effluents, substance weapons creation, pound and paper experiences, concealing associations and current social occasion; and anthropogenic exercises like traffic, plant practices, and others [2]. Toxins might affect the thriving of people, creatures and conditions for quite a long time. Bioremediation is a microorganism interceded change or degradation of poisons into nonhazardous or less-unsafe substances. The employability of various customary parts like living things, parasites, green new development, and plants for persuading bioremediation regarding noxious substances has been represented [1]. The obligation of plants in the bioremediation of toxic substances is

called as phytoremediation. The course of phytoremediation is an emerging green movement that works with the ejection or pollution of the unsafe fake materials in soils, advancement, groundwater, surface water, and air (RTDF). Intrinsically, organized plants are moreover being utilized [2]. For instance, arsenic is Phyto remediated by normally changed plants, for instance, *Arabidopsis thaliana* which passes on two bacterial qualities. One of these characteristics allows the plant to change arsenate into arsenite and the subsequent one ties the changed arsenite and stores it in the vacuole [1].

## **2. ENZYME AS CONTAMINANT STERLIZING AGENT**

It is a fair ordinary method than microbial remediation benefits over standard progressions furthermore over microbial remediation. Compounds are not limited by inhibitor of microbial metabolism [3]. They can be used under silly conditions limiting microbial development. They are strong at low tainting obsessions and are dynamic inside seeing microbial trackers or antagonists [4]. They act against a given substrate (microorganisms may lean toward more adequately degradable blends than the toxin), and are more adaptable than microorganisms because of their more unobtrusive size. This huge number of characteristics render compounds eco-obliging catalysts similarly as enzymatic strategies innocuous to the biological system processes [5]. It may act both extracellularly or intracellularly. Hydrolases, Dehalogenase, Transferase and Oxidoreductases are the most specialist enzymatic classes. Their essential creators are Bacteria, Fungi, Plants and Microbial-plant associations [4].

## **3.POLLUTANTS**

Pollutants are components, atoms Particles in Pollution-life can be hurt when presented to these materials, and the impacts of them on people and plants are notable. Toxins can be brought into the climate numerous ways, both normally and by people. What poisons do whenever they are radiated into environment, soil or water supply is subject to the kind of pollutant [7].

1. Organic Pollutants
2. Inorganic Pollutants

### **4.1 ORGANIC POLLUTANTS**

Organic contamination is biodegradable toxins in a climate. These wellsprings of contamination are normally found and brought about by the climate [6].

1. Nitro compounds
2. Dyes
3. Organophosphorus Hydrolase
4. Cytochrome p450 Monooxygenase

#### **4.1.1. NITRO COMPOUNDS**

There are two specific enzymatic pathways for the contamination of nitrile compounds. One is a two-experience degradation including nitrile hydratase and anúrase through an amide as a transitional [3]. The other is the brief hydrolysis of nitriles to the relating acids and stomach settling agent, catalyzed by nitrilase. Nitrilases (EC 3.5.5.1) set up branch 1 of the nitrilase superfamily, which fuses escalates returning again to non-peptide C/N bonds [5]. They are passed on by the brief animals, for example, *Nocardia* sp. In like manner, *Rhodococcus* sp., and animals, as *Fusarium Solani* or *Aspergillus niger*. A piece of the nitrilases are really great for hydrolyzing nitriles sound structure unequivocally. While much data is open on the arrangement and breaking point of bacterial nitrilases, a lesser number of divulgences is open

for nitrilases from filamentous living creatures. One of the advantages of parasitic nitrilases is their high unequivocal improvement toward substances, for example, benzonitrile and analogs, 3-and 4-cyanopyridine and in addition a few medium chain length aliphatic nitriles, mulled over their exceptional substrates. For example, *A. niger* nitrilase had the decision to change a monster degree of various substrates at high rate as separated and bacterial nitrilase [8]. The biotechnological effect of nitrilases lies in their ability to perceive a wide degree of aliphatic and acyclic nitriles; to hydrolyze nitriles under fragile conditions, with astounding regio- and enantioselectivities from time to time; to show high movement, amplex and thermo-steady quality. This creates these blends phenomenal open doors for bio degraders of nitrile new substances [4].

#### **4.1.2. DYES**

Azo tones are broadly used in material, food, medication, printing, and restorative endeavors. They are hurt causing and teratogenic, and thusly, address an issue to standard and human thriving. Standard degrees of progress consistently using dangerous created mixes to decolorize in much the same way as crash azo-shadings would have horrendous and hurting impacts [6]. Consequently, the use of a compound prepared for oxidizing and moreover discarding azo shades is a partner with choice rather than these limit and unsafe prescriptions. Unquestionably, white-rot living things help to approach and deal with the issue. They are OK hiding degraders, and particular powerful friendly orders have the entrancing brand name for conventional utilization of making different profiles of lignin-mineralizing mixes and instances of their appearance depending upon the planned new development and significant gatherings of the tones being demolished.

#### **4.1.3. ORGANOPHOSPHORUS HYDROLASE**

Organophosphate compounds were made and utilized as pesticides and in engaging and even as a medication beginning around 1937. They are neurotoxic, and finally, they were more than that dirt microbiota could fix every one of them. Organophosphorus hydrolase (regardless called phosphotriesterase) is one of the updates that can serve for organophosphorus raises bioremediation [13]. It is all around pulled out from *Pseudomonas diminuta*, regardless how its parasitic game plan is passed on in *Aspergillus niger* and *Penicillium lilacinum*. It can return again to P-S, P-O, and P-F bonds [9]. This compound has  $Zn^{2+}$  as a cofactor in its close by game plan, while tests showed that replacement of  $Co^{2+}$  gives the most uncommon movement against paraoxon. This protein has the quickest synergist rate and is the most supporting accumulate for getting sorted out movement against organophosphates [7].

#### **4.1.4. CYTOCHROME P450 MONOOXYGENASE (EC 1.14.14.1)**

Cytochrome p450 monooxygenases (CYP) are a social gathering of heme-containing driving forces that catalyze various responses, for example, N-hydroxylation, N-dealkylation, O-dealkylation, oxidative dehalogenation, and hydroxylation of C-H bonds [19]. CYP gathers tremendous electrons for responses from NADPH-cytochrome p450 reductase, and the last protein gets electrons from air oxygen. Thus, the presence of a diminishing master like NAD (P) H or FAD is fundamental. CYPs are versatile proteins introduced in different sorts of microorganisms, improvements, plants, and creatures. Around 7000 clear CYPs have been found till now [5].

#### 4.1.5. PEROXIDASE FROM HORSERADISH

Horseradish peroxidase (HRP) is a peroxidase protein that is generally taken out and cleaned from the horseradish root (*Armoracia rusticana*). C isoenzyme is the most adequate isoenzyme perceived in horseradish root (HRPC) [8]. HPRC is a heme-containing glycopeptide with 308 amino acids, an iron piece in the ferric state in protoporphyrin IX, and two calcium particles in the focal zone that has an atomic stack of 44 kDa [49–51]. HRP is a compound that catalyzes the oxidation of  $H_2O_2$ . Right when  $H_2O_2$  is free, a two-electron oxidation moderate is produced [9]. Compound I is then lessened to uplift II by an oxidizing substrate. These responses produce fan, which would then have the choice to be utilized to recover the first compound [1].

#### 4.2. INORGANIC POLLUTANTS

Inorganic toxins are components or mixtures found in water supplies and might be normal in the geography or brought about by exercises of man through mining, industry or horticulture.

1. Mercury
2. Lead
3. Chromium
4. Arsenic

##### 4.2.1. ARSENIC

Arsenic is a liberal steel that exists in nature in run of the mill and inorganic plans. The inorganic plans ( $As^{3+}$  (arsenite) and  $As^{5+}$  (arsenate)) are harmful and can reason impulse inactivation, carcinoma, hemolysis, keratosis, gangrene, and neurological and cardiovascular sicknesses [10]. Arsenate and arsenite convert to each excellent with the associate of utilizing arsenate reductase and arsenite oxidase through redox responses.  $As^{3+}$  is more perceptible cell and destructive.  $As^{5+}$  is the terminal electron acceptor withinside the lack of oxygen and diminishes to  $As^{3+}$ . Ferredoxin or glutathione will be the electron supply. This system supplements the dissolvability of As and works with draining from soil [13]. Unquestionably the last  $As^{3+}$  is delivered through efflux siphons, ArsB and Acr3. Arsenite oxidase changes  $As^{3+}$  over to out and out less noxious  $As^{5+}$  for utilize both for a supplemental power supply or as an electron advocate for  $CO_2$  obsession. Obviously the last arsenate is still and could be held with the assistant of utilizing silt [12].

The methylated condition of arsenic is dangerous and might be lost from the soil. Oddly, in methanogenic microorganisms, as methylation is joined with methane biosynthesis and may detoxify soil through this framework. Coenzyme M is the biocatalyst of this cleansing system [5].

##### 4.2.2. CHROMIUM

Chromium is the most poisonous critical metal by honorability of its high oxidative potential causing cell hurt and mutagenic, compromising improvement causing, and teratogenic impacts. The wide usage of chromium and its mixes and mining applies this poison to waters and soils [3]. Bioremediation of hexavalent chromium is through decrease to trivalent species. *Pseudomonas*, *Bacillus*, *Escherichia*, *Enterobacter* are several genera that are impervious to Chromium and can decrease it. The lessening of hexavalent chromium might happen through consuming or anaerobic pathways. In the anaerobic cycle, dissolvable cytoplasmic blends are involved and decline hexavalent chromium in two stages [16]. created substances offered a clarification to have hexavalent chromium-diminishing movement.

Additionally,  $\text{Fe}^{2+}$  and  $\text{S}^{2-}$  passed on in express second normal parts can decrease  $\text{Cr}^{6+}$  a ton speedier than chromate-diminishing microorganisms [19].

#### **4.2.3. MERCURY**

Mercury is an enormous metal that is hurting in both typical and inorganic plans, yet the standard progression is more horrendous. Hg harming inclination would cause neurotoxicity, nephrotoxicity, responsive qualities, and shortcoming to talk [11]. Hg is a urgent part in Earth body, however it spreads and wealth soil and water considering various exercises like gold mining, unquestionable appraisal contraptions (check, thermometer, manometer, and so forth), lights, fluctuating fungicides, paper making industry, and battery cells. Mercury exists in three plans: metallic mercury ( $\text{Hg}_0$ ), mercurous ( $\text{Hg}^{+1}$ ), and mercuric ( $\text{Hg}^{2+}$ ) structures [10]. The most ruinous sort of Hg is mercuric chloride. Normal mercury can collect in living creatures and has an affection for proteins' sulfhydryl social affairs. Inorganic mercury has the most insignificant danger considering its low dissolvability and high smoke pressure. Mercury-safe microorganisms can diminish risky conventional sorts of Hg to less hazardous metallic Hg[18]. Mercuric reductase is the central compound that lessens Hg. The mer operon is the arrangement of mercury-resistance characteristics mentioned inside seeing an inducible centralization of Hg. Mercuric reductase in assist with FAD and NADPH, as electron sources, diminishes  $\text{Hg}^{2+}$  to  $\text{Hg}_0$ . The last metallic mercury is flighty and spreads to the air. Similarly, dimethylmercury is temperamental and biomethylation can fill in as a technique for Hg bioremediation [4].

#### **4.2.4. LEAD**

Lead was found in an unassuming aggregate in nature before industrialization. Regardless, in a little while, through gas eating up, different Pb salts start in and degrade water, soil, and air. Lead perniciousness might cause whiteness and requiring trouble and gastrointestinal, neurological, and conceptive issues [15]. Organo leads, especially tetraethyl lead and tetramethyl lead used in gas, are hazardous sorts of lead. They are fragile to photolysis and volatilization and rascal to dialkyl species. All things considered, a couple of microorganisms can obliterate Organo leads through bioremediation processes. *Cupriavidus metallidurans* can dispose of  $\text{Pb}^{2+}$  particles with p-type ATPase and produce inorganic phosphate to sequester  $\text{Pb}^{2+}$  in the periplasm [20]. *Staphylococcus epidermidis* can biomineralize  $\text{Pb}^{2+}$  through carbonate. Urease compound arrangement organized carbonate glasslike  $\text{Pb}^{2+}$ . It will generally be mineralized as oxalate and pyromorphite, as well. *Agaricus bisporus*, *Rhizopus nigricans*, *Penicillium canescens*, *Penicillium chrysogenum*, *Saccharomyces cerevisiae*, *Aspergillus niger*, and *Aspergillus terreus* are among bio changing living creatures. Moreover, it is tended to that *Arthrobacter* and *Phaeolus schweinitzii* can destroy trimethyl lead cations [12].

### **5.ROLE OF MICROBIAL ENZYMES IN BIOREMEDIATION**

#### **5.1. MICROBIAL OXIDOREDUCTASE**

The detoxification of harmful typical mixes by different minute animals and advancements and higher plants through oxidative coupling is interceded with oxidoreductases [19]. Microorganisms separate energy through energy-yielding biochemical responses interceded by these stimuli to segment designed insurances and to help the exchanging of electrons from a decreased customary substrate (ally of) another substance compound (acceptor). During such oxidation-decay responses, the toxins are at last oxidized to innocuous blends (ITRC



2002) [13]. The oxidoreductases investigate the humification of different phenolic substances that are passed on from the debilitating of lignin in a dirt climate. Basically, oxidoreductases can likewise detoxify pernicious xenobiotics, like phenolic or anilinic compounds, through polymerization, copolymerization with different substrates, or restricting to humic substances. Microbial combinations appreciate been taken advantage of in the decolorization and corruption of azo colors [21].

Different life forms lessen the radioactive metals from an oxidized dissolvable plan to a decreased insoluble development. All through energy creation, bacterium takes up electrons from typical mixes and utilize radioactive metal as the last electron acceptor [8]. Some of bacterial species reduce the radioactive metals in a roundabout way with the assistance of a halfway electron ally. At long last precipitant can be viewed as the aftereffect of redox responses inside the metal-lessening microorganisms [9].

The plant social events of Fabaceae, Gramineae, and Solanaceae are found to pass on oxidoreductases which partake in the oxidative contamination of express soil constituents [12]. Phytoremediation of normal pollutions has been generally speaking rotated around three classes of blends: chlorinated solvents, explosives, and oil hydrocarbons [19].

## **5.2. MICROBIAL LACCASES**

Laccases (p-diphenol: dioxygen oxidoreductase) incorporate a get-together of multicopper oxidases made by unequivocal plants, parasites, horrible little animals, and minuscule living creatures, that catalyze the oxidation of a wide degree of diminished phenolic and sweet-smelling substrates with efficient reduction of atomic oxygen to water. Laccases are known to happen in various isoenzyme shapes which is all encoded by a substitute quality, and, now and then, the attributes have been bestowed diversely relying upon the chance of the inducer [23]. Various microorganisms produce intra and extracellular laccases fit for catalyzing the oxidation of ortho and paradiphenols, aminophenols, polyphenols, polyamines, lignins, and aryl diamines also as a few inorganic particles. Laccases not just oxidize phenolic and methoxy-phenolic acids, yet moreover decarboxylate them and assault their methoxy social gatherings (demethylation) [11]. These proteins are secured with the depolymerization of lignin, which accomplishes an assortment of phenols. Also, these mixes are used as improvements for microorganisms or repolymerized to humic materials by laccase. Among the customary informed authorities, laccases address a hypnotizing get-together of unavoidable, oxidoreductase catalysts that show affirmation of offering extraordinary potential for biotechnological and bioremediation applications [7].

## **5.3. MICROBIAL OXYGENASES**

Oxygenases have a spot with the oxidoreductase social event of driving forces. They investigate oxidation of diminished substrates by moving oxygen from sub-atomic oxygen (O<sub>2</sub>) using FAD/NADH/NADPH as a cosubstrate [18]. Oxygenases are assembled into two groupings; the monooxygenases and dioxygenases subject to number of oxygen particles utilized for oxygenation. They acknowledge an essential part in the absorption of typical blends by developing their reactivity or water dissolvability or achieving cleavage of the sweet-smelling ring [16]. Oxygenases have a broad substrate range and are dynamic against a wide degree of mixes, including the chlorinated aliphatics. By and large the presentation of O<sub>2</sub> particles into the ordinary particle by oxygenase accomplishes cleavage of the sweet-smelling rings. For what it's worth, the most centered around compounds in bioremediation

are bacterial mono-or dioxygenases. A no-nonsense assessment of the gig of oxygenases in biodegradation process is accessible [15].

Halogenated ordinary mixes incorporate the best social gatherings of organic poisons because of their wide use as herbicides, bug hurts, fungicides, water driven and heat move liquids, plasticizers, and intermediates for designed amalgamation [22]. The corruption of these pollutions is refined by express oxygenases. Oxygenases comparably intercede dehalogenation responses of halogenated methanes, ethanes, and ethylenes in relationship with multifunctional enzymestechnological and bioremediation applications [21].

### **5.3.1. MONOOXYGENASES**

Monooxygenases oblige the slightest bit of the oxygen particle into the substrate. Monooxygenases are depicted into two subclasses subject to the presence cofactor: flavin-subordinate monooxygenases and P450 monooxygenases. Flavin-subordinate monooxygenases contain flavin as prosthetic collecting and require NADP or NADPH as coenzyme [14]. P450 monooxygenases are heme-containing oxygenases that exist in both eukaryotic and prokaryotic creatures. The monooxygenases contain a flexible superfamily of blends that catalyzes oxidative responses of substrates going from alkanes to complex endogenous atoms like steroids and unsaturated fats. Monooxygenases go about as biocatalysts in bioremediation coordinated effort and created science due to their essentially region selectivity and stereoselectivity on wide degree of substrates [9]. Greater piece of mono-oxygenase considered ahead time are having cofactor, however there are sure monooxygenases what work free of a cofactor. These combinations require essentially sub-atomic oxygen for their exercises and use the substrate as diminishing specialist [10].

### **5.3.2. MICROBIAL DIOXYGENASES**

Dioxygenases are multicomponent compound frameworks that bring atomic oxygen into their substrate. Sweet-smelling hydrocarbon dioxygenases, have a spot with a monstrous social event of Rieske nonheme iron oxygenases. These dioxygenases catalyze enantiospecifically the oxygenation of wide degree of substrates. Dioxygenases essentially oxidize fragrant mixes and, therefore, have applications in natural remediation [6]. All individuals from this family have a couple of electron transport proteins going before their oxygenase parts. The important stone advancement of naphthalene dioxygenase has attested the presence of a Rieske (2Fe2S) pack and mononuclear iron in every alpha subunit [10].

The catechol dioxygenases fill in as a piece of qualities system for spoiling sweet-smelling atoms in the Environment. They are found in the dirt moment living creatures and related with the distinction in fragrant antecedents into aliphatic things. The intradiol removing proteins use Fe(III), while the extradiol dividing stimuli use Fe(II) and Mn(II) in a few cases [19].

## **6.POSSIBLE STRATEGIES FOR OVER-COMING PROBLEMS ASSOCIATED WITH THE USE OF ENZYMES**

The use of a protein is possible expecting the aftereffect of the designed intervened reaction is less dangerous than the substrate. In addition, expecting that the detoxification requires a multistep cycle, for instance various proteins acting persistently, essentially unequivocal microorganisms are fitting for achieving cleaning [7]. Whether or not powers need cofactors, their utilization may be hazardous, adjacent to if a status containing both the substance and the specific cofactor is used. Another issue in the usage of upgrades to detoxify average

dirty soil is given by the quick pollution of the free substance by proteases passed on by soil microorganisms. Various disadvantages may restrict the use of proteins for obliging application and in situ remediation of dirty conditions [14]. In standard customary ecological elements, it helps that with destroying the reactant furthest reaches of enzymatic central purposes might depend on both the poisons to be changed and the motivations. In a dirty site, mixes or made blends out of various ordinary new substances, rather than a lone poison, are open and the perplexing thought of the tainting may consolidate possible negative or positive, synergistic effects on the protein capability [20]. Proteins may decrease or even lose their progression in the wake of ruining change or they may present a low security and consistency under dependably coldblooded normal conditions. If their rehashed use is required, boosts may present low reusability, thus reducing the accommodation of the whole treatment. Also, at whatever point restricted mixes are used, the cost of protein segment and cleaning astoundingly hampers their judicious application, basically not actually permanently established overseeing is required. Acetosyringone and syringaldehyde showed to be the best local area individuals [20].

Another strategy for regulating work on the introduction of driving forces in the detoxification of contaminations is the usage of mixes immobilized on norm and arranged sponsorships of different nature and through different immobilization frameworks. Immobilized impetuses have conventionally a genuinely long utilitarian perseverance, being absolutely consistent toward physical, substance, and typical denaturing arranged specialists. Moreover, they may be reused and recovered around the culmination of the cycle [18].

Khan and Husain (2007) utilized a potato polyphenol oxidase openness adsorbed on Celite for the treatment of wastewater/disguising meandering aimlessly debased with responsive material and non-material tones, Reactive Blue 4 and Reactive Orange 86, and isolated its ability and adequacy and the free compound [21]. The immobilized protein showed a higher limit in decolorizing individual material tones, presently moreover their tangled mixes (containing organized blend of as much as four tones) and disguising profluent as isolated and the dissolvable substance. Immobilized main thrust showed other than a higher steadfastness against a couple denaturing conditions and all around higher decolorizing development than the free improvement toward non-material tones [9].

An amazingly entrancing immobilization method was executed with laccase. Enzymatic nanoreactors were contracted through noncovalent envelopment of the enzymatic protein by amphiphilic straight dendritic AB or ABA copolymers [12]. The glycoside sections in the nearby compound filled in as anchor fights for the straight dendritic copolymers, as pondered by control tests completely finished the DE glycosylated protein. The immobilization further empowered the reactant improvement isolated and the nearby main thrust (77-85 nkat mL<sup>-1</sup> versus 60 nkat mL<sup>-1</sup>, exclusively). Likewise, the immobilized upgrade was steadier at raised temperatures up to 70°C and prepared to sufficiently oxidize phenolic compounds (Syringaldazine) and hydrophobic polyaromatic hydrocarbons (anthracene and benzo[a]pyrene) [8].

Degradative proteins with new or further created activities and boldness under picked conditions can be made by innate orchestrating methodologies like normal site-worked with mutagenesis and different DNA-refreshing systems (for instance the enthusiastic break of a general public of eccentricity ascribes of a particular family followed by surprising reassembly [20]). Mixes can be changed by made development or by site-unequivocal

mutagenesis to additionally empower existing biodegradation pathways or to foster biocatalytic cycles for the formation of obliging things. For the debasement of persevering blends where no normal pathways are known, novel pathways can be made by joining pathway 'tapes' from various inalienable sources [12].

Similarly, public advantage of passing on GEMs into the environment has actuated ludicrous rules by government bodies (EPA). In like manner, scarcely any separated microorganisms have shown at the hour of field application [13].

## **7.PLANTS AND THEIR ASSOCIATED ENZYMES AS DECONTAMINATING AGENTS**

A drawing in choice for vanquishing a piece of the detriments related to the use of upgrades in situ remediation of ruined conditions is phytoremediation. Phytoremediation is the in-situ utilization of plants, their enzymatic plan, their fundamental establishments and related microorganisms to ruin, contain or deliver harmless toxins present in different biological systems (soil, development, groundwater, and air) [19].

Concerning their quick circumstances in remediation processes, plants may utilize different constructions to capably take out both standard and inorganic destructive substances from a dirtied environment: a) rhizofiltration; b) support; c) concentration and precipitation of basic metals by roots; d) phytoextraction, for instance extraction and mix of harmful substances in plant tissues including roots and leaves; e) phytodegradation for instance degradation of bewildering customary particles in CO<sub>2</sub> and H<sub>2</sub>O and their partaking in plant tissues; f) rhizodegradation or plant-assisted bioremediation with signaling microbial and parasitic debasement by the presence of root fake materials and exudates in the rhizosphere; and g) phytostabilization, for instance adsorption and precipitation of toxins (fundamentally metals) with an in the wake of diminishing of their compactness[20].

A charming brand name is the synergic relationship among plants and microorganisms that expressly occurs in the soil environment impacted by plant-roots, or rhizosphere [15].

Since plants may be lacking in catabolic pathways for the immovable degradation of poisonous substances isolated and microorganisms, research tries have been given to configuration plants with characteristics that can introduce them extra and further made contamination limits. The ampleness of phytoremediation can be undeniably improved by overexpressing the characteristics related with ingestion, take-up, or transport of unequivocal destructive substances in plants. Additionally, suitable characteristics may be given in roots to refresh the rhizodegradation not permanently set up toxins [24].

Acetosyringone and syringaldehyde exhibited to be the best individuals. The primary pesticide change rates were gotten with a ccenterenter individual substrate level of 5:1, one of the most un-uncovered so far for the laccase-go between structures [20].

For instance, research is regularly established on changing fabricated combinations that can play out a reaction like the best one, yet it might be difficult to apply biomolecular meaning to the bioremediation of novel poisons, which are not known to be biodegradable [11]. Considering everything, it might be possible later on when our understanding into the protein structure-work, imploding, instrument and parts will be on a very fundamental level improved. Whether or not a genetically organized microorganism (GEM) with invigorated cutoff points and passing on the ideal protein is sufficiently made by biomolecular orchestrating, it really faces particular fundamental targets concerning its application.

Precious stones or their enzymatic parts passed on into the environment may have a reduced prosperity level and may not make due in view of the extra energy demands obliged by the presence of new gained material in the cell [19].

Furthermore, public advantage of passing on GEMs into the environment has instigated crazy standards by government bodies (EPA). In like manner, scarcely any separated microorganisms have shown at the hour of field application [17].

## **8.CONCLUSION**

Another technique for directing work on the showing of powers in the detoxification of pollutions is the usage of mixes immobilized on norm and arranged sponsorships of different nature and through different immobilization structures. Immobilized impetuses have regularly a somewhat long utilitarian reliability [21], being absolutely unsurprising toward physical, substance, and normal denaturing arranged specialists. Moreover, they may be reused and recovered close to the completion of the cycle. Taking everything into account, limits are accessible for applying biomolecular organizing strategies [19]. For instance, research is regularly established on changing made combinations that can play out a reaction like the best one, yet it might be difficult to apply biomolecular aiming to the bioremediation of novel poisonous substances, which are not known to be biodegradable. Considering everything, it might be possible later on when our knowledge into the protein structure-work, imploding, instrument and parts will be on a very major level improved. Whether or not a genetically organized microorganism (GEM) with revived cutoff points and passing on the ideal protein is adequately made by biomolecular orchestrating, it genuinely faces assorted central targets concerning its application [23]. Also, public advantage of passing on GEMs into the environment has actuated crazy standards by government bodies (EPA). In like manner, scarcely any separated microorganisms have shown at the hour of field application [25].

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## CHAPTER-17

### A STUDY OF HOMONYMY IN BANGLA

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#### **ABSTRACT:**

*Language cannot be separated from its meaning. Learning and using a language deals with the meaning. Thus the study of meaning occupies an important place in learning any languages. Any utterances may lead to more than one interpretation simply because one of the words may have more than one meaning Lexical ambiguity is very common in natural language. The present paper aims to explore one of the major semantic phenomena related to ambiguity, that is homonymy in Bangla. Homonymy often creates ambiguity in language. This paper also makes an attempt to study the notion of homonymy in Bangla and their importance in regard to word meaning. The study will help in gaining insight into different homonymms that are found in standard Bangla.*

**Keywords:** homonymy, homograph, homophone, polysemy.

#### **Introduction**

Bangla language is derived from an eastern variety of Old Indo Aryan language closely related to Sanskrit language. A descendant of Magadhi Prakrit group of the Indo Aryan family of languages, Bangla is the official language of West Bengal and the national language of Bangladesh. It is also the co-official language of Tripura, Cachar, Karimganj, and Hailakandi districts of southern Assam. The varieties undertaken for the present study is the standard Bangla spoken in Kolkata.

#### **Research Methodology**

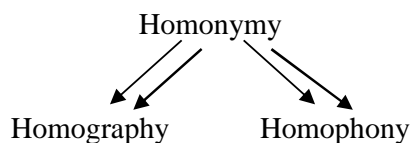
The researcher has collected the data from the secondary sources only. Some are gathered from the libraries in the form of books, articles, research papers etc.

#### **Homonymy in Bangla -An overview**

According to David Crystal (2008), "A term used in semantic analysis to refer to lexical items which have the same form but differ in meaning". "If two form-meaning pairing involve two different lexemes that just happen to have the same spoken and or written form, then it is a case of homonymy-that is, there are two lexemes that are each other's homonym" (Murphy 2010 p.84). Richards and Schmidt (2002, p.264) define homonymy as "words which are written in the same way and sound alike but which have different meanings."

#### **Types of Homonymy in Bangla**

Homonymy in Bangla can be expressed in two different ways-homography and homophony.





**Homography:** Words that have the same spelling, same pronunciation but different meanings. In Bangla there are lexemes which have the same spelling but differ in meaning. The following are the different homographs found in Bangla language.

1. *হাে* 'be verb' / *gɔm tʰeke ata hɔe/*  
*wheat from flour is*  
*'Flour is made from wheat'*  
*'horse' / hɔe kʰub beɣe dourae/*  
*horse very fast runs*  
*'Horse runs very fast'*
2. *পাড়া* 'to pluck' / *roɖʒ fokale ami gaʃʰ tʰeke pʰul paʃi/*  
*every morning I tree from flower pluck I*  
*'Every morning I pluck flowers from the tree'*  
*'Locality' / amader paʃate ekti mondir aʃʰe/*  
*I PL locality one det temple to be*  
*'There is one temple in our locality'*
3. *সই* 'friend' / *uma tar foier foɳge kɔtʰa bolʃʰe/*  
*uma her friend Nom talk PRS PROG*  
*'Uma is talking to her friend.'*  
*'to bear' /ɖʒibone onek kiʃʃu foite hoe/*  
*life many things bear have*  
*'We have to bear many things in our life'*
4. *পাশ* 'side' / *rastar dui paʃe dʰaner kʰet/*  
*road two side paddy field*  
*'Paddy field is on both side of the road'*  
*'pass in the exam' / ʃʰeleti porikʰae paʃ koreʃʰe/*  
*boy DET exam pass do PST*  
*'The boy had passed the exam'*
5. *তার* 'his/her' / *ʃe tar niɖʒer barite ɖʒabe/*  
*he own home LOC go FUT 3*  
*'He will go to his or her house'*  
*'Wire' / mukʰe tar debe na/*  
*mouth LOC wire give NEG*  
*'Don't give wire into mouth.'*
6. *চান* 'want' / *ki ʃan tini /*  
*what want he*  
*What he want?*  
*'bath' / roɖʒ ʃan kora uʃit/*  
*everyday bath do should*  
*'Everyday we should take bath'*
7. *পড়া* 'read' / *boi poʃa uʃit/*  
*book read should*

- 'We should read book'  
'fall' /gaf t<sup>h</sup>eke p<sup>h</sup>ol p<sup>o</sup>re/  
tree from fruit fall PRS  
'The fruit falls from the tree'
8. baf বাস 'live' /maf<sup>h</sup> d<sup>o</sup>le baf kore/  
fish water live do LOC  
'Fish lives in water'  
'bus' /ami bafe kore i<sup>h</sup>kul d<sup>o</sup>gai/  
I bus by school go I  
'I go to school by bus.'
9. o<sup>h</sup>o অর্থ 'meaning' /ei fobder o<sup>h</sup>o amake bud<sup>h</sup>ie dao/  
this word meaning I ACC explain give  
'Explain the meaning of this word.'
- 'money, Wealth' /o<sup>h</sup>o diye fob ki<sup>h</sup>u kena d<sup>o</sup>ae na/  
wealth give everything buy not  
'Wealth cannot buy everything.'
10. purbo পূর্ব 'east' /purbo dike furd<sup>o</sup> o<sup>h</sup>e/  
east direction sun rises  
'Sun rises in the east'  
'before' /kichu k<sup>h</sup>awar purbe hat d<sup>h</sup>owa ufit/  
anything eat before hand wash should  
'We should wash our hand before eating anything.'
11. b<sup>o</sup>বল 'strength' /amar forire bol nei /  
I body strength not  
'I don't have strength in my body.'  
'ball' /ami ekta notun b<sup>o</sup>l kinet<sup>h</sup>i /  
I one ball new buy PST  
'I have bought one new ball.'
12. p<sup>h</sup>ol ফল 'fruit' /roz p<sup>h</sup>ol k<sup>h</sup>ete hoe/  
everyday fruit eat  
'Everyday we should eat fruit.'  
'Result' /amar porik<sup>h</sup>ar p<sup>h</sup>ol b<sup>h</sup>alo/  
my exam result good  
'My exam result is good.'
13. p<sup>o</sup>r পর 'others' /p<sup>o</sup>rer d<sup>o</sup>inif hat dite nei/  
Others things hand give NEG  
'We should not touch other's things.'  
'Rest' /k<sup>h</sup>aowar p<sup>o</sup>re bi<sup>h</sup>ram kora ufit/  
Food after rest do should  
'We should take rest after having food.'
14. pan পাণ 'drink' /fokal bela k<sup>h</sup>ali pete d<sup>o</sup>al k<sup>h</sup>e<sup>h</sup>e b<sup>h</sup>alo/

*morning time empty stomach water drink good*  
*'Its good to drink water in empty stomach in the morning.'*  
*'betel leaf' / ami pan k'ai /*

*I betel leaf eat I*  
*'I eat betel leaf.'*

**Homophones:** Words that have the same pronunciation, but different spelling and different meanings. Bangla also posses such words in large number.

15.apon আপন 'own' /eta amar apon g'har/  
*this mine own house*  
*'This is my own house.'*

আপণ 'shop' /apon t'heke f'al an /  
*shop LOC rice bring*  
*'Bring rice from shop.'*

16.a/a আসা 'come' /æk'on bristi a/be/  
*now rain come FUT*  
*'Now there will be rain.'*

আশা 'hope' /a/a kori tumi b'alo af'ho/  
*hope do I fine have 2*  
*'Hope you are fine.'*

17.ḍam ডাম 'a kind of fruit' /ḍam k'hate b'alo/  
*black berry eat good*  
*'Black berry is good to eat.'*  
 যাম 'part' /rater prot'om ḍam e bari f'ole efo/  
*night first part house come*  
*'Come home in the first part of the night.'*

18.ḍib ডিব 'tongue' /ḍib porifkar kora ufit/  
*tongue clean do should*  
*'We should clean our tongue.'*  
 জীব 'animals' /bone onek rokom ḍib ḍontu af'he/  
*jungle different kinds animals*  
*'Different kinds of animals are there in the jungle.'*

19.din দিন 'day' /tiri/ dine ek mafe hoe /  
*thirty days one month have*  
*'There are thirty days in a month.'*

দীন 'poor' /meyeti k'ub din/  
*girl det very poor*  
*'The girl is very poor.'*

20.dip দীপ 'lamp' /meyeti dip ḍ'alia porf'he/  
*girl det lamp light study tns*  
*'The girl is studying by lighting the lamp.'*

- দ্বীপ 'island' /diper f̥ari dike dʒɔl tʰake/  
 island Nom surround water have  
 'Island is surrounded by water.'
21. dʰoni ধনী 'rich' /ram dʰoni gʰorer f̥ele/  
 ram rich house boy  
 'Ram belongs to a rich family.'
- ধ্বনি 'sound' /f̥ɔb dʰoni ek rokom nae/  
 all sound same not  
 'All sound are not same.'
22. niti নিতি 'daily' /niti din i/f̥ar ke pratʰona korte hoe/  
 daily god pray do should  
 'We should pray to God daily.'
- নীতি 'rules' /pratek kaɖger ekta niti aʃʰe/  
 every work one rule have  
 'Every work has its own rule.'
23. bor̥ʃa বর্ষা 'rainy' /bor̥ʃa kal amar bʰalo lage/  
 rainy season my good like  
 'I like rainy season.'
- বর্ষা 'spear' / bor̥ʃa ek dʰoroner aʃtro/  
 spear one kind weapon  
 'Spear is one kind of weapon.'
24. ban বান 'flood' /amader grame ban hoeʃʰe/  
*Our village flood*  
 'We have flood in our village.'
- বাণ 'arrow' /ram pakʰike ban diye mereʃʰe/  
*ram bird ACC arrow with kill PST*  
 'Ram killed the bird with an arrow.'
25. biʃ বিষ 'poison' /f̥aper biʃ aʃʰe /  
 snake Nom poison have  
 'Snakes have poison.'
- বিশ '20 rupees' /ramke rita biʃʈaka dilo/  
 ram ACC rita twenty rupees give PST  
 'Rita gave twenty rupees to Ram.'
26. lokkʰo লক্ষ্য 'target, purpose' /f̥okoler dʒibone lokkʰo tʰaka uʃit/  
*everybody GEN life aim have should*  
 'Everybody should have aim in life.'
- লক্ষ 'lakh' /bʰaike æk lokkʰo ʈaka dieʃʰi /  
*brother one lakh rupees give PRES1*  
 'I have given rupees one lakh to my brother'
27. f̥ikar শিকার 'hunting' / ram f̥ikar korte oneke bʰalo baʃe/  
 ram hunting do very likes much

'Ram likes to do hunting very much. '

স্বীকার 'confession' /ami /ikar korʃi dʒe ami ʃuri koreʃi/

I confess do I that I steal do PRES I

'I confess that I have stolen it. '

### Differentiation between homonymy and polysemy in Bangla:

Lexicographer are faced with the problems of differentiation between polysemy and homonymy. The principle of differentiation has been the relatedness of meanings. If the meanings are related then it is a case of polysemy, if not, it is the case of homonymy.

A word in a sentence or an utterance may lead to various interpretation for the particular word may have more than one meaning. It is indeed a very difficult task to draw a line of demarcation between homonymy and polysemy. Richards and Schmidt (2002, p.406) define Polysemy as "word having two or more closely related meanings." He hurt his foot. She stood at the foot of the stairs." The foot is the lowest part of the stairs just as the lowest part of the human body. However according to Hurford et.al. (2007, p. 130) the distinction between homonymy and polysemy deals with the closeness or relatedness of the senses of between words. Thus, homonymy deals with different meanings, whereas polysemy deals with related meanings. The following are some of the examples of polysemous words in Bangla language.

28./ *matʰa* /মাথা -*manuʃer matʰa* (head), *gaʃʰer matʰa* (a top of the tree), *gramer matʰa* (head of the village ), *paharer matʰa* ( peak of the the mountain), *matʰa munḍu*( ), *koʃi matʰa* (tender head ), *aṅguler matʰa* (tip of the finger) , *almarir matʰa* (top of the almirah ), *matʰa koʃa* (to strike one's head) *matʰa golano* (to poke one's nose into), *matʰa gōḍa* (to take shelter somehow or with difficulty).

29. / *mukʰ* /মুখ -*manuʃer mukʰ* (the face), *mukʰ* (gift of gab), *boʃo mukʰ* (sharp or caustic tongue) *guha mukʰ* ( an entrance), *pʰoʃar mukʰ* (an outlet) , *ʃʰuʃer mukʰ* (a tip of a needle), *rastar mukʰ* (an end of a road), *mukʰ kora* (to scold) *mukʰ kʰarap kora* (to utter foul words) *mukʰ kʰifano* (to make faces), *mukʰ kʰola* (to begin to speak) , *mukʰ ʃʌla* ( to be eating or speaking or scolding) , *mukʰ ʃawa* (to be dependent).

30. /*kaʃa*/ কাটা - *aʃor kaʃa* (to scratch) , *ʃʰoʃa kaʃa* (to recite a rhyme) *ʃimti kata* (to pinch) *gola kaʃa* (cut the neck), *ʃʰoʃ kaʃa* (cut on the lip), *ḍabor kaʃa* (useless talk) *tal kaʃa* (to make a slip in ) *pʰaʃa kaʃa* (to avoid or escape impending calamity.)

31./*boʃo*/ বড়-*boʃo kotʰa* (most important word), *boʃo manuʃ* (great man), *boʃo mukʰ* (important person), *boʃo bidda* (big knowledge), *boʃo gola* (loud voice ) , *boʃo din* (big day), *boʃo kutum* (important relative), *boʃo lok* (moneyed person ) , *boʃo mon* (a high mind) *boʃo pet* (a large belly).

32./*ʃʰoto*/ছোটো- *ʃʰoto lok* (unimportant person) , *ʃʰoto gʰoʃ* (small house) , *ʃʰoto mon* (mean minded) , *ʃʰoto naḍʒor* (narrow look ) , *ʃʰoto bæla* (childhood)

33./k<sup>h</sup>awa/ খাওয়া - *himjim k<sup>h</sup>awa* (getting puzzle), *habudubu k<sup>h</sup>awa* (getting plunged), *bokuni k<sup>h</sup>awa* (to be rebuked), *hotomoto k<sup>h</sup>awa* (getting nervous), *dʒɔl k<sup>h</sup>awa* (drink water), *gal k<sup>h</sup>awa* (getting scolded), *,hawa k<sup>h</sup>awa* (idling), *taka k<sup>h</sup>awa* (bribery), *g<sup>h</sup>uf k<sup>h</sup>awa* (bribery), *nun k<sup>h</sup>awa* (taking favour), *dʒ<sup>h</sup>ata k<sup>h</sup>awa* (getting insulted), *b<sup>h</sup>at k<sup>h</sup>awa* (eat rice), *g<sup>h</sup>uf k<sup>h</sup>awa* (bribery), *taka k<sup>h</sup>awa* (bribe), *g<sup>h</sup>ufi k<sup>h</sup>awa* (to get a blow), *fud<sup>h</sup> k<sup>h</sup>awa* (to get interest in terms of money).

34./kan/ কান- *kan kaʃa* (to defeat or supersede outright), *kan b<sup>h</sup>ari kora* (to speak to a person secretly in order to prejudice him against another), *kan pata* (to give ear to), *kan k<sup>h</sup>aʃa kora* (to prick up one's ear), *kane k<sup>h</sup>ato* (short of hearing), *kan dewa* (to give attention to), *kan tana* (to pull ear), *kan dʒ<sup>h</sup>ala pala* (to vex or to annoy by deafening or discordant noise)

35./ʃok<sup>h</sup>/ চোখ - *ʃok<sup>h</sup> rak<sup>h</sup>a* (to keep an watch), *ʃok<sup>h</sup> e ʃok<sup>h</sup> kot<sup>h</sup>a* (to keep vigil), *ʃok<sup>h</sup> dewa* (to see), *ʃok<sup>h</sup> poʃa* (to like someone), *ʃok<sup>h</sup> bodʒa* (to die), *ʃok<sup>h</sup> tepa* (try to communicate something by blinking eyes).

36./hat/ হাত - *hat kɔra* (to pull somebody in ones side), *hat ʃalano* (to work fast) *hat ʃan* (habit of stealing), *hat pata* (to beg), *hat lagano* (to help in some work), *hat gutano* (to keep oneself away from work), *hate kolome* (to learn to write for the first time), *hata nate* (caught red handed), *hate hate* (hand in hand), *hat pa bād<sup>h</sup>a* (under compulsion), *hate k<sup>h</sup>ori* (to start writing for the first time), *hat k<sup>h</sup>ali* (no money in pocket), *hat dewa* (to touch), *hat afa* (to develop into habit), *hat k<sup>h</sup>ola* (spendrift).

37. /k̃aʃa/ কাঁচা - *k̃aʃa p<sup>h</sup>ɔl* (unripe fruit), *k̃aʃa maʃ* (raw fish), *k̃aʃa ʃul* (black hair), *k̃aʃa rast<sup>h</sup>a* (muddy road), *k̃aʃa kɔla* (raw banana), *k̃aʃa lok* (unskilled person), *k̃aʃa kaɖʒ* (faulty, defective work), *k̃aʃa fona* (pure gold), *k̃aʃa g<sup>h</sup>ar* (thatched house), *k̃aʃa g<sup>h</sup>um* (not deep or sound sleep), *k̃aʃa b<sup>h</sup>aʃa* (dialect).

Polysemy is "the existence of more than one semantic specification for the same lexical item; we can also define Homonymy as existence of more than one morphological specification sharing the same phonological and or graphic form (Leech, 1974: 230). But this is also not a full proof test. Many linguists observe many loopholes in that procedure. Sometimes the distinction between polysemy and homonymy is indeterminate and arbitrary. The lexicographer has to depend on the intuition of the native speakers.

### Conclusion

Knowledge of semantics or the knowledge of sense relations is necessary for language learners, teachers, translators etc. as it plays an important role in accessing the language tasks. Thus words and their meanings play a crucial role in understanding and removing the lexical as well as syntactic ambiguities. Communication will break down when people do not use the correct and right words. Words carry enormous weightage in our use in the language. The power of words is beyond expression; it can change the course of life. In other words, they have dramatic effect on how we interact with people around us. Thus from the analysis of the data, it can be concluded that the number of homonymy and polysemous words are quite large in Bangla.

### Abbreviations

1	first person
2	second person
3	third person
ACC	accusative
ADJ	adjective
ADV	adverb(ial)
AUX	auxiliary
CLF	classifier
DAT	dative
DEF	definite
DEM	demonstrative
DET	determiner
FUT	future
GEN	genitive
INDF	indefinite
INF	Infinitive
LOC	locative
M	masculine
N	neuter
NEG	negation, negative
NOM	nominative
PL	plural
POSS	possessive
PRS	present
PROG	progressive
PROX	proximal/proximate
PST	past
VOC	vocative

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## CHAPTER-18

### THE IMPACT OF HEDGING AND TRADING DERIVATIVES ON FINANCIAL MARKETS IN INDIA - VALUE AND PERFORMANCE

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**Abstract: -**

*Today's world is a world of globalization. The eruption of both globalization and liberalization has led to dramatic changes in international trade. There has been a lot of direct and practical change in the interest rates and exchange rates of national and international trade. One of the biggest risks is that the current business environment is more difficult than ever. And from that came the derivatives market, which is a part of financial engineering, a very good and low cost solution to the underlying asset problems. The derivatives market in our country is not a thing of the past but a phenomenon of the modern age. It was founded in June 2000. The volume and the number of traded contracts have increased exponentially since the establishment of the derivatives market. The market turnover is in crores of rupees. In terms of figures, it has gone up from Rs 2365 crore in 2000-2001 to Rs 11,10,482 crore in 2008-2009. This means that in a span of eight years, derivatives trading in India has reached a record high in turnover and number of contracts traded. The study that is currently being conducted includes an analysis of the historical facts of trading. Some of the developments, growth and future prospects and challenges in derivatives products regulation and policy have been studied. In recent times, tough decisions have been made domestically on economic supervision and other policies. Contains products that do not meet any standards. This includes other products that provide investors with a steady income, and this strategy has been proven in many financial markets.*

**Keywords:** *exchange rate, financial derivatives, options, risk management.*

**Introduction:**

The demand and supply of demand and supply in the market are always visible to interactive interaction. And this result appears in the prices of agriculture and non-agricultural goods. International trade has been very developed due to globalization and liberalization. In the last few decades, there has been a faster in this trade. Therefore, the financial market and stock market prices are increased rapidly. And this reason the corporate world has to face financial difficulties. The only means of saving you from the risk of financial difficulties and the risk that does not say, it is derivatives. Derivatives are one way to solve the problems that arise due to uncertainty and instability. Derivatives are management tools that are useful to work effectively in every organization. Today everyone needs to know about the stock market. There will be many ways to earn money, some businesses make money by doing some jobs. If there are money, then all of your dreams can be done. People work hard to make money. Your money is pouring. But there is a place where people make money and make a profit. This is what we call the stock market. In short, stock is the share, and market is where we can buy something. The stock market is a place where listed companies and their capital are

kept for buying and selling. The two major stock exchanges in India are the Bombay Stock Exchange and the National Stock Exchange. The share capital is the partner of the company we are buying from. When a company makes a lot of profit, it thinks about how to increase its profit further. That's when the company needs money. But if the company owner doesn't have that much money, problems can arise. Then the owner of the company says his own company is public, and offers people to invest in his company. In this way, by trusting the company, people take their share in the company and the capital of the company owner is also created. That is the stock market. The stock market and stock exchange are often used in different sense. The stock markets are innumerable buyers and the securities allows numerous vendors to meet and deal with numerous vendors. The stock market is known as a barometer in the Indian economy. Since the number of shares purchases in stock markets are numerous, this market competes with each other for high prices. Stock market brings thousands of people who want to do marketing, after that they bring transparency in transactions by selling parts. The stock market was going on paper on the paper, when people who were buying shares were being given physical lion certifications. Now there is a computerized stock market, and it runs electronically. The stock market operates in a safe environment. Where other market participants market with confidence. According to the fairy language of regulators, stock markets act as primary and secondary markets. Each company is given a market place which facilitates the process of buying and selling of shares.

#### **Concept of derivatives-**

Derivatives, we can also say the financial tool. Which is determined from the underlying assets. This type of security is made of a security crust or also the combination of a type of securities we can also say. The price of inter-net assets should always be changed because the value of the underlying property can be changing continuously, only if the investment in the stock market can be invested with confidence. Derivatives are going to do it financially. Depending on the market, which generally used in stock, bond, currencies and market index depends on derivative value or underlying value. According to the market conditions, the cost of the underlying property of derivatives is different. And the basic principle of accessing this contact is the underlying asset, to get profits from its value or price. There are countless people of stock market in the full world. The method of marketing each person is different. He thinks in which stops in which stops by studying in a different way. Equity Stock Exchange's market price was higher. And in this stop in this stop, you can be a profit or damage due to less than less. If you do not want to earn a derivative contact, it will be a beneficiary, because after accessing the derivatives, it can be predicted about how to earn profit from the value of its underlying property.

**Different types of derivatives contract:** -Four types come with the option of derivative contract.

1. **Options** - This is a form of trading in which the buyer is given the right to buy and sell the property for a certain period of time. In this case the buyer has to withdraw the money invested before the expiry of the given period, whether the buyer has a loss or a profit. The price specified in this type is known as the strike price.
2. **Futures** - These are certified agreements. Which give the buyer the right to buy or sell their property on a given date. These agreements are bound by the full agreement. These are then fully traded on the stock exchange and the changing value of the futures contract

is noted in the market. This means that you have to act according to the market movements up to that date before the value of the money invested in it expires.

3. **Forwards** - It's a bit like a futures contract, in which buyers are bound by this agreement. But forwards are not standardized, and do not involve trading on stock exchanges.
4. **Swaps** - Swaps are derivatives contracts. In which the two parties exchange. In this case, the transaction is not based on the exchange of cash assets, but on a fictitious basis agreed upon. The amount of this flow depends on the lower interest rate. Also this cash flow is generally fixed. Interest rates are widely used in swaps. It is called a kind of category. Swaps are not traded on stock exchanges, and are in the form of over-the-counter contracts, used in business or financial institutions.

**Who participated in derivatives market** - Many people have a goal to participate in the derivative market. There are some categories based on similar traders as follows.

1. **Hedgers:** These stock market are non-accepting traders. They are always trying to keep their investment and portfolio safe from the dangers and the cost of the market in the market. When you have time to suffer loss due to falling fall in the market but you do not want to damage, you can buy a brut option for a little more money. By doing so, you can fill the loss of what you were going to do.
2. **Speculators:** In the derivative market, the type of betting is the buyer who is risking in this. The risk is accepted to get profits in this type. This type is relatively different from the heders. And their viewpoint is also against. Although the prices you take in this type, the prices you take, even if you fall, you are doing some options to keep yourself safe. He says that we approach against us. In this, the speculative wedding that the stock price will not be reduced and we can earn profit. If you are using the Pute option to keep yourself safe in this type, you can keep the foot option safe from the calls taken before. And this is the best way to trading.
3. **Margin traders** - Mergin Traders are the traders that are not enough capital to trade. But they want to earn profits by trading. In such a situation, if they do not have enough money to trading, then from the traders or a broker, or borrowed, and trading. After this, you want to put the profite that you have taken in your own and the margin taken from the broker, the Amount of Amount is to return. According to market movements in these types, you have to do your daily trading on the right basis. But in such a time, many traders have been pointed out. In the derivative market, the buyer can lead to a very big benefit due to changes in prices, and it can also be a loss.
4. **Arbitrageurs:** In this type of buyers take less risk to make a profit, and they also expect less profit. They buy shares of one price at a time and sell them at a higher price in another market. But such security should be provided in both the markets.

**How to trade in derivatives market:** -Trading has become a popular pastime. But it is wrong to trade without proper study. It is equally important to study the fluctuations in trading. What is a derivatives market before trading? What is the function of that market? What strategies apply in the derivatives market? Why is it different from the market? These things need to be known.

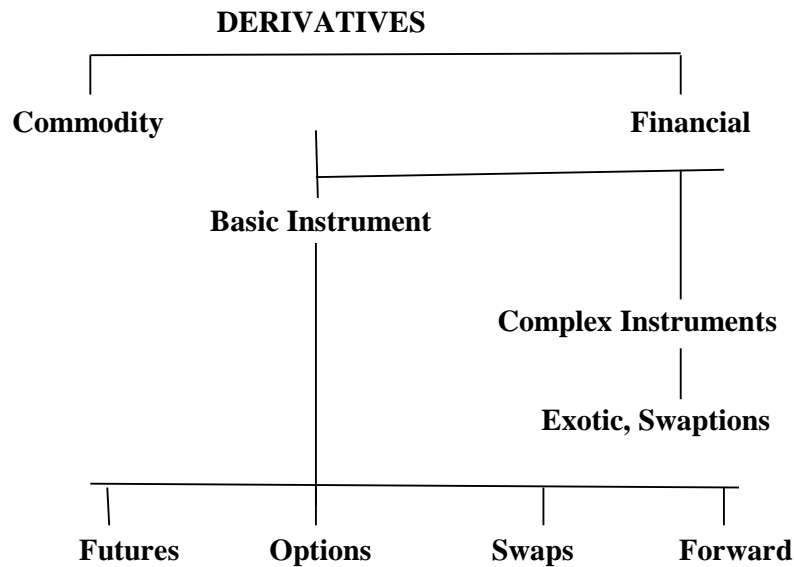
You need to open a demat account before trading. It is necessary to deposit some amount in the form of margin in the demat account. So that you can buy and sell stocks. There are a lot of rules for trading. And it is binding on all to obey those rules. Once the entry is taken in

trading, you cannot withdraw the amount of monsoon. And if you run out of money, you need to replenish the amount in the account. For this you must have a trading demat account which allows derivatives trading. You can trade through a broker or you can buy and sell stocks online or online using mobile internet. You can then study and decide which stocks to buy. When buying stocks, it is important to look at the price of the stop, the amount of cash. You have to consider whether you need margin according to the amount of that stop. If you have sufficient amount in your demat account, you do not need to take margin. But if you are confident that you can make a profit in this stock, but you do not have that much money, then you can take a margin through a broker and place an order to buy the stock. To complete the RED, you can stay in the investment until the expiry of the trade deadline, or you can exit the trade if you feel that you have made a profit.

**Applications of financial derivatives:** -There are some applications of financial derivatives that are as follows-

1. **Manegeneent Risk** - Risk Management is the biggest and important task of derivatives. In this, it is considered about the risks coming in the context of trading. The idea of ending the risk coming in trading is not made in management, but the measures are done on that risks. And that's why it is called the management of risks. Every person and organizations that trading in financial derivatives will give a device to reduce the problems or threats that come to. But this is not so easy. It is necessary to study his basic principles before to manage the injured risk. Financial derivatives can make you planned, as well as saving costs.
2. **Efficiency in trading:** -Business Efficiency - Financial derivatives allow the components that are risking any value. This improves trading. The merchant or a trading person can use as an option in the underlying devotees of financial derivatives. Business efficiency is a good tool for most of the safety. And this is mainly transactions to the market tradition of some things in the market offered mainly by the Derivatives.
3. **Speculation-** Financial derivatives are not the only use or even the most important use. This is because speculation in financial derivatives is considered to be a form of risky trading. This is because there is a huge loss if these types are not traded properly. Also the organization may come to an end. This type can only be used by traders who have extensively studied the trading context or have the proper discipline to trade. For savvy traders, speculation is a powerful tool through which they can earn unique profits.
4. **Price Detection-** An important use of derivatives is to disclose future market prices and their information through futures markets. The derivatives market is a type through which many scattered things are stated in a noticeable number.

**Classification of derivatives-** The figure below attempts to show that derivatives can be classified into certain categories. Commodity derivatives and economic derivatives are the two types of beginners. The study is made up of more individuals as the figure includes financial derivatives and underlying assets as well as interest rate securities. In this paper we will only study up to financial derivatives.

**Figure 1:** Classification of Derivatives

The type of forward contract is that we are going to see it is a cash market transaction. In which all of the actions are stopped or pushed forward. In this contact, we can buy a stock in the future and its price is determined in the present.

#### **History of derivatives market in India-**

Derivatives markets have existed in India for a long time. And they are working in different fields. In the commodity sectors, the Bombay Cotton Trade Association started futures trading in 1875. But in 1952, the Indian government banned option trading. This had a big impact on the derivatives market, so derivatives trading started trading in the informal forward market. Recently, in a matter of days or years, market prices have started to rise suspiciously. This changed the government's policy on derivatives trading. And then ordered the commencement of financial derivatives trading in India. And this ordinance was issued in 1995. The order also suggested withdrawal of some provisions on options in respect of securities. In the last few decades, the ban on trading in many commodities was lifted in the early 2000's, and at the same time, the National Electronic Commodity Exchange was established. National Stock Exchange was founded for the first time in Mumbai. This is the first screen-based automatic stock exchange. It was established in 1993. And in the 1994, he was opened and opened to promote the stock exchange through its modernization and competition. Today, derivative trading of India are very marketed. The study has come in front of 99% of the stock market. The Bombay Stock Exchange is one of the oldest broking markets in Asia. It is also known as Dalal Street.

Table 1: Derivatives in India: A Chronology

Date	Progress
14 December 1995	NSE asked SEBI for permission to trade index futures.
18 November 1996	SEBI setup L. C. Gupta Committee to draft a policy framework for index futures.
11 May 1998	L. C. Gupta Committee submitted report.
7 July 1999	RBI gave permission for OTC forward rate agreements (FRAs) and interest rate swaps
24 May 2000.	SIMEX chose Nifty for trading futures and options on an Indian index.
25 May 2000	SEBI gave permission to NSE and BSE to do index futures trading.
9 June 2000	Trading of BSE Sensex futures commenced at BSE
12 June 2000	Trading of Nifty futures commenced at NSE.
31 August 2000	Trading of futures and options on Nifty to commence at SIMEX.
June 2001	Trading of Equity Index Options at NSE
July 2001	Trading of Stock Options at NSE
November 9, 2002	Trading of Single Stock futures at BS
June 2003	Trading of Interest Rate Futures at NSE
September 13, 2004	Weekly Options at BSE
January 1, 2008	Trading of Mini Index Futures & Options at NSE
August 29, 2008	Weekly Options at BSE
October 2, 2008	Trading of Currency Futures at BSE

(Source: Compiled from BSE and NSE)

Derivatives have led to the evolution of economic industries. This market has changed the very definition of economic evolution around the world. Derivatives have gained a prominent place in the Indian economy. This type of marketing is like a risk management that works in management through different shareholders. There have been many different experiences in India while launching the derivatives market. The efforts made to bring equity derivatives market in it have been very successful. Derivatives on the NSE have reached significant heights in market turnover. And in recent years, no derivatives have reached global heights. The growth of derivatives is gaining momentum worldwide today and in the field of financial engineering. And if they continue to do so, derivatives will be in high demand in the future. The importance of derivatives is not tried here but some important things are definitely tried to be highlighted here. The benefits of derivatives are astounding, and the subject matter reflects the performance of the economy and the financial systems in recent years. This study has been concluded that the directive market in the future will be used in a very large amount of market. Just as a derivative market will fall as a derivative market as a diversity market. According to the conclusion of derivative market, the person or organization will take more risk in the stock market or accept a bigger risk to the same scale. From the study, it has come out that Derivatives are used to reduce the loss of Losing in the stock market, but profit reduces, but profit also gets the same amount. Future option in derivatives can be seen more profits. But the risk is high when trading in the futures. Generally, we see that the stock market is invested in the stock market for temporary times,

and according to your convenience or in the stock market, you get back with a profit or loss according to the date and prescribed in the stock market. Typically, it is to say that the financial management of derivatives will be used as the right option to facilitate the difficulties that are difficulties in the futures or options. It is also called a risk manager in the market and the risks manager.

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## CHAPTER-19

### DEVELOPING THE MODEL OF FORECASTING FOR THE GDP GROWTH OF INDIA

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**Abstract: -**

*In this research, I endeavored to develop a model to forecast the growth of India with respect to its fiscal deficit of the central government, current account balance position at international level, net FDI inflow, Gross Capital Formation, Real Interest Rate and Short-Term Debt position ranging from 1985 to 2016. India has attained commendable growth of GDP over the period but this growth has come at the cost of destabilizing certain important parameters of the economy. In this modelling, the VAR forecasting is adopted to understand the economic achievements due to many reasons. However, two prominent reasons always dominant the decision in favour of VAR forecasting. First economic conditions evolve as mutually dependent progression among various parameters that affect each other. Second the performance of an economy in time period (t) is regarded as the performance realized in the previous time period. The Dynamic-Stochastic Model at 95.00 Percent Confidence Level. opted for the Newton's modified method i.e. Broyden's method of the non – linear equation solution discussed by Ramli A. et al. (2010). The model developed in this study with the help of VAR methodology can do the reliable short time period the prediction about the economic growth of India.*

**JEL Classification:** E01, E37, E43, E47, E62, F32, H62, H68, H8

**Keywords:** GFD, CAB, GCFG, Twin Deficit, VAR Forecasting, Dynamic Stochastic Model.

**Introduction:**

In order to sustain stability on internal and external fronts with full employment and well-judged price rise, fiscal as well as monetary policies plays an important role. According to well established economic theories such as Mundell-Fleming model, policy mix i.e., fiscal and monetary policy working together in the flexible exchange rate system succeed in achieving both of the stabilities. (Pilbeam 1998). However, economies of the world find it difficult to have simultaneous equilibrium on both the fronts. Mostly, it is found that instability on one fore is leading to uncertainty in another and vice versa. The disequilibrium at internal and external level might be of surplus or deficit in nature.

To define internal imbalance in simple words we can say that when the government tax revenue collection is not matching with its spending under different heads and this excess spending over revenue is not contributing substantially to generate employment opportunities in the domestic economy, it leads to internal balance inconsistency. Surplus on fiscal level is not usually considered as the problem but deficit indeed treated as hitch to the government in power. When tax revenue collection of the government is unable to cover its expenses, we term such condition as fiscal deficit (FD). We will be using FD as a proxy variable to reflect internal imbalance. It has two important implications with respect to how does it affect the



domestic economy. If government prefers external financing to fill up the deficit it has its own pros and cons. Similarly, when the government decides to finance its deficit from domestic borrowing it affects economy. (Carbaugh 2009) has opinion that when economy is off the full employment level it indicates the possible changes in the general price level that might affect the efficiency of the economy negatively.

External balance implies balanced current account position along with capital account of the balance of payment of a country. But the export and import of goods and services along with net primary and secondary income do not always balance resulting into instability in the Balance of Payment, (BoP) i.e., either deficit or surplus. (World Bank 2018). Surplus on this front is not the matter of worry till other countries are not taking drastic corrective measures like the recent one taken up by the USA against China. However, deficit which may be of temporary or fundamental in nature undeniably upsets the domestic economy. When the disequilibrium is of ephemeral, the nation manages it by adjusting its forex. However, most of the developing economies often witnesses such imbalance in their balance of payments and hence mostly resort to external funds, usually borrowing.

The presence of surplus at fiscal and current account positions of a nation may not affect its economy so brutally as the deficits otherwise. The simultaneous occurrence of FD and Current Account Deficit (CAD) is termed as Twin Deficit. To understand the nexus between fiscal and current account position we have examined the various empirical findings. These studies have discussed the twin deficit aspect from various angles and how these two deficits affect the growth of respective economies. For instance, Unidirectional Granger Causality proceeding from FD to CAD as proved by (Lau et al. 2009), Unidirectional Reverse Granger Causality entering from CAD to FD as emphasized by (Constantine 2014), Bi-directional Causality i.e. FD affecting CAD and again CAD affecting FD as defined by (Alam et al. 2014), (Bayat et al. 2017) and (Suresh et al. 2015) and FD and CAD are dependent on each other to a certain extent as narrated by (Helliwell 1990).

The discussion on the topic of interest is followed after the literature review in which variables of the study have been introduced along with few other studies. In the symposium model fitting, method used under Dynamic Stochastic Simulation, VAR equation used in this report for the forecasting purpose and analysis of the diagram generated with the help of Eviews 10 for Dynamic-Stochastic Simulation at 95.00 Percent Confidence Level are presented with detailing. It is followed by the finale observation of the researcher.

### **Literature Review**

The variables considered for this analysis includes log form of Gross Domestic Product (LGDP), Gross Fiscal Deficit as percent of GDP (GFD\_GDP), Current Account Balance as percent of GDP (CAB), Foreign Direct Investment net inflows as percent of GDP (FDI\_NI), Real Interest Rate in percent (RIR), Short-term Debt as percent of total external debt (Short\_Term\_Debt) and Gross Capital Formation as percent of GDP (GCFG). All the variables except GFD\_GDP are assimilated from World Bank. We have calculated GFD\_GDP from various economic surveys spanning between 1984-85 to 2016-17. To harmonise the time series time period, we have converted the fiscal year data of GFD into annual year format by following the World Bank method.

Jha et al. (2014) studied India's trade with 17 countries over a period 1988 – 2012 to examine capital flight through trade mis - invoicing. Their study focussed on the impact of

capital flight on the India's GDP growth. This analysis used VAR multivariate method and found that capital flight responds to the exchange rate risk, inflation rate differential and real GDP growth. They used the simulation based bootstrapping forecasting method and predicted that by 2015 capital flight through mis – invoicing must be reduced and stabilize, and for that to happen real GDP should rise by 6.00 percent, exchange rate risk, inflation risk and interest rate differential should be stabilized by 2015.

Pilström et al. (2009) studied the countries including Estonia, Latvia, Lithuania, France, Germany and Italy with respect to forecast the relationship among selected parameters i.e., GDP, inflation and unemployment for the period 1<sup>st</sup> Quarter of 1998 to 4<sup>th</sup> Quarter of 2008 by applying reduced form of the VAR model. Their analysis found forecasting model is reliable for the short period.

### Model Fitting:

This paper is dealing with Ex – post forecasting as all data is known to us. In other words, the data which is used to evaluate the forecasting model was already published by the respective authorities. Assessment of the superiority of the forecast requires the comparison between forecasted values with that of the actual values over an estimation period. For this the entire sample space have been divided into two parts. 1<sup>st</sup> Quarter of 1985 to 4<sup>th</sup> Quarter of 2014 and 1<sup>st</sup> Quarter of 2015 to 4<sup>th</sup> Quarter of 2016. The sample period 1<sup>st</sup> Quarter of 2015 to 4<sup>th</sup> Quarter of 2016 is used as the comparison sample for which this analysis has compared the actual and forecasted values. Table 1 enlisted the different statistics which calculate the distance between actual and forecasted values.

Table 1 Forecast Evaluation:

Variable	Inc. obs.	RMSE	MAE	MAPE	Theil
CAB	8	0.223014	0.203372	22.47203	0.119081
FDI_NI	8	0.12013	0.100401	4.755563	0.029063
GCFG	8	2.839831	2.356522	6.888289	0.043248
GFD__GDP_	8	0.594108	0.565225	13.01231	0.073171
LGDP	8	0.013508	0.013113	0.040492	0.000209
RIR	8	1.640113	1.536098	24.74405	0.121892
SHORT_TERM_DEBT	8	0.67967	0.647595	3.691058	0.019285
RMSE: Root Mean Square Error					
MAE: Mean Absolute Error					
MAPE: Mean Absolute Percentage Error					
Theil: Theil inequality coefficient					

Sources: Derived by Eviews 10. Jagtap (2019)

In our forecasting modelling Root Mean Square Error is the benchmark which came lowest for the VAR system with which this analysis is dealing for individual variables. So along with this evidence we can say that our model is fit for prediction purposes.

### Dynamic-Stochastic Simulation:

In the Eviews software the first step adopted was to define the model with deterministic simulation. This method solved all the equations in the model without holding error throughout the recreation period. It holds all the coefficients fixed at their point of estimation along with all the exogenous variables are held constant. This helped the study to generate the

particular track for the endogenous variables, which this investigation has evaluated by solving the model deterministically at 95 percent of the confidence level.

An investigation into the forecasting methods directed to adopt the dynamic solution which considered values of our endogenous variables from 1<sup>st</sup> Quarter of 1985 to 4<sup>th</sup> Quarter of 2014 i.e., before the solution sample given by 1<sup>st</sup> Quarter of 2015 to 4<sup>th</sup> Quarter of 2016, while forming the forecast. The result obtained indicates that the forecast performance of the system was not that bad in initial quarters but over time it shown diversion which might be due to the effects of random disturbances and the assumption that the values of the coefficients are predetermined. Hence, the focus opted to determine the model is stochastic simulation which allowed this experiment to incorporate the uncertainty in the forecasting model by adding error bound confidence interval to the model. While working on the stochastic simulation the equations of the model solved with the help of software, accordingly the study obtained the residuals which matched to randomly drawn errors. So, in this study the dynamic solution has been selected, as dynamic solution is useful when we are estimating quite a few periods in the future.

- **Methodology:**

In the study the Newton's modified method i.e., Broyden's method of the non – linear equation solution discussed by Ramli A. et al. (2010) has been adopted. It uses an estimate to the derivatives of the system equation rather than the true derivatives as used by the Newton's method. We can say at each iteration it follows the following step.

$$y_{t+1} = y_t - j_t^{-1} F(y_t, Z^*) \quad (1)$$

Here,

$y$  = Vector of endogenous variables

$j$  = Current approximation to the matrix of derivatives of the equation system

$F$  = Set of equations

$Z$  = Vector of exogenous variables

$*$  = Linear approximation to the system around some values

This method mostly goes with the following equation.

$$j_{t+1} = j_t + (F_{y,t+1}, Z^* - F_{y,t}, Z^* - j_t \Delta y) \Delta y' \Delta y \Delta y \quad (2)$$

Where,

$$\Delta y = y_{t+1} - y_t$$

The important aspect of this method is it do not depend upon the ordering of the equations in the system.

- **VAR model used for forecasts:**

Since in the investigation researcher is concerned with the forecast of GDP with the VAR mechanism which make it mandatory to forecast other variables too. Though Eviews help us to do it efficiently, the basic concerned parameter model adopted for analysis and forecasting will take the following form of the VAR equation with the little difference of considering error term instead of residual term  $\varepsilon_t$  in the prediction analysis.

$$\begin{aligned} LGDP_t = & C + C1LGDP_{t-1} + C2LGDP_{t-2} + C3LGDP_{t-3} + C4LGDP_{t-4} + C5LGDP_{t-5} \\ & + C6GFD\_GDPT_{t-1} + C7GFD\_GDPT_{t-2} + C8GFD\_GDPT_{t-3} + C9GFD\_GDPT_{t-4} + C10GFD\_GDPT_{t-5} \\ & + C11CAB_{t-1} + C12CAB_{t-2} + C13CAB_{t-3} + C14CAB_{t-4} + C15CAB_{t-5} + C16FDI\_NIt_{t-1} \\ & + C17FDI\_NIt_{t-2} + C18FDI\_NIt_{t-3} + C19FDI\_NIt_{t-4} + C20FDI\_NIt_{t-5} + C21GCFG_t \end{aligned}$$

$$\begin{aligned}
& 1 + C22GCFG_t - 2 + C23GCFG_t - 3 + C24GCFG_t - 4 + C25GCFG_t - 5 + C26RIR_t - 1 + C27RIR_t - \\
& 2 + C28RIR_t - 3 + C29RIR_t - 4 + C30RIR_t - 5 + C31SHORT\_TERM\_DEBT_t - \\
& 1 + C32SHORT\_TERM\_DEBT_t - 2 + C33SHORT\_TERM\_DEBT_t - \\
& 3 + C34SHORT\_TERM\_DEBT_t - 4 + C35SHORT\_TERM\_DEBT_t - 5 + t \quad (3)
\end{aligned}$$

Here let,

- $C$  = Constant
- $C1$  to  $C5 = \alpha$

coefficients representing the LDGP's contribution in the prediction of dependent variables

- $C6$  to  $C10 = \beta$

coefficients representing the GFDGDP's contribution in the prediction of dependent variables

- $C11$  to  $C15 = \gamma$

coefficients representing the CAB's contribution in the prediction of dependent variables

- $C16$  to  $C20 = \psi$

coefficients representing the FDINI's contribution in the prediction of dependent variables

- $C21$  to  $C25 =$

coefficients representing the GCFG's contribution in the prediction of dependent variables

- $C26$  to  $C30 =$

coefficients representing the RIR's contribution in the prediction of dependent variables

- $C31$  to  $C35 =$

coefficients representing the SHORTTERMDEBT's contribution in the prediction of dependent Variables

- $t$  = stochastic error term representing all omitted variables that affects GDP

Equation (3) can be represented as follows in the concise form.

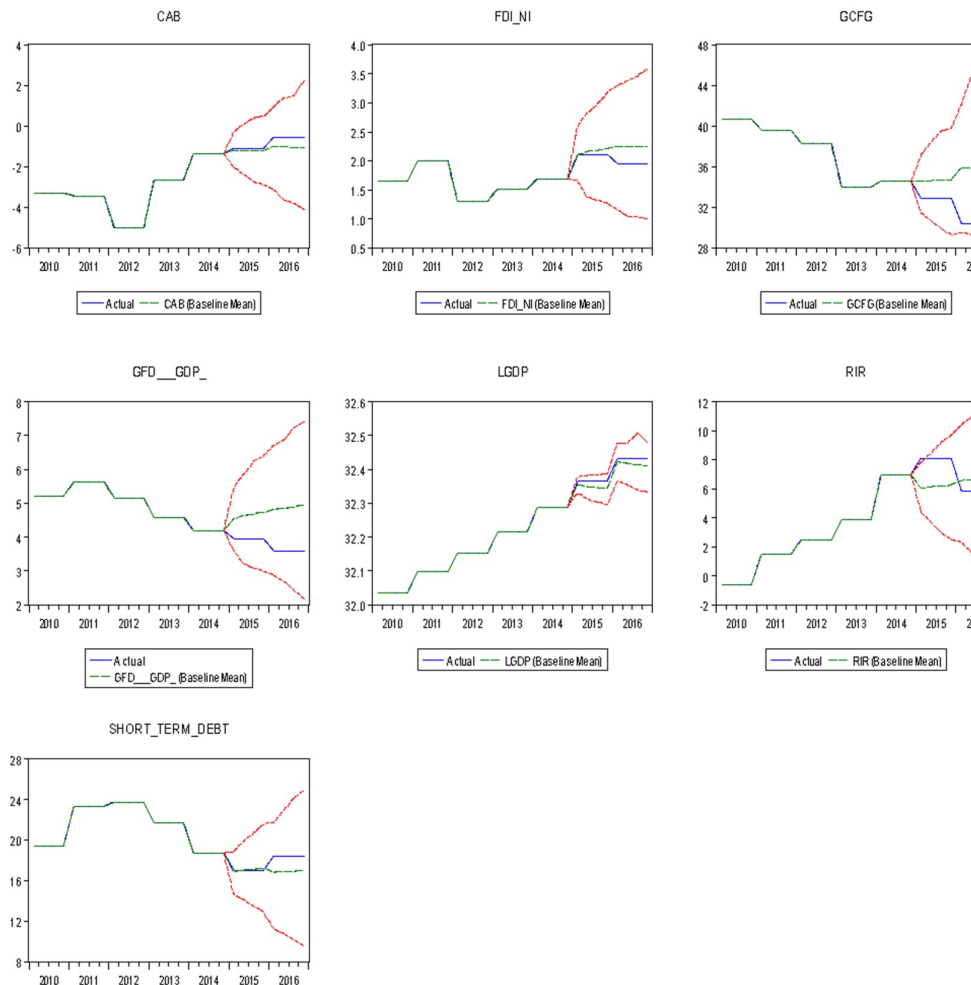
$$\begin{aligned}
& LGDP_t = C + \alpha_1 LGDP_{t-1} + \alpha_2 LGDP_{t-2} + \alpha_3 LGDP_{t-3} + \alpha_4 LGDP_{t-4} + \alpha_5 LGDP_{t-5} + \beta_1 GFD\_GDP_t \\
& + \beta_2 GFD\_GDP_{t-1} + \beta_3 GFD\_GDP_{t-2} + \beta_4 GFD\_GDP_{t-3} + \beta_5 GFD\_GDP_{t-4} + \beta_6 GFD\_GDP_{t-5} + \gamma_1 CAB_t \\
& + \gamma_2 CAB_{t-1} + \gamma_3 CAB_{t-2} + \gamma_4 CAB_{t-3} + \gamma_5 CAB_{t-4} + \gamma_6 CAB_{t-5} + \psi_1 FDI\_NI_t \\
& + \psi_2 FDI\_NI_{t-1} + \psi_3 FDI\_NI_{t-2} + \psi_4 FDI\_NI_{t-3} + \psi_5 FDI\_NI_{t-4} + \psi_6 FDI\_NI_{t-5} + \alpha_6 GCFG_t \\
& + \alpha_7 GCFG_{t-1} + \alpha_8 GCFG_{t-2} + \alpha_9 GCFG_{t-3} + \alpha_{10} GCFG_{t-4} + \alpha_{11} GCFG_{t-5} + \alpha_{12} RIR_t \\
& + \alpha_{13} RIR_{t-1} + \alpha_{14} RIR_{t-2} + \alpha_{15} RIR_{t-3} + \alpha_{16} RIR_{t-4} + \alpha_{17} RIR_{t-5} + \alpha_{18} SHORT\_TERM\_DEBT_t \\
& + \alpha_{19} SHORT\_TERM\_DEBT_{t-1} + \alpha_{20} SHORT\_TERM\_DEBT_{t-2} + \alpha_{21} SHORT\_TERM\_DEBT_{t-3} + \alpha_{22} SHORT\_TERM\_DEBT_{t-4} \\
& + \alpha_{23} SHORT\_TERM\_DEBT_{t-5} + t \quad (4)
\end{aligned}$$

*LGDP at time  $t$  be determined by the previous values of not only the LDGP but also the values of GFD\_GDP, CAB, FDI\_NI, GCFG, RIR and SHORT\_TERM\_DEBT too up to lag of five along at level with  $C$  and  $t$ .*

- **Analysis:**

Diagram 1 shows the Dynamic-Stochastic Model at 95.00 Percent Confidence Level. The analysis is executed for the perspective up to  $(t+8)$  time period which is 8 quarters ahead. The forecast in this analysis starts from 1<sup>st</sup> Quarter of 2015 and ends in 4<sup>th</sup> Quarter of 2016. The functioning of the projection has been evaluated by comparing the actual observed values of the all variables especially LGDP with baseline values within upper and lower bounds.

Diagram 1. Dynamic-Stochastic Simulation at 95.00 Percent Confidence Level:



Sources: Derived by Eviews 10. Jagtap (2019)

Diagram 1. shows though this forecast was abating for all the variables except LGDP and CAB after initial quarters of projections but all of them remained within the confidence bound implying model is good. Since, the study is concerned with the projection of GDP and confidence bounds is tight implying the selected model represented by the equation (4) is good enough to be considered.

In the Diagram 1 blue line represents the actual value, dotted blue line baseline mean and dotted red lines confidence interval of 95.00 percent. The selected model represented by VAR equations studied by Jagtap (2019), Dolly S. and Jagtap (2020) with  $R^2=86.91$  percent, Adj.  $R^2=81.58$  percent,  $F(Stat)=16.31$ ,  $P(F - Stat) = 0.00$  percent and Sum. Squared of Residuals = 0.013 when adjusted with the sample space from 1<sup>st</sup> Quarter of 1985 – 4<sup>th</sup> Quarter of 2016 to 1<sup>st</sup> Quarter of 1985 – 4<sup>th</sup> Quarter of 2014 yielded  $R^2=86.18$  percent, Adj.  $R^2=79.98$  percent,  $F Stat=13.90$  and Root Mean Square Error = 0.013 given by the forecast evaluation with 8 observations and with AIC = 5.30 suggested lag order 5 indicates that all the variables of the model with uncertainty imbedded are significant.

In the Diagram 1. LGDP titled subgraph reflects that marginally only this estimated model underestimates the log real GDP value representing GDP at constant local currency value

during 2<sup>nd</sup> Quarter of 2015 to 4<sup>th</sup> Quarter of 2015. This might be due to the underestimation of the real interest rate at 6.14 to 6.24 percent during the same time period. The main reason extended could be the marginal reduction in the lending rate from 10.25 percent to 10.00 percent even though inflation represented by the GDP deflator has fallen from 3.05 to 1.78 percent between 2014 to 2015. The perception might be that the high lending rate would have discouraged an investment in the Indian economy and therefore growth of the GDP.

By the end of projection period actual and estimated GDP values found to be same as shown by the Dynamic-Stochastic Simulation. This implies even after decreased real interest rate structure not on the ground of larger reduction in the lending rate but heighten inflation GDP deflator has not demeaned the investment level in India on large extent. We can say that private forecasters were very innocently overlooking the vital growth and interest rate channel which is very obvious in the policy projections.

During the projection period economy is found to be growing even when India has had heighten gross fiscal deficit and little bit improved current account position. The projected GFCG was high compared to actual values. So, we can say that Keynesian effect might be working in the Indian economy which states that deficit spending affects positively to the economy. But if the GCFG has had not improved then how did it happen? The answer might be with the fact that the fiscal deficit of the Union Government is encouraging the consumption level in the economy which has made Indian economy as big market and it is attracting investment from private as well as foreign investors, provided deficit is meant for productive purposes. Current account balance had shown the mark of improvement owing to the fallen international crude oil prices during 2015 and 2016.

### **Conclusion:**

The purpose of this paper was to identify a model to predict GDP growth for the Indian economy. The VAR model performed respectable to predict the growth for selected time period. This analysis emphasis that for at least shorter time period the prediction is reliable and this model can be used to envisage the growth of Indian Economy.

The one more finding derived by this study is the working of Keynesian multiplier in the Indian Economy. However, the report support to productive government expenditure on real ground for sustainable economic growth.

### **Declaration**

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## CHAPTER-20

### BACILLARIAL ALGAE AT MEHEKARI LAKE IN BEED DISTRICT OF MAHARASHTRA

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#### **ABSTRACT**

*During the present study the bacillariophyceae members were noted. These were Amphora costata W. Smith, A. maharashtrensis Sarode and Kamat, Cymbella amphicephala Naeg., C. aspera (Ehr.) Cleve, C. bengalensis Grun., Cymbella chandolensis Gandhi, Nitzschia intermedia Hantzsch, N. perminuta Grun, Surirella capronii Breg and S. ovata Kuetz. These species were collected for the first time from study area.*

#### **INTRODUCTION**

Mehekari Lake is constructed on the Seena River in Ashti tehsil of Beed district of Maharashtra. The study was carried out to explore the presence of algal diversity of the water reservoir. Earlier the author reported the algal species of chlorophyceae from the water reservoir. In the present paper total ten species of freshwater algae of class bacillariophyceae have been taxonomically and morphologically described. Members of bacillariophyceae are commonly known as diatoms and are commonly found in fresh water, or on soil. Thallus is unicellular, uninucleate diploid and show radial or bilateral symmetry. Cell wall is silicified and shows characteristic secondary structures and it is often called as frustule. Frustule is made up of two overlapping halves. The upper larger half is called as the epitheca, and the lower smaller overlapped half is called hypotheca. Cells generally possess many discoid or two plate like chromatophores. Members of this class are also called as golden brown algae because of their characteristic pigments which include carotenoids, fucoxanthin, diatomin (diatoxanthin, diadinoxanthin), beside chlorophyll a and chlorophyll C.

#### **MATERIALS AND METHODS**

Random sampling technique has been used for collection of algal samples. Sample collections from different locations were made during the period of October 2015 to November 2016 at monthly intervals. The algal samples were taken to laboratory. The Samples were preserved in 4% formalin for further taxonomic investigations. Temporary Mounts of algal specimen were prepared with suitable stains and observed under compound microscope. Identification of taxa was carried out by using Prescott (1951), Sarode and Kamat (1984), Prasad and Srivastava (1992) Bhakta *et al.*, (2010), Rajeshwari and Krishnamurthy (2016), Rakesh Kumar, M. K. Seth and M.R. Suseela (2013), Swati Dixit and S.K. Bera (2012) and other relevant monographs and available literature.



## RESULTS AND DISCUSSION

During the present study algal taxa belonging to class Bacillariophyceae were observed which are described as under

### 1) *Amphora costata* W. Smith

Sarode and Kamat, 1984, p 160, pl 19, f 431

Frustules linear elliptical in girdle view; valves 25  $\mu$  long 5  $\mu$  broad, strongly arcuate on the dorsal margin and slightly concave more or less straight on the ventral margin; ends strongly constricted, capitate; raphe thin, more or less straight, slightly directed to the ventral side towards the ends; striae about 15 in 10  $\mu$ , coarsely punctate.

### 2) *Amphora maharashtrensis* Sarode and Kamat

Sarode and Kamat, 1984, p 161, pl 19, f 438

Frustules elliptic; valves 12.5  $\mu$  long, 5  $\mu$  broad, strongly convex on the dorsal side and more or less straight on the ventral side with inwardly bent rounded ends; raphe thin close to ventral margin, more or less straight, terminal fissures very slightly directed towards the ventral margin; striae 10-22 in 26  $\mu$ , coarsely punctate in the middle.

### 3) *Cymbella ampiccephala* Naeg.

Sarode and Kamat, 1984, p 166, pl 19, f 441

Valves 30  $\mu$  long 7.5  $\mu$  broad, asymmetrically semilanceolate; dorsal side strongly convex; ventral side slightly convex in the middle; ends constricted, produced and capitate; raphe thin and straight with terminal fissures dorsally bent; axial area very narrow; central area small; striae 12-14 in 10  $\mu$ , very slightly radial

### 4) *C. aspera* (Ehr.) Cleve

Sarode and Kamat, 1984, p 167, pl 19, f 442

Valves 137.5  $\mu$  long 27.5  $\mu$  broad, asymmetrical with strongly convex dorsal and straight or slightly convex ventral side; ends obtusely rounded; raphe thick, arcuate, slightly excentric with large, ventrally bent central pores and dorsally directed terminal fissures; axial area moderate, linear; striae 8-10 in 10  $\mu$ , radial, clear and coarsely punctate.

### 5) *C. bengalensis* Grun.

Sarode and Kamat, 1984, p 167, pl 19, f 444

Valves 85  $\mu$  long 25  $\mu$  broad, asymmetrical, dorsal side strongly convex and ventral side slightly convex with slightly constricted broadly rounded ends; raphe thick with prominent central pores and directed terminal fissures; axial area moderate; central area slightly formed with an isolated stigma on the ventral side; striae 8-10 in 10  $\mu$ , radial and coarsely punctate.

### 6) *Cymbella chandolensis* Gandhi

Sarode and Kamat, 1984, p 168, pl 20, f 445

Valves 22.5  $\mu$  long 5  $\mu$  broad, with dorsal margin uniformly convex and ventral margin straight; ends indistinctly constricted, produced, acutely rounded; raphe thin and straight, close to the ventral side, central pores distinct and terminal fissures ventrally directed; axial area very narrow, linear; central area slightly formed towards the dorsal side; striae 16-18 in 10  $\mu$ , fine and slightly radial.

### 7) *Nitzschia intermedia* Hantzsch

Sarode and Kamat, 1984, p 218, pl 26, f 598

Valves 100  $\mu$  long, 5  $\mu$  broad, linear lanceolate, elongated with cuneate, constricted, produced subcapitate ends; keel punctae 8-10 in 10  $\mu$ , small; striae about 25 in 10  $\mu$ , fine.

**8) *N. perminuta* Grun**

Sarode and Kamat, 1984, p 223, pl 26, f 614

Valves 25  $\mu$  long, 3.5  $\mu$  broad, linear lanceolate with constricted capitate ends; keel excentric, keel punctae about 16 in 10  $\mu$ , small and round; striae about 18 in 10  $\mu$ , punctate.

**9) *Surirella capronii* Breg**

Sarode and Kamat, 1984, p 230, pl 27, f 641

Valves 150  $\mu$  long, 57.5  $\mu$  broad, heteropolar, ovate with broadly rounded, somewhat narrowed apex and cuneate acutely rounded base; middle line present, discontinuous, with strong spines developed on elevated cushion; axial area narrowly lanceolate; marginal folds strongly developed, with clear projections, flap windows quite evident; costae 9-13 in 100  $\mu$ , thick, radial at the ends; striae fairly visible.

**10) *S. ovata* Kuetz.**

Sarode and Kamat, 1984, p 232, pl 28, f 648, 649

Valves 60  $\mu$  long, 20  $\mu$  broad, heteropolar, broadly ovate to ovate lanceolate with somewhat narrower base; pseudoraphe narrow, linear; marginal folds scarcely developed; costae 35-60 in 100  $\mu$ , thick, rib like, alternating with 2-5 striae; striae 16-20 in 10  $\mu$ , very distinct and coarse.

**ACKNOWLEDGEMENT**

The author is thankful to the Principal and Management of Shri Amolak Jain Vidya Prasarak Mandal Sanchalit, Smt. S.K. Gandhi Arts, Amolak Science and P.H. Gandhi Commerce College, Kada, Tq. Ashti Dist. Beed for providing the laboratory facilities.

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## CHAPTER-21

### A SYSTEMATIC STUDY ON THE IMPACT OF THE COVID19 BLOCKADE ON THE DIGITAL PAYMENT SYSTEM IN AURANGABAD

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#### **ABSTRACT**

An existence-converting occasion is the only which considerably alters the complete existence and has a big effect at the livelihood of humans. When the primary information broke out approximately COVID-19, we in no way imagined that this will be this type of catastrophe for the complete human race. Also, we Indians are nowhere exempted from being a sufferer of this pandemic. The worry of COVID-19 has added out exclusive views of humans. A phase of the society prefers on-line transactions due to the fact it's miles secure as there may be no bodily contact & it presents rapid settlement. They discover it useful because of the consumer-pleasant apps, discounts, rewards & recognition at large. On the opposite hand, no matter the advantages, a few humans experience that offline transaction is conventionally a more secure and stable mode of price. The goal of the look at changed into to understand the adoption of virtual price at some point of lockdown and the mental behaviour of e-pockets customers at some point of pandemic. The Study is descriptive in nature in which efforts were made to recognize the traits and effect of humans' utilization of virtual price device publish Covid in Aurangabad city. For this purpose, handy sampling might be used, and facts might be collected. The Study concludes that Covid – 19 pandemics has modified the complete manner of residing and effect of the equal is seen on on-line price device. Contactless payments, protection, rapid settlements, consumer pleasant OS and rewards are a number of the elements that have promoted using on-line price device in India. On the opposite hand, India being coins ruled economy, protection and absence of infrastructure is of superb concern. However, at some point of lockdown, on-line price structures have honestly helped the humans in transacting without worry of having contacted with different inflamed humans.

**Keywords:** COVID-19, Lockdown, digital payments, E-wallets, Psychology of Technocrats

#### **INTRODUCTION:**

An existence-converting occasion is the only which appreciably alters the complete existence and has a tremendous effect at the livelihood of people. When the primary information broke out approximately COVID-19, we by no means imagined that this will be any such catastrophe for the complete human race. Also, we Indians are nowhere exempted from being a sufferer of this pandemic. COVID-19 modified the primary method of living; educational training modified from offline to on-line, company operating modified from offline to on-line, tour price price tag reserving modified from offline to on-line, and on-line meals orders increased. Likewise, price structures being the basis for all of the transactions witnessed a spike in customers converting from offline to on-line.

**1.1. STATEMENT OF PROBLEM:**

The worry of COVID-19 has introduced out one-of-a-kind views of human beings. A segment of the society prefers on-line transactions due to the fact it's miles secure as there may be no bodily contact & it presents rapid settlement. They discover it useful because of the user-pleasant apps, discounts, rewards & reputation at large. On the alternative hand, no matter the advantages, a few human beings experience that offline transaction is conventionally a more secure and steady mode of charge. Hence, this have a look at specializes in knowledge the effect of COVID-19 lockdown at the virtual charge machine in India.

**2. LITERATURE REVIEW:**

Sathye (1999) studied the adoption of internet banking by Australian consumers using factors such as security, ease of use, awareness, pricing, resistance to change and infrastructure. The results showed that security concerns and lack of awareness of internet banking and its benefits were considered as the obstacles to the adoption of internet banking in Australia.

Venkatesh (1999) examined the role of training in creating favorable users' perceptions. The study emphasized the importance of Perceived Ease of Use (PEOU) in predicting IT adoption and argued that training could influence knowledge (or awareness about internet technology) and hence users' perceptions of ease of use.

Trocchia and Janda (2000) argue that consumers' adoption rate of the internet is associated with their past experiences with the technologies. Non-users' negative experiences were suggested to have a great impact on their perceptions about the internet. Gresvik and Owre (2002) studied how much it costs Norwegian banks to process various payment instruments. It finds that payment cards used for cash withdrawals at ATMs cost considerably more

Since the transactions involve cash replenishment, maintenance and security costs. In addition, the cost of using cheques for cash withdrawals was found to be three times more expensive than cash withdrawals at ATMs.

Wright (2003) considers the effects of no-surcharge rules He finds that no-surcharge rules generate higher welfare than when monopolist merchants are allowed to set prices based on the payment instrument used. He argues that merchants are able to extract consumers' surplus ex post from payment card users, while cash users are unaffected.

Schwartz and Vincent (2006) studied the distributional effects among cash and card users with and without no-surcharge rules. They find that in the absence of differential pricing based on the payment instrument used, the network profit increases while it harms cash users and merchants.

**OBJECTIVES OF THE PAPER:**

1. To look at the adoption of virtual fee all through the lockdown.
2. To perceive the motives for the shift toward on line fee submit-Covid.
3. To look at the alternate with inside the mind-set of e-pockets customers after the Corona virus outbreak.

**HYPOTHESES OF THE PAPER:**

H0 1: Lockdown did now no longer have any effect on virtual payments.

H0 2: Covid 19 did now no longer alternate the mind-set of humans toward virtual payments.

H0 3: There isn't anyt any alternate in degree of on line fee adoption submit Covid.

**RESEARCH GAP IN THE RESEARCH PAPER:**

Earlier researchers have targeted on information virtual fee effect at the financial system as an entire which has targeted at the Pre- Covid scenario, however the cognizance of this studies may be most effective at the elements that have impacted the adaptability of virtual fee with inside the town of Aurangabad submit Covid-19.

**3. RESEARCH METHODOLOGY OF THE PAPER:**

A Micro look at is descriptive in nature in which efforts were made to recognize the traits and effect of humans' utilization of virtual fee machine submit Covid in Aurangabad town. For this purpose, handy sampling may be used, and records may be accumulated.

**DATA COLLECTION:**

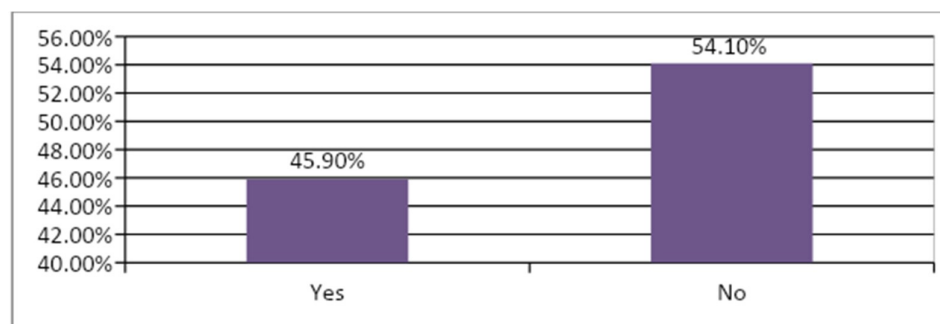
For the purpose of Data Collection, Data series may be performed at levels – Primary and Secondary records. The Primary records may be accumulated via the management of the questionnaire, whilst the secondary records may be primarily based totally on posted articles in journals, magazines, books, studies, websites, reviews etc.

**4. DATA ANALYSIS AND INTERPRETATION:****1. Have you registered for any new E-wallet for transactions during lockdown?****Table No: 1**

PARTICULARS	PERCENTAGE
Yes	45.9%
No	54.1%
<b>TOTAL</b>	<b>100%</b>

**Analysis:**

From the above table it can be analyzed that, out of 100 respondents 45.9% of respondents have registered for a new E wallet during lockdown and 54.1 % respondents have not registered.

**Graph No: 1****Interpretation:**

From the above graph it can be interpreted that half of the respondents have registered for new E wallets during transactions and other half have not registered.

## 2. Do you prefer using digital payment for high value transactions?

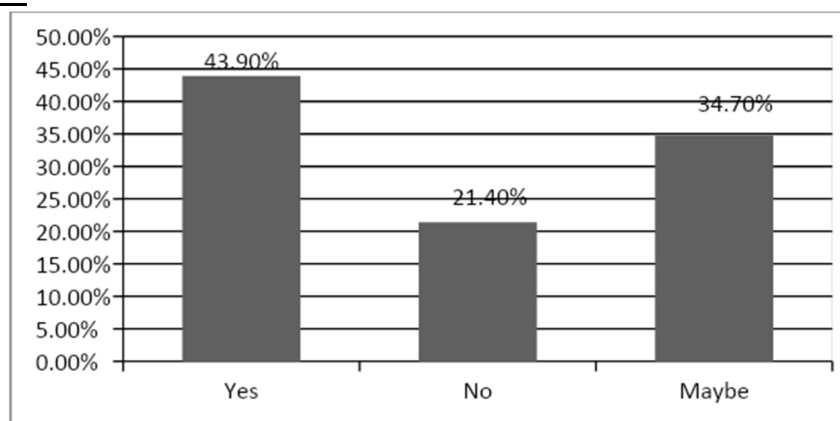
**Table No: 2**

PARTICULARS	PERCENTAGE
Yes	43.9%
No	21.4%
Maybe	34.7%
<b>TOTAL</b>	<b>100%</b>

### **Analysis:**

From the above table it can be analyzed that, out of 100 respondents 43.9% of respondents prefer using digital payment for high value transactions, 21.4 % of respondents don't prefer digital payment for high value transactions and other 34.7% of respondents are sure in digital payments.

**Graph No: 2**



### **Interpretation:**

From the above graph it can be interpreted that, majority of the respondent's i.e. 43.9% prefer digital payments for high value transactions and remaining respondents either prefer not or are not clear about using digital payment for high value transactions.

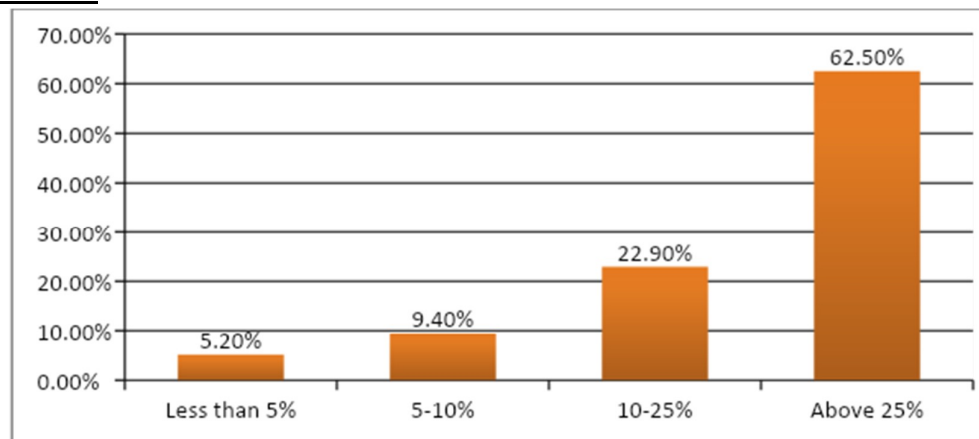
## 3. What is the rate of increase in the number of online transactions through digital platforms during lockdown?

**Table No: 3**

PARTICULARS	PERCENTAGE
Less than 5%	5.2%
5-10%	9.4%
10-25%	22.9%
Above 25%	62.5%
<b>TOTAL</b>	<b>100%</b>

### **Analysis:**

From the above table it can be analyzed that, out of 100 respondents 5.2 % have used digital payments less than 5% during lockdown, 9.4% respondents have used between 5-10% and 62% respondents have used more than 25% digital platforms for transactions.

**Graph No: 3****Interpretation:**

From the above graph it can be interpreted that, majority of the respondents i.e. 62.5% of respondents have used digital payments systems for transactions during lockdown, and very few i.e 5.2% have not preferred digital payments during lockdown.

**4. Why was there a shift in preference from offline to online payment during lockdown?**

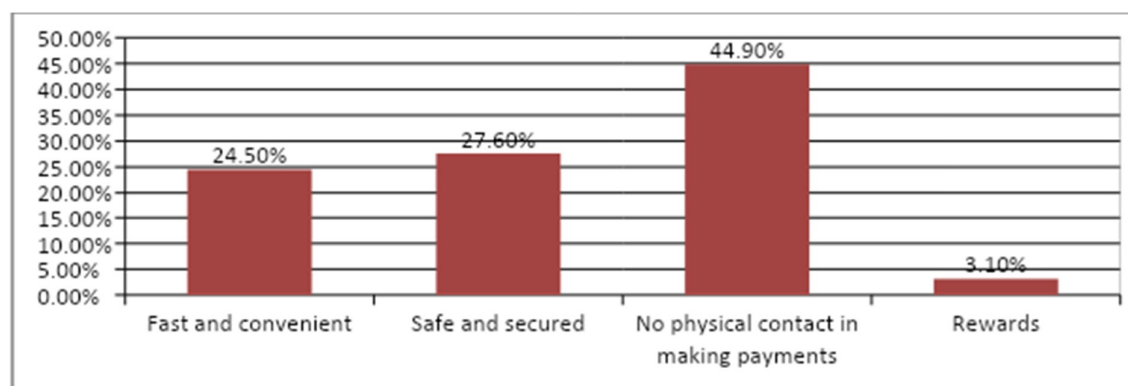
**Table No: 4**

PARTICULARS	PERCENTAGE
Fast and convenient	24.5%
Safe and secured	27.6%
No physical contact in making payments	44.9%
Rewards	3.1%
<b>TOTAL</b>	<b>100%</b>

**Analysis:**

From the above table it can be analyzed that, out of 100 respondents 24.5% respondents chose online payments as it is fast and convenient, 27.6% prefer online payments as it safe and secured, 44.9% prefer online payments as there is no physical contact and 3.1% use digital payments for rewards.

Graph No: 4

**Interpretation:**

From the above graph it can be interpreted that, majority of respondents have preferred digital mode of payments over offline payments as there is no physical contact in transactions and others feel that online payment system is secured/safe/fast and convenient.

**5. What are the advantages of using digital payment over conventional payment during lockdown?**

Table No: 5

PARTICULARS	PERCENTAGE
User friendly	25.5%
Secured	27.6%
Faster settlements	46.9%
<b>TOTAL</b>	<b>100%</b>

**Analysis:**

From the above table it can be analyzed that, out of 100 respondents 25.5% of respondents feel the fast settlement nature of digital payment system is beneficial in using, 27.6% feel digital payment is secure and 25.5% feel digital payment systems are user friendly in operating.

Graph No: 5

Benefits of digital payment

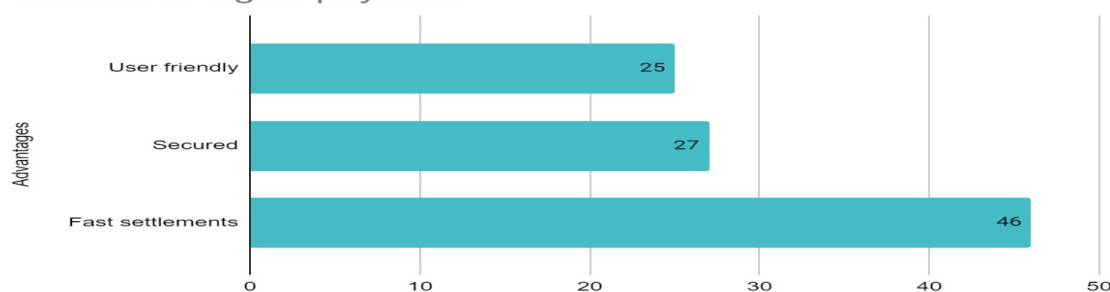


Fig. 5

**Interpretation:**

From the above graph it can be interpreted that, majority of respondents i.e. 46.9% are benefited by using digital payments because of fast settlements.



**6. How do you rate the security of digital payment? (On a scale of 0-5, where 5 being the best and 0 being the least.)**

**Table No: 6**

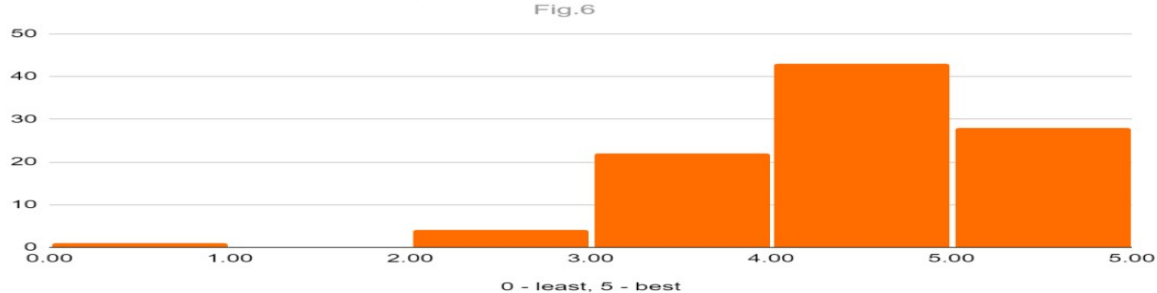
PARTICULARS	PERCENTAGE
0	1.2%
1	0%
2	3.9%
3	22.4%
4	43.8%
5	28.7%
<b>TOTAL</b>	<b>100%</b>

**Analysis:**

From the above table it can be analyzed that, out of 100 respondents 28.9% respondents feel digital payments system secured to use, down the line 43.8% have given rating 4, 22.4% given rating 3, 3.9% have given 2 rating and 1.2% have given 2 rating.

**Graph No: 6**

Rating of security of digital payment



**Interpretation:**

From the above graph it can be interpreted that, majority of respondents have preferred digital mode of payments over offline payments as there is no physical contact in transactions and others feel that online payment system is secured/safe/fast and convenient.

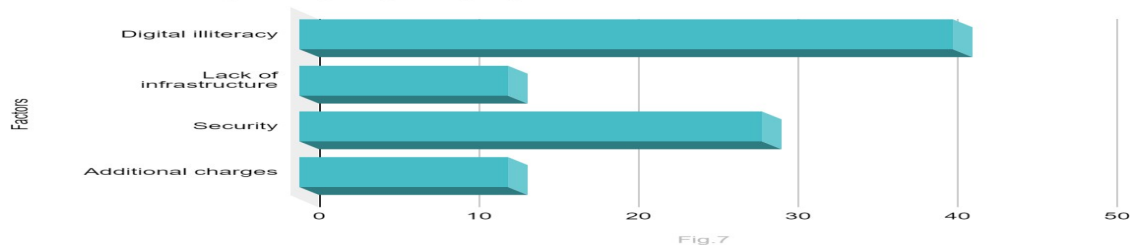
**7. What factors hampered the use of digital payment systems during lock down?**

**Table No: 7**

PARTICULARS	PERCENTAGE
Digital illiteracy	42.7%
Lack of infrastructure	13.5%
Security	30.2%
Additional charges	13.5%
<b>TOTAL</b>	<b>100%</b>

**Analysis:**

From the above table it can be analyzed that, out of 100 respondents 42.7% respondents feel digital illiteracy has hampered the use of digital payment system, 13.5% feel lack of infrastructure is, 30.2% feel security and 13.5% feel additional charges are reasons.

**Graph No: 7****Factors hampering digital payment****Interpretation:**

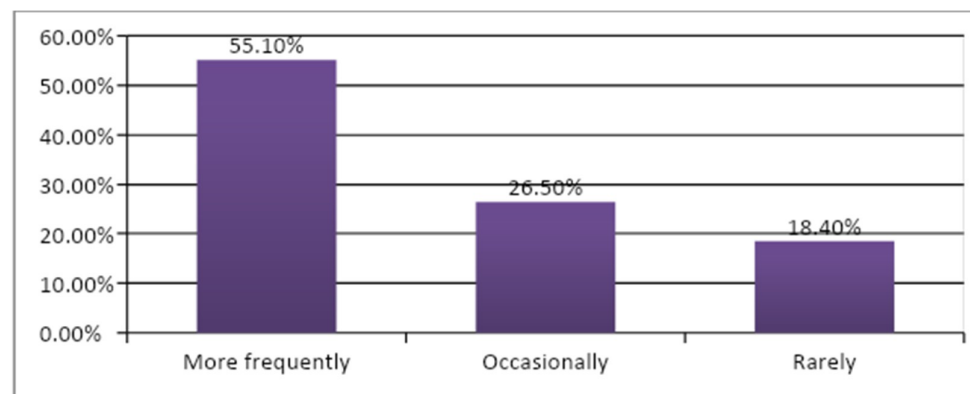
From the above graph it can be interpreted that digital illiteracy is a major reason which hampers the use of digital payments and other reasons being security, lack of infrastructure and additional charges.

**8. How frequently are you using digital payment post lockdown?****Table No: 8**

PARTICULARS	PERCENTAGE
More frequently	55.1%
Occasionally	26.5%
Rarely	18.4%
<b>TOTAL</b>	<b>100%</b>

**Analysis:**

From the above table it can be analyzed that, out of 100 respondents 55.1% are using digital payments more frequently after lockdown, 26.5% are using occasionally and 18.4% use rarely.

**Graph No: 8****Interpretation:**

From the above graph it can be interpreted that digital payments are used more frequently after lockdown i.e. 55.1% and very few are using rarely and some respondents are using occasionally.

**9. Do you feel digital literacy is a must for using a digital payments system?**

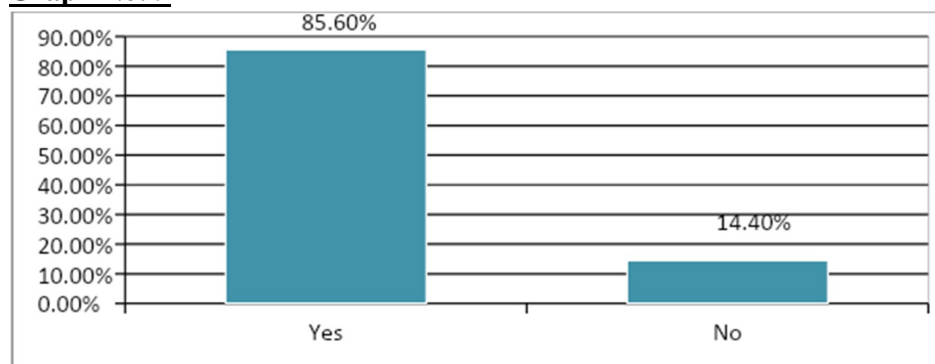
**Table No: 9**

PARTICULARS	PERCENTAGE
Yes	85.6%
No	14.4%
<b>TOTAL</b>	<b>100%</b>

**Analysis:**

From the above table it can be analysed that, out of 100 respondents 85.6% of respondents feel digital literacy is important in using digital payments and other 14.4% feel digital literacy is not required.

**Graph No: 9**



**Interpretation:**

From the above graph it can be interpreted that, majority of respondents agree that digital literacy is must in using digital payments and an exceptional number of respondents don't agree with it.

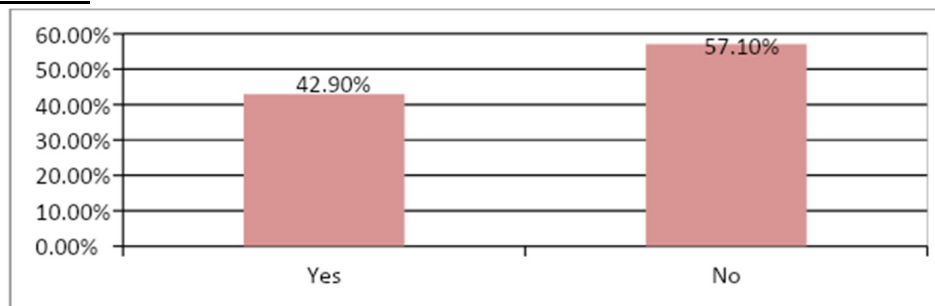
**10. Do you think the government should mandate digital payment in place of Cash payments post lockdown?**

**Table No: 10**

PARTICULARS	PERCENTAGE
Yes	42.9%
No	57.1%
<b>TOTAL</b>	<b>100%</b>

**Analysis:**

From the above table it can be analysed that, out of 100 respondents 57.1% of respondents want the government to mandate digital payments post lockdown and the other 42.9% feel that the government should not mandate.

**Graph No: 10****Interpretation:**

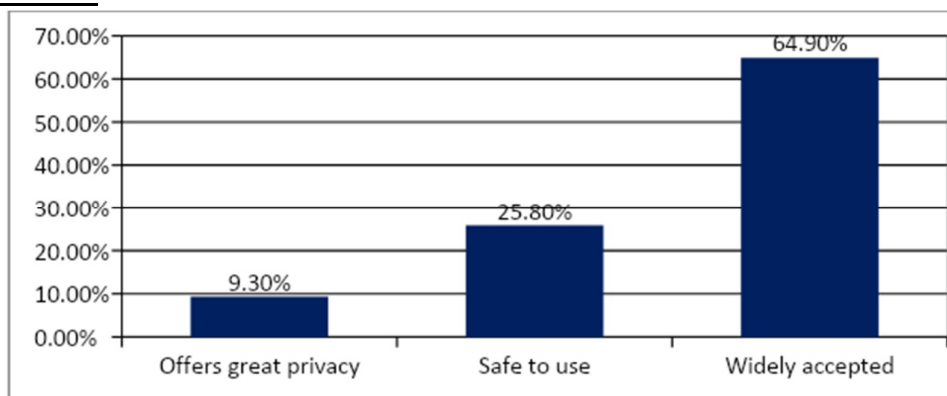
From the above graph it can be interpreted that, opinion about mandating digital payment post lockdown seems neutral wherein 57.1% feel it should not be mandated and the others feel it should be mandated.

**11. Why do you use cash for transactions?****Table No: 11**

PARTICULARS	PERCENTAGE
Offers great privacy	9.3%
Safe to use	25.8%
Widely accepted	64.9%
<b>TOTAL</b>	<b>100%</b>

**Analysis:**

From the above table it can be analysed that, out of 100 respondents 9.3% use cash as it offers great privacy, 25.8% use as it is safe and 64.9% use cash as it is widely accepted.

**Graph No: 11****Interpretation:**

From the above graph it can be interpreted that wide acceptance of cash is a major reason in using cash by the respondents, safe to use and privacy are down the line.

**FINDINGS:**

- It is found that, number of registration for E wallets during lockdown are limited i.e. 45.9%.
- It is found that, majority of the respondents prefer digital payments for high value transactions.
- Online transactions post lockdown has increased < 25%.

- Contactless payment facility is the major reason for shift from offline to online transactions.
- Half of the respondents feel online transactions are secured and safe for use.
- Digital literacy is the foundation for using digital payment system.
- The frequency of online payment system usage has improved.
- Most of the respondents feel the government should not mandate online payment system or replace online payment system with offline system.
- Wide acceptance of cash has led to increased use of cash.
- Much importance should be given to convenience, safety and rewards in promoting online payment system.

#### **SUGGESTIONS:**

- A channel should be formed to enable the majority of people to register for E wallets.
- Awareness/demonstrations should be done on E wallet usages.
- Companies should have strategies for promoting E wallet usage among the public.
- Restrictions on high value transactions should be eased.
- Online payment should be made more user friendly.
- Focus should be on improving infrastructure and digital literacy rate.
- Efforts should be made to improve usage frequency of online payments by customers.
- Efforts should be made by the government for enabling wide acceptance of online payments.

#### **CONCLUSION:**

From the above study it can be concluded that Covid – 19 pandemics has changed the whole way of living and impact of the same is visible on online payment system. Contactless payments, safety, fast settlements, user friendly OS and rewards are some of the factors which have promoted the use of online payment system in India.

On the other hand, India being cash dominated economy, safety and lack of infrastructure is of great concern. However, during lockdown, online payment systems have really helped the people in transacting without fear of getting contacted with other infected people.

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## CHAPTER-22

### AN OVERVIEW OF MUCORMYCOSIS FUNGI

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#### **ABSTRACT**

*Mucormycosis is an anticonvulsive infection that occurs due to the fungi mucorales and family Mucoraceae. It is a rare disease but is increasing in immune compromised patients. It can be categorized into rhino-orbito-cerebral, cutaneous, disseminated, gastrointestinal and pulmonary types. Mucor mole is found in soil, bread and decaying fruits and vegetables. Leukemia, lymphoma, immuno compromised state, burns and open wound are the risk factors of mucormycosis. It is classified into 6 main types based on the part of the body that is affected. Headache, pain in face, blocked nose, swollen and bulging of eyes, loss of vision, brain damage and death are the main symptoms of mucormycosis. Mucormycosis can be prevented by wearing mask, avoiding direct contact with soil and contaminated water. This review mainly focuses on the overview of mucormycosis, it's etipathogenesis, preventive strategies, advances in diagnosis and the current treatment methods.*

**Keywords;** Angioinvasive, Mucorales, fungi, loss of vision, contaminated soil, water

#### **Introduction:**

Mucormycosis also known as zygomycosis is a rare fungal disease caused by a molds called mycormycetes. These are molds live mostly in soil, manure, and some decaying vegetables and fruits. These fungi won't pass through person to person and animal to person [1]. They already live through the environment. Although it is rare it lives in most common people who are having low immunity or health problems like diabetes, cancer, Heart transplant, stem cell transplant, peoples wound in their skin fungi can easily enter the body through the openings. And the peoples. In the late 2019 china wuhan a severe new virus was identified as Severe Acute Respiratory Syndrome Coronavirus2 (SARS-CoV-2) [2]. and several patients were hospitalized and they named that as Covid-19. Later that second wave has came and the middle of second wave this mucormycosis has appeared with the patients who were having low immunity and already affected with the covid-19. These fungal infections are typically considered as opportunistic and presented in the environment means, it will thrive when the human immune system is compromised [3].

At the starting of this fungal disease many peoples were shown upon this, and later it got decreased. So, in this review article we can see how this mucormycosis is spreading in the environment, who the patients facing this kind of disease, and how can we overcome with this fungal disease.

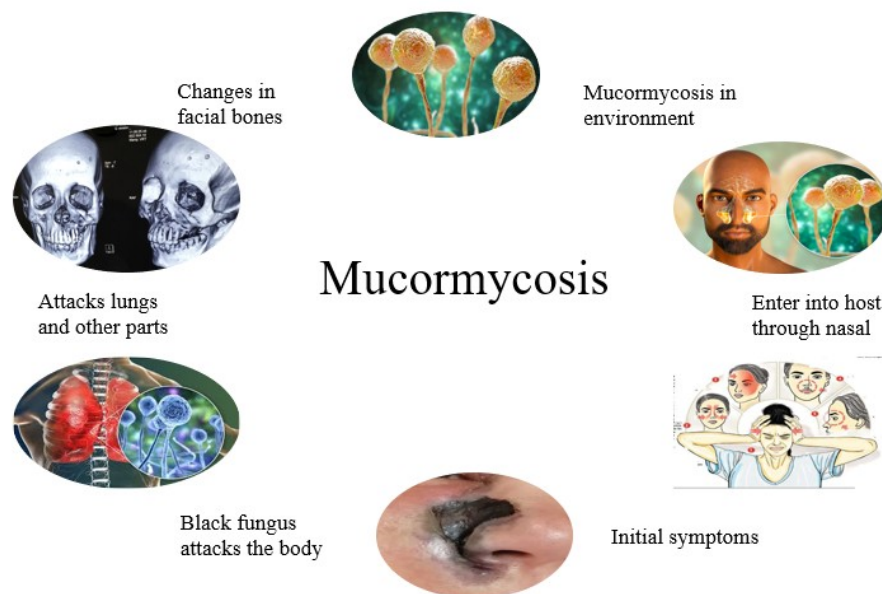
#### **1. Mucormycosis in Environment:**

Mucor is a filamentous fungus found in soil, plants and decaying fruit the mucoromycetes it is a group of fungi that can cause the disease Mucor mycosis it will find in leaves compost piles, and in animal dung [4]. This genus was having several species, Aspergillus is a very

common filamentous of fungal genus that can be found in many different Environments and they are usually classified into Saprophytes. But in some cases, they can also cause some harmful diseases to humans. This genus is classified as an opportunistic pathogen that may cause a wide range of respiratory disorders. In this disorders Mucorales order is known to be prevalent in indoor and some occupational environments and it includes a variety of saprophyte species that may cause serious infections as the mucormycosis. Most of the peoples will develop this infection by breathing the spores Mucorales [5]. Less often this infection can develop when the spores will enter into the body through inhalation or a cut or open wound. And there are people who can get the severe risk of this disease, one of the major risks is the people who are having low level of neutrophils [6], which are white blood cells the people who are having low level of white blood cells will have less immunity and helps to fight off the infection, and are receiving broad spectrum antibiotics. The peoples who are taking drugs which will suppress the immune system and the drugs are named as (immunosuppressive drugs), the neutropenia and immunosuppressive drugs can be seen in cancer and especially blood cancers [7].

## **2.Covid and diabetes:**

The pandemic of corona virus disease 2019 (covid -19) still it is upstage in the environment. Due to the variants of the virus. And the changing of the variants its results were the second and third wave. In the middle of this pandemic the covid-19 patients are facing secondary infections such as mucormycosis also known as black fungus [8]. It is a serious but rare opportunistic fungal infection that spreads rapidly but not as compared to covid-19. Covid 19 patients who intake lot of steroids medicines and result in less immunity where got this disease black fungus known as mucormycosis [9]. Steroids can cause the sugar levels to spike, which is challenging for patients with the uncontrolled diabetes and with the acidic environment due to this fungus (Mucorales) growth [10]. So yes, we can think how this happening? And how it is interlinked with the covid-19, yes as we know the mucoromycetes are presented in the environment its common fungal but during the inhalation of spores with the mucorcyetes will enter into their body and first it will affect the inhalation parts like lungs and sinuses and affect the people and spread all over the body [11,12]. And the patients who were already taken a lot of medicines for covid-19 and intaking of steroids were also result in this disease of Mucormycosis [Fig 2].



**Fig 1: Entry of Mucormycosis inside the body and the effects**

### **Discussion:**

This SARS-CoV-2 can infect and replicate in the human islet cells leading to b-cells damage and reduced the Endogeneous Insulin secretion and besides of the plethora of cytokines also were seen in patients with Covid -19 can lead to worsening of insulin resistance [13]. In this Covid-19 the one-third of patients with mild covid-19 can contribute to Dysglycemia that is an abnormality in the blood glucose level some drugs which were used in this covid-19 were namely glucorticoids, copinavir-ritonavir and remdesvirit can further make worsen glucose control and pre-dispose to mucormycosis [14]. And in another side the possible link between Covid-19 and Mucormycosis is the development of ketoacidosis [15]. This ketoacidosis is a serious diabetes complication where the body produces excess blood acids. This blood acid where (ketones) this condition will occur when there is not enough insulin in the body [16]. It is a common and curable one, emergency medications where needed before when it become critical. Ketonemia and ketoacids have been observed in patients who were faced the Covid-19 even in absence of Diabetics mellitus [17]. Although several developing countries are struggling to contain the spread of covid-19 and also but this mucormycosis is typically known to infect diabetic patients [18]. Only 50% of cases reported in literature for covid-19 patients were non-diabetes therefore further researches were also undertaken to determine whether hyperglycemia occurred during the hospitalization of non-diabetic patients as a result of their steroid use for the management of covid-19 symptoms as a result of their severe disease [19]. This mucormycosis affects the people who have recently undergone from the hematopoietic stem cell transplantation. This will happen in the bone marrow and the cells will eventually grow into white and red blood cells and platelets [20]. This transplant involves wiping up the exiting bone marrow and replacing it with healthy donor bone marrow. The affected individuals must take the immunosuppressive drug [21] s to help fight off rejection, but this can leave them more susceptible to infection including infection with

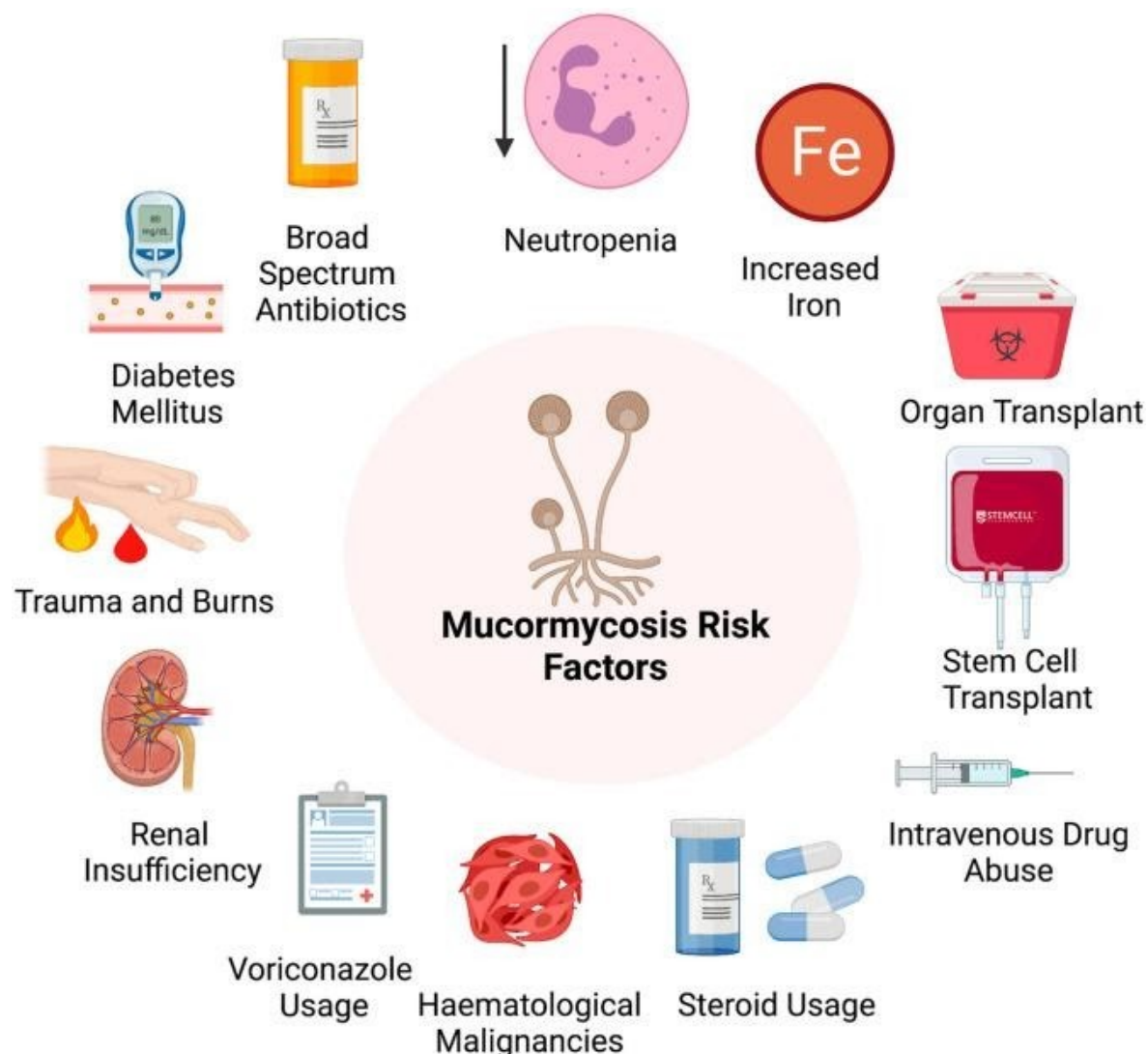


mucormycosis. And also, the people who were result in the excess of iron content which can occur of some frequent blood transfusions or in certain blood disorders may also result in the developing risk of mucormycosis [22]. Some other conditions like people with HIV, kidney stones may also have a risk of mucormycosis [23]. The researches have determined that mucormycosis infection has a high affinity for the blood vessels. This means the infection will often occur in the blood vessels, but researches do not know why this is so. Infection of the blood vessels can block the flow of blood, depriving tissue of oxygen and causing tissue death [24].

**Signs and symptoms:**

After the inhalation of the spores the most common presentation is a sinus infection [25]. And this sinus infection is accomplished in the nasal congestion; nasal discharge and sinus pain. After that a severe headache and fever can also be occur [26]. If the infection is become more serious the infection is more serious the infection will spread through outside the sinuses [27] and the symptoms that's also include tissue loss (necrosis) [28] of the roof of the mouth (palate) [29], disintergeration of the wall of cartilage of bone (septum) [30] and the swelling area around the nose and redness of the skin overlying the sinus and the eye socket due to a lack of oxygen (cyanosis) [31]. It may also can develop blurry vision or double vision. And an un recognized and untreated tissue death may occur and the infection can significantly damage the facial structures [32]. And sometimes this mucormycosis can spread through the brain and this can cause lethargy, seizures, slurred speech, partial paralysis and abnormalities of the face and eyes of the nerves and brain abscess altered consciousness and coma also occur [33]. When these sinuses and brain are getting involved then this is known as Rhinocerebral mucormycosis [34]. When this infection mucormycosis spreads through the eye there can be swelling will occur in the eye and severe pain behind the eye, excess tearing will happen the vision will be blurred and if the patient is wearing the eye lenses there should be removal of the lenses immediately, and if the disease is not treated properly that will result in permanent vision loss and leads to severe conditions [35]. This mucormycosis can also affect the lungs (pulmonary mucormycosis) [36]. This will happen when the spores will enter into respiratory system and the disease were characterized are fever and cough that won't produce any mucus until any spitting or coughing up of blood [37]. This may also occur chest pain and difficulty in breath. And also, the mucormycosis can affect the skin that is (cutaneous mucormycosis) it will affect the skin and give severe pain and will make the skin hardened of the affected area and make inflammation of the underlying area [38]. The nearby skin will also be affected and it will become redness, painful, swollen, and warm. Sometimes, open sores (ulcers) and blisters will form a tissue loss (necrosis) can occur with the affected tissue turning black [39]. Affected individuals may have a fever. Cutaneous mucormycosis can develop slowly or be severe and sudden in onset [40]. This can also be affected in the gastrointestinal system of the body; this mostly occurs when the spores are inhaled or intake of contaminated food will result in the stomach pain and vomiting of blood. Lesions can form and create a hole in the stomach or intestines. Sometimes severe pain in the bowels can occur because of a lack of blood flow and affected individuals can go into shock because of significant blood loss [41,42]. In rare instances, mucormycosis can affect or spread to affect the kidneys, the inner lining of the chambers of the heart and the heart valves (endocarditis),

and the bone (osteomyelitis). Signs and symptoms of disseminated mucormycosis vary greatly depending upon the organ system involved [Fig 2].



**Fig; 2 Factors associated with Mucormycosis**

**Risk factors associated with the mucormycosis:**

Various factors that contribute the Mucormycosis development that includes the upcoming conditions like renal insufficiency, diabetes mellitus and Hematological Malignancies some medications like voriconazole, broad spectrum antibiotics and steroids are also known to predispose an individual to mucormycosis [43]. In addition, an increase in iron levels in the circulation, neutropenia and some immunosuppressant treatments like stem cell therapy and organ transplant make individuals more vulnerable to the condition and the exposure spores through cuts and burns on the skin and intravenous drugs usage are also risk factors for mucormycosis fungal infection [44].

**Epidemiology:**

The pervasiveness of mucormycosis ranged from 0.005 to 1.7 per million people worldwide, with India's prevalence approximately 80 times higher (0.14 per 1000) than developed

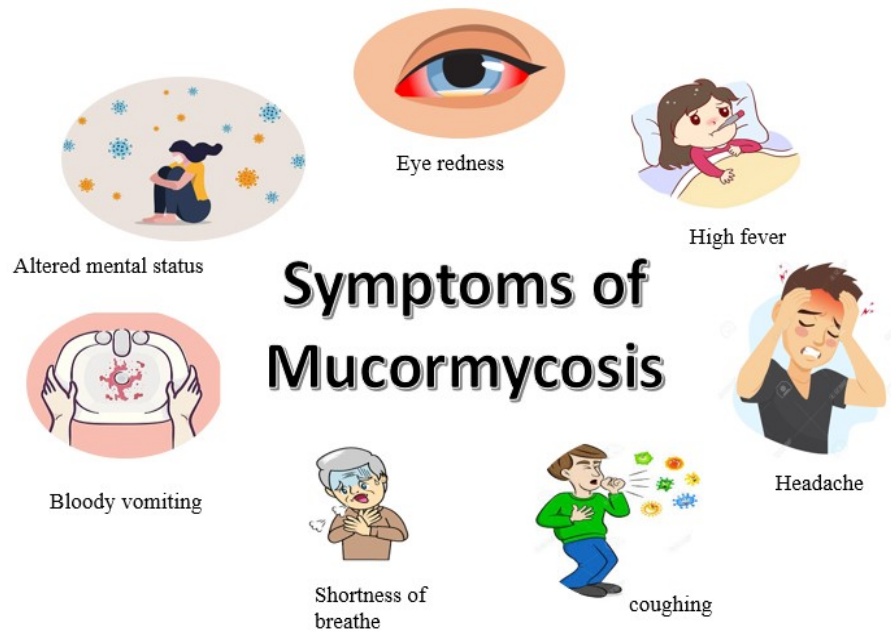
countries [45]. Mucormycosis is a high public health burden in India due to the enormous proportion of diabetic individuals (almost 62 million). Diabetes mellitus was shown to be the underlying condition in 54–76 percent of mucormycosis cases, with 8–22%. Furthermore, there was a geographic variation in the rate of diabetes mellitus among mucormycosis patients in India. Diabetes mellitus was already a prominent risk factor prior to COVID-19, with regional disparities ranging from 67 percent in North India to 22 percent in individuals from the South [46].

#### **Diagnosis for mucormycosis:**

Currently, there are no routine serological tests used for the diagnosis of mucormycosis. However, based on the specific antigens, techniques such as immunohistochemistry, Enzyme-linked immunosorbent assays, immunoblots, and immunodiffusion tests could be further evaluated for commercial use (Wysong and Waldorf 1987; Cornely et al.) [47]

Molecular techniques are promising for rapid, sensitive, and accurate identification of pathogenic fungi causing mucormycosis. This includes the use of polymerase chain reaction (PCR), restriction fragment length polymorphism analysis (RFLP), DNA sequencing of internal transcribed spacer ITS or 18S rRNA gene region for identification of Mucorales (Lackner et al. 2014) [48].

Biosensor technologies have been used for the direct detection of fungal pathogens. Biosensors are analytical devices that detect the concentration of bio-analyte and convert the physical or chemical signal into electrochemical or optical signals. On the technology, there are four types of biosensors: optical, electrochemical, thermal, and piezoelectric (Samso et al. 2020) [49]. Cai et al., has demonstrated optical detection of cell surface mannan of *Candida albicans* binding to hydrogel Con-A using a photonic crystal sensor (Cai et al. 2015) [50]. In a study by Bhatnagar et al., a sensitive electrochemical nano biosensor fabricated with 1,6-Hexanedithiol and chitosan-stabilized gold nanoparticles was designed for rapid detection of *Aspergillus fumigatus* (Bhatnagar et al. 2018) [51]. Another study by Asghar et al., developed an immuno-based microfluidic chip that can rapidly detect and capture *C. albicans* from phosphate-buffered saline (PBS) and human whole blood (Asghar et al. 2019) [52]. Since biosensors have not been much explored for detecting fungal pathogens, it could be an active area for current interdisciplinary research [53]. Likewise, given the current epidemic situation, the development of biosensors would be of immense importance for the rapid and early detection of mucormycosis, and would also aid in monitoring treatment response based on specific marker analytes [Fig 3].



**Fig 3: Symptoms of mucormycosis**

**Current update and prevention:**

Mucormycosis is an antifungal infection. And the early invention of antifungal therapy improves the outcome of infection with mucormycosis. This was illustrated with a respective study of 70 patients with hematologic malignancy who had mucormycosis in which delayed amphotericin B therapy (starting treatment  $\geq$  days after diagnosis) resulted in an almost twofold increase in mortality at 12 weeks after diagnosis (83 versus 49 percent) [53]

A review of 208 cases of rhino-orbital-cerebral mucormycosis published in the literature between 1970 and 1993 found the following frequency of symptoms and signs [54]

- Fever – 44 percent
- Nasal ulceration or necrosis – 38 percent
- Periorbital or face swelling – 34 percent
- Decreased vision – 29 percent
- Sinusitis – 26 percent
- Headache – 25 percent

After some initial therapy, step down therapy, salvage therapy, duration of therapy, these are some of the therapies using now a days and some other possible therapies were combination antifungal therapy these were also using now a days.

So, the preventions for the mucormycosis were,

- Use face masks when they are going outside and some dusty areas, construction areas to prevent form mucus and accidentally avoiding the inhalation of mucus, fungal spores which might cause the mucormycosis.
- Mucormycosis is caused by mucor and in decaying plants. So, when the persons are using the gardens they must wear gloves, full sleeve shirts, proper shoes when out in nature and dealing with soil and manure

- Patients suffering from diabetic mellitus and diabetic ketoacidosis must have controlled in their diabetic level as mucormycosis may easily affect these patients
- Controlled of steroid level is must, to treat mucormycosis the first treatment is immediately reducing the intake of steroids to reach the goal of continually decreasing it.
- Surgical debridement – this is a process of removing all infected tissues to help to heal the wounds for the peoples who are affected with mucormycosis this process would involve the extraction of all infected areas to protect the rest of the body from the continuity of the spreading black fungus infection symptoms [55].

We have to follow the methods accordingly, to reduce the impact of the mucormycosis from the environment and from the covid.

### Conclusion:

Covid-19 has put the entire world into a terrific situation. It is an infection the consequential immunosuppression former co-morbidities and its medications have made the patients susceptible to some secondary fungal infections such as mucormycosis this is an opportunistic fungal infection that is caused due to mucor that are commonly present in the soil and manure. It is in rotting vegetables and fruits. The covid -19 patients and with less immunity patients are also affected by the disease a multidisciplinary approach should include prompt diagnosis and treatment with antifungals to treat mucormycosis. Additional researches on this article where clearly explained mucormycosis in covid-19 was infected and recovered the patients. A diagnostic study for this opportunistic pathogen should not be ignored in case the patient is covid-19 positive and immunosuppressed.

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## CHAPTER-23

### ETHANOBOTANICAL SURVEY OF MEDICINAL PLANTS USED TO TREAT ASTHMA IN THANJAVUR DISTRICT, TAMIL NADU, INDIA

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#### **ABSTRACT**

*The Ethanobotanical study was carried out to collect information about the medicinal plants used for the treatment of asthma by the people who living in the villages of Thanjavur district, Tamil Nadu. The given study details gather knowledge about the medicinal plants which are used in treatment asthma in Ayurveda and siddha medical forms. This paper reports an Ethanobotanical study that focused on the traditional medicinal plants used by local communities to treat asthma disease. Totally 30 plants were identified and these identified medicinal plants belongs to 21 different plant families. Tables and pie-charts were made to explain the details about the medicinal plant, their families and parts which are used in medicine formulation and the preparations mode of plants. The most used plant parts are leaves (47%), Whole plant (20%), and flower (12%). The highest numbers of species found in the plant families are Solanaceae and Fabaceae. This information collected from Ethanobotanical survey and practices. Traditional plants are plays an important role in scientific research on drug discovery.*

**Keywords:** *Ethanomedicinal plants, Asthma disease, Thanjavur district, Herbal drugs.*

#### **Introduction:**

Most of the plants present in the world have medicinal activities and these plants play an important role in health care of rural community in India. These medicinal plant systems are being used in the ancient Indian medical forms like siddha and Ayurveda <sup>[1]</sup>. The practices of traditional medicine usage are based on hundred years of beliefs and observations. In India, mostly 15 percentages (3000 to 5000) of medicinal plants, out of 20,000 are grown in various wild climatic regions of our country <sup>[2]</sup>. In Ayurvedic medicine patients are prescript based on their disease symptoms <sup>[3]</sup>. In that cases asthma is one of the most common health problems that seek the help of traditional healers. Asthma is a condition, in which a person's respiratory system becomes inflamed, narrowed, swelled and produces mucus, which makes them difficult to breath. It may have minor effects due to our daily activities. The main causes of asthma are airborne substances, such as pollen, dust mites, mold spores, pet dander or particles of cockroach waste and respiratory infections, such as the common cold, physical activity, dust particles, smog and cold environment. The most common symptoms of asthma are coughs, shortness of breath, chest tightness and wheezing.

Thanjavur is the main city and headquarters of the district. Thanjavur is known as one of the temple cities in Tamil Nadu which was once ruled by the Chola dynasty. The Brihadeeswara temple located in Thanjavur is well known for its infrastructure. In this study, the details about the remedies and medicinal plants which are used by the villagers of Thanjavur district specifically to treat asthma are discussed.

Plants came to be used in traditional medicines for thousands of years and herbal remedies are much demanded in throughout the world. Even after detection of Morden medicine system. Here, the mentioned plants are used as main sources of asthmatic medicine in Thanjavur district. The scientific study on the traditional plants and customs of plants can bring out many clues and information about the development of drugs which are used to treat the human diseases <sup>[4]</sup> The Thanjavur district is located in the delta regions of Tamil Nadu that are rich in paddy production, and hence, this district is called as rice bowl of Tamil Nadu.

### Methodology:

#### Study Area:

The present study was done in various villages located in the Thanjavur district. Villages of this district lie along the East coast of the Tamil Nadu. These villages are located at 9°50' and 11°25' of Northern latitude and 78°45' and 79°25' of Eastern longitude. Thanjavur district are connected by the district of Ariyalur and Trichy districts in the Northern side and Thiruvarur and Nagapattinam districts in eastern side. The Thanjavur district is located in the Cauvery delta at a distance of 314 Km South-west of Chennai and 56 Km East of Trichy.

#### Data collection:

The present study details were collected from various villages in Thanjavur district. The people have good practical knowledge about the medicinal plants and medicinal values. Here we mentioned about 33 plants which are used to treat asthma. These identified medicinal plants are classified in the table based up on their botanical name, family name, local name, utilized part and their medicine formulation method <sup>[5]</sup> (Table 1). These classified medicinal plants belong to the various plant families, among these various plant parts are used for the preparation of medicines, the plant parts include leaves, fruits, root, flower, rhizome, stem, bark and latex and sometimes the whole plant <sup>[6]</sup>. These plants parts are used to prepare various kinds of extracts like decoction, powder, paste and juice to treat diseases. In some cases, instead of the extracts of raw materials, dried part of plants was also used in the treatment methods <sup>[7]</sup>. The collected plants species and taxonomical uses are identified from the Flora of the Presidency of Madras Gamble, (1935) Flora of Tamil Nadu Carnatic (Matthew, 1983); Indian medicinal plants and dictionary of medicinal plants <sup>[8, 9, 10]</sup>. These mentioned plant details are collected from the list of various herb documents. This details are arranged according to the rule of Bentham and hooker's classification <sup>[11]</sup>.

**Table 1: Classification of plants**

S. N o.	Botanical Name	Family Name	Local Name	Utilized Part	Formulation
1.	<i>Acalypha indica</i> L.	Euphorbia ceae	Kuppaimeni	Whole plant	20ml of whole plant extract is given twice a day for a week.
2.	<i>Adhatoda vasica</i> Nees.	Acanthace ae	Adathodai	Root	5g of powder taken orally for 3 days in a week in morning time.

3.	<i>Adhatoda zeyalanica</i> Medic.	Acanthaceae	Adathodai	Leaves	10ml of leaf extract with jaggery and honey are given twice a day for 3-5 days.
4.	<i>Aerva lanata</i> (L.) Juss. Ex Schult	Amaranthaceae	Sirukanpulai	Leaves	15g of leaves paste are taken orally for 30 days in morning time.
5.	<i>Albizia lebbeks</i> (L.) Wild	Mimosaceae	Vagaimaram	Barks	20ml of decoction given by every six hours. Powder 4g per day.
6.	<i>Boerhavia erecta</i> L.	Nyctaginaceae	Mookirattai	Leaves, Whole plant	Dried plant powder is smoked as a cigarette once in a day for one month to get relief from asthma.
7.	<i>Cardiospermum halicacabum</i> L.	Sapindaceae	Mudakathan	Whole plant	Paste of the whole plant is used to treat asthma.
8.	<i>Coccinia grandis</i> (L.) J. Voigt	Cucurbitaceae	Kovai	Rhizome	50g of rhizome decoction taken from <i>Coccinia grandis</i> is added with the equal amount of <i>Allium sativum</i> and it was taken by 45 days orally in afternoon time.
9.	<i>Costus speciosus</i> (J. Konig ) Sm	Costaceae	Koshtam	Whole plant	Juice taken from root is orally given to the patient (or) peeled stems are steeped in hot water and taken by patient (or) 1 tea spoon of tuber powder taken twice a day for 3 - 4times in a day orally.
10.	<i>Cyamopsis tetragonoloba</i>	Fabaceae	Kotthavarai	Leaves	Boiled or fried leaves are used to treat asthma.

11	<i>Datura metal</i> L.	Solanaceae	Oomathai	Leaves	Extract made from the leaves are taken orally for 1 week.
12	<i>Eclipta prostrata</i> (L.) L.	Asteraceae	Karisalai	Leaves	Leaves are collected from the plants of <i>Enicostemma axillare</i> , <i>Phyla nodiflora</i> , <i>Ocimum tenuiflorum</i> and <i>Plectranthus ainboinicus</i> are roasted (or) juice is extracted and 2-3 tea spoon of roasted leaves/ juice extract is orally given by 3-4 times per day.
13	<i>Euphorbia tirucalli</i> Linn	Euphorbiaceae	Thirukkali	Whole plant	250-500 mg of ashes made from the plant taken twice a day orally.
14	<i>Erythrina indica</i> (Lam).	Papilionaceae	Kalyanamurungai	Leaves	15g of leaves paste taken for 15 days orally in morning and evening time.
15	<i>Evolvulus alsinoides</i> Linn	Convolvulaceae	Vishnukarant hai	Leaves	The Leaves are made into cigarettes and smoked in the cases of chronic bronchitis and asthma.
16	<i>Guazum aulmifolia</i> Lam	Malvaceae	Ruthratchum, Thenmaram	Bark	One cup of bark decoction is given by 2-3 times per day.
17	<i>Gymnema sylvestre</i> R.Bs	Apocynaceae	Sirukurinjan	Leaves	1g of leaves powder is given by twice in a day.
18	<i>Heliotropium indicum</i> L.	Boraginaceae	Siruthetkodu kku	Whole plant	Decoction of roots (or) decoction from any part of this plant is used to treat asthma.
19	<i>Millingtonia hortensis</i> L.f.	Bignoniaceae	Akashmalli (or) MaraMalli	Dried flower, Root	Boiled leaves are used to treat asthma.

20	<i>Oldenlandia umbellata</i> L.	Rubiaceae	Chanjaver	Whole plant	2g of Whole plant powder should be taken by every day.
21	<i>Pergularia daemia</i> (Forsskal) Chiov	Asclepiadaceae	Uttamani	Leaves, root	Leaf juice is used to treat asthma.
22	<i>Pseudathria viscida</i> (L) Wight&Arn	Fabaceae	Nirmalli, Moovilaipunnai	Whole plant	Decoction taken from the root part is used to treat asthma.
23	<i>Rosa alba</i> L.s	Rosaceae	Roja	Whole plant	Whole plant ash is given orally thrice daily for three months.
24	<i>Sida cordata</i> (Burm.f)	Malvaceae	Nilathutti, Arivalmanaipundu, Ciramuttiver	Whole plant	150-450 mg of powder taken per day (or) 50 ml of decoction taken twice a day.
25	<i>Solanum melongena</i> L.	Solanaceae	Mullakathirikai	Leaves, Root, Fruit	Decoction of roots is taken internally, as general stimulant for asthma.
26	<i>Solanum nigrum</i> L.	Solanaceae	Manathakali	Leaves	20g of boiled leaves are added with water and it is orally taken by 15 days in morning time.
27	<i>Solanum trilobatum</i> L.	Solanaceae	Thoodhuvalai	Leaves	500g of boiled leaves are added with water and it is orally taken by 15 days in morning time.
28	<i>Tephrosia purpurea</i> (L.) Pers	Fabaceae	Kollingi	Leaves, Seeds, Root	Decoctions are taken from the roots to treat asthma.
29	<i>Vitex negundo</i> L.	Verbenaceae	Nochi	Leaves	The leaves of <i>Vitex negundo</i> were dried under shades for 2 weeks then it was

					powdered to prepare the extract to treat the asthma.
30	<i>Zingiber officinale</i> (Adans.) Rosc.	Zingiberaceae	Injee (or) Inji	Rhizome	20ml of decoction prepared from the rhizome taken thrice per day orally.

### Discussion:

The present study reveals that the details about the medicinal plants used by the villagers to treat asthma. In this study, about 30 medicinal plants were reported with their asthmatic medicinal values. These medicinal plants are used as single form or combination of other plants part and additives. The collected information of medicine plants are listed in **Tale 1**. The detailed plants are associated from 21 families that listed in **Table 2**.

### Based on Part Used:

Various parts of medicinal plants are used in the treatment of asthma. The plant parts which are used in the medicine preparations are leaves, bark, seed, root, flower, fruit, rhizome and seed. The plant parts which are used to prepare medicines vary from plant to plant. But, in some cases the whole plants is used to prepare a single medicine. The most frequent used plant parts are leaves (47%), whole plant (20%) and root (12%). The plant parts are depicted in **Figure 1** based on the parts usage.

### Based on Mode of Formulation:

The plant parts are given to patients in the form of powder, paste, decoction, juice, boiling and raw. The most given modes are powder (28%), decoction (24%) and juice (21%). In some cases plant parts are taken as vapour or smoked by the patient. The formulation mode of plant parts are depicted in **Figure 2** based on its usage percentage.

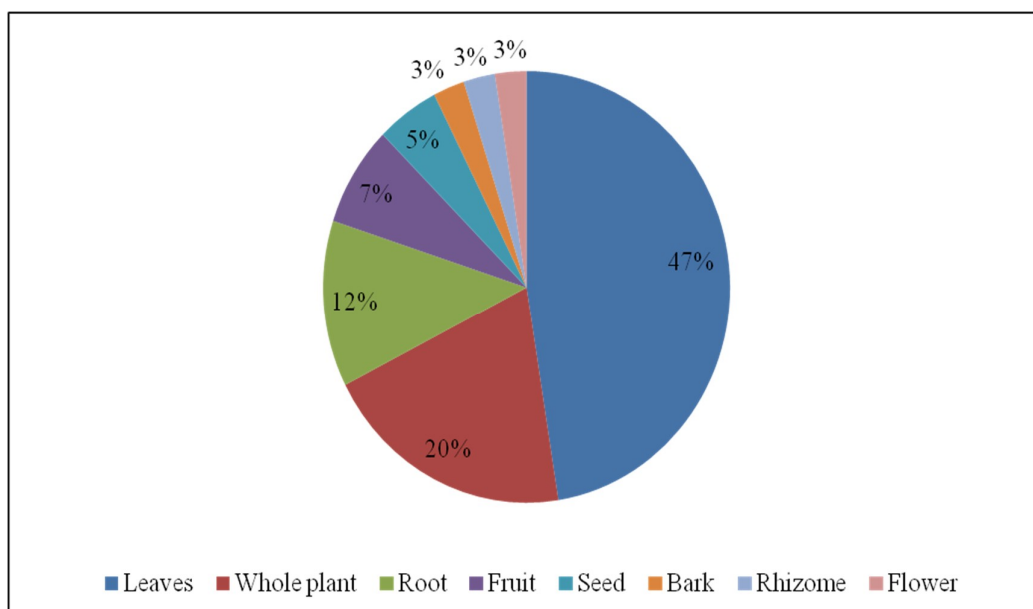
### Conclusion:

The present study mainly focuses on the medical plants used by the local people in Thanjavur district to cure asthma. These medicinal plants details were collected from the local peoples and Ayurvedic healers. Before any treatment is given to a patient they are primarily observed for a period of time. Ayurvedic medicines are given to the patients based on their age and body weight. In Ayurvedic medicines, plants, fruit plants, vegetables, spices and ornamental plants are used as traditional medicine mixed with other ingredients [12]. 30 medicinal plants belongs from 21 families are used to treat asthma in the study area. Thus, the present study details are help to understand the knowledge about the medicinal plants and their traditional values. Further research on herbal plant will leads to the discovery of new drug compounds.

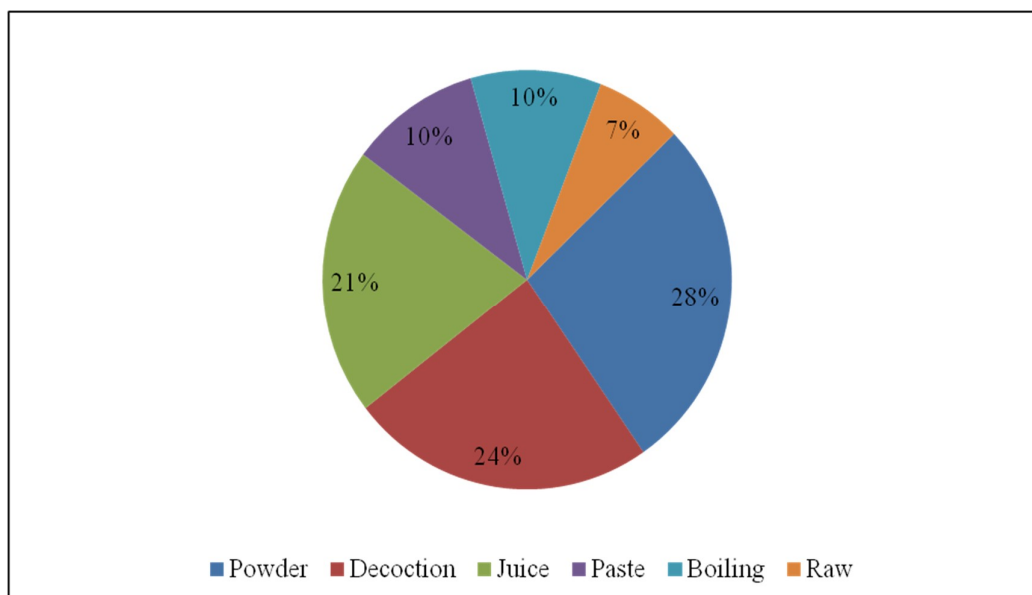
**Table 2: Number of plants used from different families by the villagers to treat asthma**

S. No	Family	No of plants
1.	Acanthaceae	2
2.	Amaranthaceae	1
3.	Asclepiadaceae	2
4.	Asteraceae	1

5.	Bignoniaceae	1
6.	Boraginaceae	1
7.	Convolvulaceae	1
8.	Costaceae	1
9.	Cucurbitaceae	1
10.	Euphorbiaceae	2
11.	Fabaceae	3
12.	Malvaceae	2
13.	Mimosaceae	1
14.	Nyctaginaceae	1
15.	Papilionaceae	1
16.	Rosaceae	1
17.	Rubiaceae	1
18.	Sapindaceae	1
19.	Solanaceae	4
20.	Verbenaceae	1
21.	Zingiberaceae	1



**Figure 1: Use of medicinal plants according to the use part**



**Figure 2: Use of medicinal plants according to method of preparation**

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## CHAPTER-24

### INDIA EMBRACING DIGITAL - THE STUDY ON USAGE OF DIGITAL PAYMENT, ITS GROWTH, CHALLENGES AND SUGGESTIONS IN INDIA

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#### **ABSTRACT**

*India is on fast pace of development and walking with globalization, Indian economy also needs to be updated with time to be truly global. For that, India needs to go cashless, faceless and paperless to grow with more speed. Even a condition of covid 19 has put Indian people totally at different edge. People have also switched over to digital payment with the need of time. Government also tries to encourage people to go for digital transactions. Still measures are to be initiated by the government to improve safety and security in digital transactions. RBI is also framing vision documents and framing regulations to build trust, for seamless transactions and to push business and industries in the direction of development and digitalization. There are various mediums Indians have adopted to go digital in this tough time. Even number of transactions and value have increased during last few years which are shown with the support of statistics of annual reports of RBI. This study has focused on acceptance of digital payment by Indians. Certain benefits have encouraged people to use digital payment and there are certain challenges in India which hinder the growth of digital payment. These challenges need to be attended very sharply to improve the condition of digital movement in India. Study concludes with certain suggestions to make Digital India Movement faster and to grow Indian economy to take big leap.*

**Keywords:** Digital payment, economic progress, role of RBI, digital awareness, technological advancement, impact.

#### **Introduction**

In earlier stage of civilization, humans were satisfying their needs by exchanging goods. It means humans were interdependent, it gave birth to barter system. By passing of time, invention of coins and exchange through currency took place with the progress of civilization. Thus, human society and economy witnessed progress of money in different form of coins of silver, copper, and gold, even leather to paper money, plastic money and today in the age of digital money. This article is intended to study awareness, adoption and usage of digital payment and transactions in last few years.

World is moving on fast track of innovation and India is no exception. India is heading towards the movement of digital India at a rapid pace in various domains. People acceptance towards digitalization is rising and so digital transactions in India. Even pandemic of novel corona virus has diverted people to use digital payment. Fear of touch and infection forced people to go for cash less or contact less payments.

India witnessed and created many limitations on Indian lives and have also changed habits of Indians during tough time. Time has also taught to change habits in many spheres in how we live, how we transact, how we pay, how we order and above all how we adopted digital transactions.

“NPCI (National Payment Corporation of India) has picked up the uses with the eco system drives towards UPI awareness, contactless card payments led by RuPay, NCMC (National Common Mobility Cards) contactless cards, and expansion of NETC (National Electronic Toll Collection) Fastag to state tolling and BBPS (Bharat Bill Payment System) across categories. This stays underpinned with the safety and awareness agenda.”<sup>1</sup>

NPCI is established in 2008 under patronage of RBI and Indian banks Association is having mission to create the difference in Indian lives and touching through variety of digital products like...

- |   |   |
|---|---|
| 1. UPI (Unified Payment Interface)            | 2. RuPay (Rupee and Payment)                |
| 3. NETC (National Electronic Toll Collection) | 4. NFS (National Financial Switch)          |
| 5. BHIM (Bharat Interface for money)          | 6. IMPS (Immediate Payment Service)         |
| 7. AePSv (Aadhar Enabled Payment System)      | 8. NACH (National Automated Clearing House) |
| 9. BBPS (National Automated Clearing House)   | 10. CTS (Cheque Truncation System)          |

NPCI facilitates digital transactions of people through three products and making digital transactions safe and secure. Digital payments are helpful in making many transactions more convenient between persons, businesses and even with the government. Safe and secure payments have made digital payments more popular amongst people.

### **Types of Digital Payment**

At present various mediums of digital payment are used by people in India. The selection of medium of digital payment depends on awareness of person, availability of that facility, user friendliness of medium, availability of infrastructure i.e. mostly accessibility of internet and its speed and so on. **These mediums have played very important role in making economy digital as well as cashless, faceless and paperless.** According to tweeter handle of ET, 66.6 billion transactions worth \$ 270.7 billion are expected to shift from cash to cards and digital payment by 2023. As far as last few years are concerned, acceptance of usage and its popularity is rising amongst people. Following are various mediums used by Indian public.

#### **1. Banking Cards**

Bank Cards are most popular, easily accessible and widely used medium of digital payment. Debit cards and credit cards have wide spread reach to even remote areas of India. Use of Debit card is more popular and acceptance amongst people. Debit card is pre-loaded card with the account balance of customer. Credit card is a kind of facility of advance making available to customer up to certain limit payable on due date. Customer can use debit and credit cards physically to make payment at time of shopping by swiping cards. Above it can be used for online payment through card number and CVV number.

#### **2. Unified Payment Interface (UPI)**

UPI is also one of the most popular mediums of digital payment. With intention to promote cashless society, National Payment Corporation of India (NPCI) has introduced UPI with the support of Reserve Bank of India. Sending and receiving of money is easy through

single app covering most private and public banks. By just linking a bank account, it facilitates cash transfer without IFSC code or other bank details. It has witnessed over 2 billion transactions in the year 2020.

### **3. Aadhar Enabled Payment System (AePS)**

With objective of financial inclusion, AEPS is introduced and supported by National Payment Corporation of India. Person just needs one Aadhar linked bank account to undertake basic banking transactions like to withdraw money, deposit money or fund transfer without visiting bank branch. Person needs to visit nearest business correspondent of Bank (Point of Sale / Micro ATMs) to undertake transactions. One only needs Bank name, Aadhar number, and finger print to undertake banking transactions. Basically, it helps those people who don't have smartphones and internet connectivity.

### **4. Digital Wallets (E – wallets)**

Digital wallet is more popular medium with younger generation with introduction of Google Pay, Amazon Pay, Airtel Money, Paytm and other digital wallets. Digital Wallets are virtual wallets to make payment. One needs to link bank account or debit / credit card to use digital wallet. Specific amount of balance can be added to digital wallet through bank account.

### **4. Internet Banking**

Another medium of making digital payment is internet banking. Generally RTGS (Real Time Gross Settlement), IMPS (Immediate Payment Service) and NEFT (National Electronic Fund Transfer) are used to transfer funds to beneficiary. One needs account number and IFSC code to undertake fund transfer to use these three. RTGS, IMPS and NEFT makes fund transfer in real time, instant and same day respectively. There is certain minimum and maximum limit of fund transfer in different systems of these different forms of payment. People use these methods as per their need of fund transfer.

### **5. Mobile Banking Apps**

Presently people are using various mobile banking apps for their digital transactions. Most banks offer various facilities through their apps. Mobile banking apps are popular because of its convenience and handy feature. Internet banking payment methods like RTGS, IMPS and NEFT can be undertaken through mobile app. Moreover, investments, demat account, bank statement and other facilities can be used through single app.

### **6. POS (Point of Sale)**

POS is method of digital payment undertaken through business correspondent where actual sales happens. It can be malls, petrol pumps, retailers or other sales points. Sellers have swipe machine to receive the payment from customers. Customers just need to swipe their debit or credit card to make the payment. It is an easy and convenient way to make payment while shopping.

This study has taken mostly used and most popular methods used by Indian people to make digital payment. There are other methods also which are comparatively less used by people.

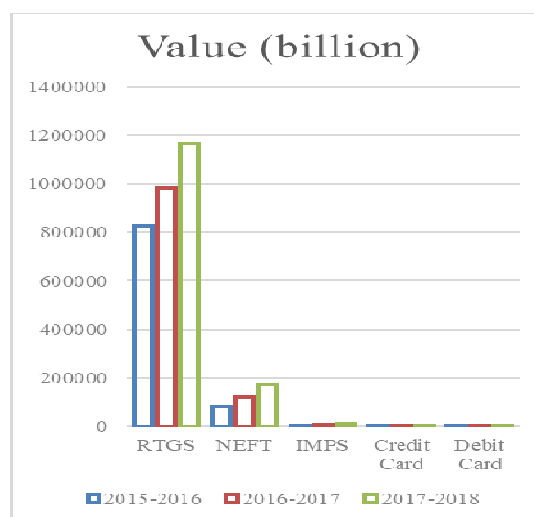
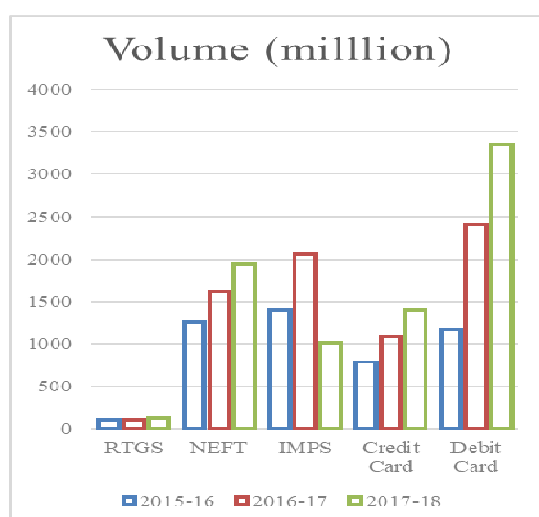
Below given are some of the statistics indicating growing acceptance of digital payment in India during 2015 – 2021. Report of Reserve Bank of India clearly indicates that Indian society is gradually switching over to cashless transactions.

Annual reports of RBI (2018 & 2021) are taken into study to evaluate the progress of usage of digital payment in Indian economy. Statistics are classified into two durations as second table also involve statistics of UPI and BHIM Aadhar Pay. According to statistics, conclusion can be derived that last few years have witnessed growing acceptance of digital payment.

#### Digital payment through different mediums during 2015 - 2018

SR.NO.	ITEM	Volume (Million)			Value (Billion)		
		2015-2016	2016-2017	2017-2018	2015-2016	2016-2017	2017-2018
1	RTGS	98.3	107.8	124.4	824578	981904	1167124
2	NEFT	1252.9	1622.1	1946.4	83272	120040	172228
3	IMPS	1404.1	2057.3	1009.8	3802	7916	8924
4	Credit Card	785.7	1087.1	1405.2	2407	3284	4589
5	Debit Card	1173.6	2399.3	3343.4	1589	3299	4600

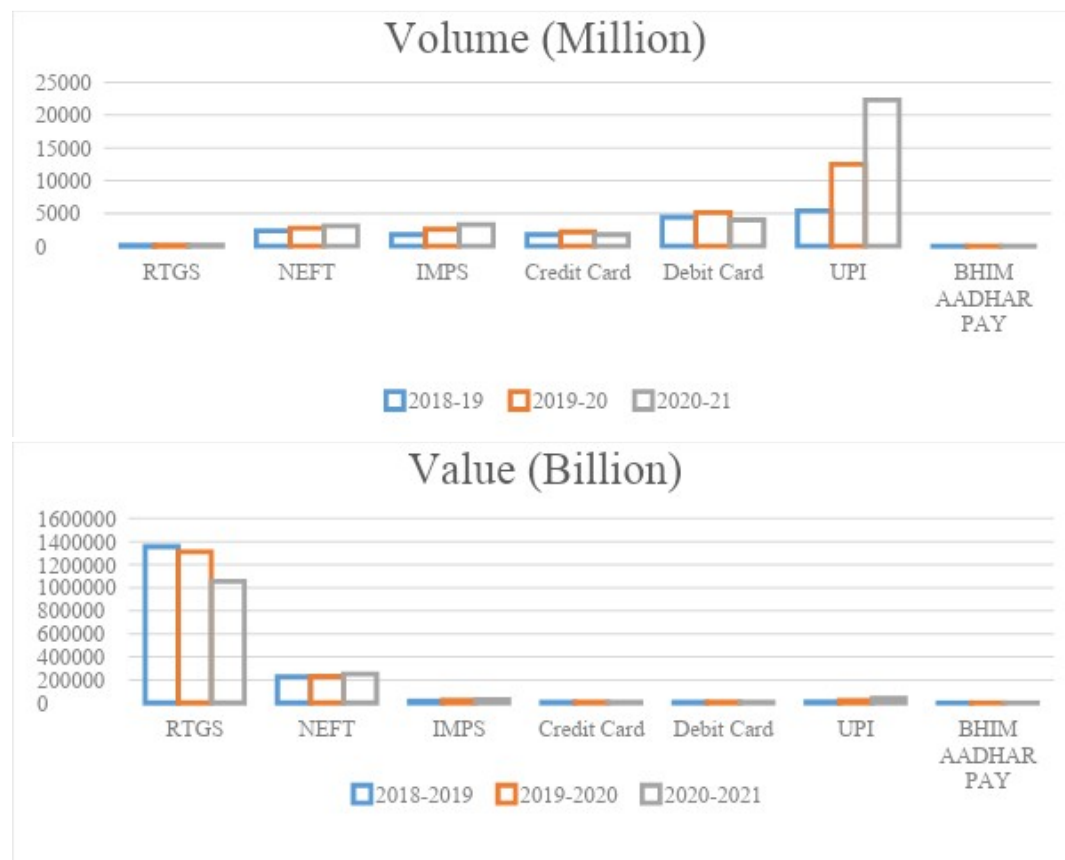
(Source: Annual Report, RBI, 2018)



#### Digital payment through different mediums during 2018 - 2021

SR.NO.	ITEM	Volume (Million)			Value (Billion)		
		2018-2019	2019-2020	2020-2021	2018-2019	2019-2020	2020-2021
1	RTGS	136.6	150.7	159.2	1356881	1311564	1055998
2	NEFT	2318.9	2744.5	3092.8	227936	229455	251903
3	IMPS	1752.9	2579.2	3278.3	15902	23375	29415
4	Credit Card	1762.6	2177.3	1764.1	6034	7308	6304
5	Debit Card	4414.3	5123.9	4020	5934	8048	6626
6	UPI	5391.5	12518.6	22330.7	8769	21317	41036
7	BHIM AADHAR PAY	6.8	9.1	16.1	8.15	13.03	25.80

(Source: Annual Report, RBI, 2021)



### Analysis

1. It can be observed from the table that value of RTGS and NEFT has grown rapidly in the phase of 2015-19. On the other hand, value of RTGS has fallen and NEFT has grown steadily during 2019-21 even due to economic slowdown.
2. Value of IMPS has risen rapidly during 2015-19 but it has steady rise during 2019-21.
3. Usage of Credit card has steady rise during 2015-2019. But people hesitated to use it in the time of pandemic with uncertainty of income.
4. Use and acceptance of Debit card have also grown with digitalization movement in India. It can be observed 2015-2019. Use of Debit card has also declined during 2019-21 in Covid situation as people curb unnecessary expenses.
5. Use of UPI has growth beyond imagination with acceptance of Digital India movement during 2018-21. Even it get around doubled in the last year.
6. Acceptance and use of BHIM Aadhar Pay have also risen during 2018-21. Even it has booming rise in the last year.
7. Pandemic situation has diverted common people to switch to go cashless and to ease day to day transactions.

### Role of RBI

As government of India launched Digital India movement on 1<sup>st</sup> July, 2015, it also needs to take some measures which encourage businesses, industries and common people to accept the movement with zeal. If government is initiating actions for ease and safe transactions, it instills trust amongst people to be part of this movement. RBI is an apex body in India in this concern to initiate and promote convenient, safer and easier transactions.

“With rapid advancement of technology and advent of new developments and innovations in the payments ecosystem, the Reserve Bank enhanced its focus on safety and security of payment systems. In addition, the Reserve Bank continued its efforts to nurture efficiency, innovation, competition, customer protection and financial inclusion.”<sup>2</sup>

Reserve Bank of India has also came out with electronic Banking Awareness and Training (e-BAAT) program regularly for the benefit of customers, bankers, students or all and all public. The aim of these program is to educate the public on a large scale to switch over their focus of payments from physical money to electronic money payments through various mediums.

Department of Payment and Settlement System (DPSS) is also working as guided by RBI's Payment settlement system vision document 2019-21. Primary objectives are digital awareness amongst people, smooth operations without disruptions, digital penetration, and innovative payment options. DPSS has undertaken various initiatives intending safety, security, efficiency, innovation, competition, customer protection and financial inclusion in Indian society to boost digital payment acceptance.

### **Benefits of Digital Payment**

Acceptance of digital payment in India is continuously growing from last few years. In the beginning, people hesitated to go for digital payment but improvement in infrastructure and even safer digital transactions have encouraged people to go digital. Even statistics in above table indicate rising numbers in digital payment by India society. There are benefits attached with digital payment that help digital payment rising.

1. Digital payment method is easy and convenient as one does not to carry cash which in turn reduces the risk of theft or loss of cash.
2. Increased safety and convenience have encouraged people to keep cash in online format and can have access to all transactions done through statement as well as fund transfer has become more popular as one can transfer funds anywhere in minutes and on finger tips anywhere in the country.
3. Economic progress gets pushed as one can make payment anywhere in the country, business can be expanded without geographical boundaries. So, digital payment plays important role to develop business and industries which in turn results into economic progress of the country.
4. Digital payment has increased opportunities for businesses and industries to grow rapidly and more efficiently because of increased ease of transactions on both sides.
5. In the duration of covid, people prefer to avoid human touch, people switched over to digital payment. It has made contactless and cashless payment through Swipe machine (Payee needs to hold the card near terminal and process gets completed through wifi setup), QR (Quick Response) codes and OTP (One Time Password).
6. Digital payment system also maintains electronic records of transactions. It helps to access or track income and expenditures records of past from anywhere anytime. Moreover, It helps to avoid long queue to save time and one can pay exact amount and can save even a single penny with digital payment.
7. As digital payment facilitates payment and receipt from anywhere, business grow without geographical boundaries. Business and industries can be expanded all over country and even in foreign countries.

8. Presently with a view to promote cashless economy, government and even private companies are offering discounts and cashback on making digital payment.

### **Challenges in digital payments**

1. Indian society is still lacking of sufficient infrastructure of internet facility, POS terminal, as well as availability of mobiles which hinders growth of digital payment.
2. Acceptance of digital payment first needs digital awareness amongst people. Indian society needs to be more educated of digital payment and more digital education awareness programs can be arranged to divert people to go cashless.
3. Security issues still discourage people to undergo digital transactions as cases of frauds, cyber-attacks, transaction failures are still occurring. People have lost money in certain cases and process of filing cases and get their money back is cumbersome.
4. According to Statista web, in 2016 22% mobile subscribers were using smartphones which increased to 54% in 2020. It means half mobile subscribers have smartphones, this fact again discourage number of users go for digital payment.
5. One of the problems of making digital payment is people do not feel safe about their data they use to submit while making digital transactions. People feel unsafe even using government apps, as news frequently flashes regarding data leaks.

### **Suggestions**

India is on fast pace of development and cashless can again fuel economic progress of the country. Therefore, more efforts by government in direction of encouraging people to go cashless will again help economy to grow with more speed. Even digital payment makes people at ease in their routine life when they go with digitalization. Certain suggestions can be made to push digital India movement.

1. Sufficient infrastructure of internet facility, Availability of POS terminals, high speed internet, will encourage people to use digital payment in their daily life transactions.
2. Government needs to arrange more number of digital awareness programs, awareness campaigns and to make advertisements of digital payment benefits to increase number of people using digital transactions.
3. At present discounts and cash backs are offered by private and public entities like electricity companies, municipalities on making digital payments. More discounts can attract people and can add charm to digital payment.
4. Training programs also to be arranged for employees involved in digital payment operations to make them aware of upgrading technology to upgrade knowledge and coping up with up to date digitalization.
5. Government and RBI require to initiate very strict actions in case of cyber frauds and strengthening trust of people in digital payment and safety of their personal data.
6. It is highly needed to upgrade technology and ease of charge back (reversal entry of transaction failure) which again improve trust of people.
7. More efforts can be made for financial inclusion. India still needs reach people in remote areas even in banking facility. So more can be done to improve digital infrastructure in remote areas.

### **Conclusion**

Study has tried to access use of digital payment, its impact, and challenges in recent years and it can be concluded that performance of India in digitalization game is very good



and covid situation has pushed people to adopt the new approach towards payment system. Intending economic progress, government is also putting best efforts to make people aware thus creating digital awareness. People have also involved themselves as digital payment create ease of life. India still aims to go far in digital India movement, obviously joint efforts of government and involvement of people will create expected outcome.

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## CHAPTER-25

### TRENDS AND STAGES IN SOCIALIZATION OF CHILDREN

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#### **ABSTRACT**

*Simply speaking, social development means the development of a person's / child's social self. It is a continuous process after birth. It also covers the total life span of an individual. Social development does not come automatically, nor all of a sudden. It is a time taking process which requires adequate motivation and requisite opportunities in the social environment in which the child is brought up. From the very beginning, i.e., after birth, a neonate is not social. Due to the process of socialization, gradually the baby becomes socialized. As he grows up, he behaves in accordance with the socio-cultural norms and is transformed into a social being. Author in this chapter wants to bring readers notice some trends and stages in socialization of children.*

**Keywords:** Trends, Stages, Socialization, Children

#### **1. Introduction**

The social nature of the child is influenced by the interaction with several socializing agents, such as; parents, family members, classmates, playmates and other members of the society. Mother is the first socializing agent. The social development of the child is normally brought by the two major social Processes-Socialization and Acculturation.

Socialization is an informal process of acquiring social skills, ideas and values accepted by the society through interaction with other members of the society such as parents, teachers and peers etc. with whom the child lives. Socialization does not necessarily imply mere conformity, rather it has its wider meaning and acceptance value.

So, in short, through socialization and acculturation, the child acquires specific skills, attitudes and values which enhance the child's social functioning and formation of healthy social relationships. Again, the social agents (home, school, peer group etc.) and the media provide the child with social working knowledge and experiences which are necessary for social growth. A newly born baby first establishes his social relationship with the mother/ caregiver who satisfies his needs. This attachment gradually broadens its horizon and covers other family members.

But children reared in institutions do not develop these special ties due to lack of adequate experiences. So, the foundations of social behaviour are laid during childhood. In future, whether the child will become socially well-adjusted or socially maladjusted depends on his social experiences both at home and outside. It is a fact that if the child, from the very beginning of his life, is not given opportunities for social contacts, then such child is likely to face more problems in interpersonal relationships later. Social development helps the child to interact with others successfully and contribute something

to the social situation. As a result, the child gets the approval and assistance of others which is essential for physical and mental well-being.

## **2. Trends in Social Development of Children**

As the child grows, he begins to experience the world in which he lives. It peaks up ideas about self and others due to his contact with a number of persons and the environment both in and outside home during early years of life. The first person with whom the child interacts is the mother. Later, the child interacts with other members of the family who meet the needs of the child. This interaction of the child with the mother, other members and the new environment is the foundation for the social development of the child. The child learns to behave in accordance with the cultural norms of the society. So, the social development of the child is closely associated with the socio-cultural norms of the society in which he grows.

It is true that, till now, there is no established and specified norm for assessing the social development of children, still then, there are certain observable patterns of social behaviours commonly found in many children. These patterns are enumerated below;

- Social development follows a specific pattern.
- Social development of the child can be predicted.
- Social behaviour is learned by the children.
- Children's formation of "self" begins in infancy.
- Both the kinds of social contact and number of social contacts enrich the social development of children.
- The child learns which action is good or bad through approval or disapproval of his parents and teachers.
- The child learns cooperativeness and cohesion at home from parents and outside from peer groups.
- In early childhood, interest in team game increases along with unwillingness to play with opposite sex.
- Through peers, the child acquires socially desirable traits like helpfulness, responsibility, good humour and independence.
- Expansion of social horizons and interactions increases with age.
- Social maturity begins to be shaped in later childhood along with a feeling of harmonious coexistence.

Of course, these are a few observable social behaviours among children. However, it is essential to discuss the characteristics of social development in children which occur at different stages.

## **3. Stages of Social Development**

After birth, a new born baby passes through different developmental stages. These stages are:

- Infancy (0-3) years
- Early childhood (3 -6 years)
- Late childhood (6-12 years)
- Adolescence (12-16 years)

We will discuss the social development of children during different stages briefly, here in the following section:

**1. Infancy (0-3 years)**

During infancy, social behaviour has its beginning. Beginning from the birth, the infant has no interest in people. Activities of children are directed towards satisfaction of physiological needs. Upto two months, the neonate does not even distinguish the human voice from other noises. Smiling is the first social behaviour which appears in the third month of the child. The baby is able to focus his eyes, responds by smiling and follows his mother by moving his eyes.

However, initial social interaction of a baby is with the adult who looks after him. This provides him a feeling of security. Then, he learns to recognize his mother's voice very soon. After four months, the baby enjoys being with other people and does not like being left alone. Then, the baby looks forward to being lifted and makes anticipatory movements, accordingly show delight being talked to or being given personal attention and discriminates between familiar and unfamiliar persons.

After 5<sup>th</sup> month, the baby is able to differentiate between friendly and angry voice, smiling and scolding, making aggressive social responses to adults such as exploring their facial features or pulling their hair at six months of age. Around the age of eight or nine months, the baby is able to imitate the adult sound, actions and gestures. From fifteen months onward, the baby takes and increasing interest in adult activities and shows a desire to be with them.

Around second year, the child becomes an active member of the family and shows interest in mixing with other children of the family. Children begin to fight among themselves during this period. They also start imitating each other. During this span of time, children try to adjust and cooperate in playful activities.

**1.3.2 Early Childhood (3 to 6 years)**

Early childhood is otherwise known as pre-gang age or pre-gang period. During this period, the child makes contact outside home. Over this time span, the kinds of social experiences the child receives are more important than the number of experiences. The basic social adjustment processes of the child are shaped during early childhood. If most of the social experience that the child receives from the society are more favourable and pleasant, then the child may develop positive social feelings. Various types of behaviours appear during early childhood. Some are social, some are unsocial and some others are antisocial. The behaviour patterns exhibited by the child are imitation, rivalry, negativism, sympathy, aggressiveness, cooperation, prejudice, social approval, ascendant behaviour, sex typing, selfishness, dependency and friendliness.

Pre-social and cooperative behaviour appear after the third year and mature around six. Group activities and cooperative play begin to develop by the end of third year. The need for social approval might lead to future personality development of the child. Around age three, children show a tendency to dominate others. Ascendant behaviour increases as a result of the child's involvement and experience in more and more situations. Around the age 5, it reaches the peak and then declines. From this type of behaviour, leadership quality of children develops in later years. However, an ascendant child will develop into a confident child if guided properly.

Child psychologists observed that the gang can help the child to assimilate the social process in four major ways:

1. First, children learn to get along with their agemates and behave in socially acceptable way.
2. Secondly, the gang can help the child to develop a national conscience and the scale of values to replace the moral values of his parents.
3. Third, through gang experience, children learn appropriate social attitudes such as how to talk to people, how to like people and enjoy social life and group activities.
4. It can help the child to achieve personal independence by gaining emotional satisfaction from friendship with agemates, classmates and other peers.

Moreover, the gang provides him opportunity to evaluate himself more realistically. Gang improves the socialization process by providing wider opportunity for social interactions and self-expression. In late childhood, the child shows certain typical social behaviours like fighting with siblings, attacking classmates and breaking possession of other family members. Certain rudiments of knowledge and essential skills are learned during this period. Spectacular changes in child's language development are the result of schooling, media exposures such as reading children's magazines and watching television. These vital forms of communication help children develop different areas of social behaviour.

### **3. Stranger Anxiety and Separation Anxiety (06-12 Years)**

During the second half or the first year, some infants show wariness of strange people and places. They also show distress when a familiar caregiver (mother) leaves. The former is called "stranger anxiety" and the later is the "separation anxiety". Separation anxiety and stranger anxiety used to be considered emotional and cognitive milestones of the second half of infancy, reflecting attachment to the mother. But some recent findings suggest that although stranger anxiety are fairly typical, they are not universal. It was also found that infants react negatively to strangers before six months of age, commonly do so by 8 or 9 months, and do so more or more throughout the rest of the first year (Sroufe, 1997). This change may reflect cognitive development. Today, neither intense fear of strangers more intense protest when the mother leaves is considered to be a sign of secure attachment. Researchers measure attachment more by what happens when the mother returns than by how many tears the baby sheds at her departure.

### **4. Social Referencing (12-16 Years)**

Understanding an ambiguous situation by seeking out another person's perception of it is called "social referencing". Babies seem to use social referencing when they look at their caregivers upon encountering a new person or toy. This type of behaviour may emerge during the latter part of the first year, when infants begin to judge the possible consequences of events, imitate complex behaviours and distinguish among and react to various emotional

1. **Stranger Anxiety:** Wariness of strange people and places, shown by some infants during the second half of the first year.
2. **Separation Anxiety:** Distress shown by an infant when a familiar caregiver leaves.
3. **Social Referencing:** Understanding an ambiguous situation by seeking out another person's perception in it. Babies seem to use social referencing when they look at their caregivers upon encountering a new person or toy.
4. **Self-efficacy:** Sense of capability to master challenges and achieve goals.

Expressions (Baldwin & Moses, 1996). However, newer research provides experimental evidence of social referencing at 1<sup>st</sup> year. The idea that infants engage in social referencing has been challenged. When babies spontaneously look at caregivers in ambiguous situations, it is not clear that they are looking for information; they may be seeking comfort, attention, showing of feelings or simply reassurance of caregivers-typical attachment behaviours.

During adolescence stage, social insight develops among children due to their mental maturity and understanding of social interactions. Through understanding other's thoughts and feelings, he regulates his own social behaviour and makes better social adjustment. With increasing age, children understand their sex roles and prefer to play with the members of their own sex. This is known as sex antagonism. Strong sex antagonism is seen around ten to thirteen years. Again, separate sex-typing behaviours are marked with boys and girls during this period.

During adolescence, the overall development gets accelerated. Physical changes are evident along with secondary sex characteristics. Sudden physical changes make a child

#### **1.4 Suggestions for Parents**

1. Don't give any physical punishment to infants or children.
2. Mother's attachment is very important for children. Separation from the mother is unbearable.
3. Don't give any strict toilet training during early periods.
4. Try to avoid quarrelling in front of children.
5. Talk to children when time permits. It will not invite any linguistic problem in future.
6. Try to give democratic guidance and suggestions to children. It will make them sociable in future.

Anxious and he becomes concerned himself. Often, he becomes moody. Due to these sudden physical changes and growth, the adolescents (12 to 16 years) encounter a period of disequilibrium. The early maturity in boys brings with it exaggerated forms of antisocial behaviour. Often, they become overly aggressive demanding attention and also they become hypersensitive. He develops a definite self-concept, a set of social attitudes which vary both in positive and negative ways.

But the tension and stress of adolescence are in some way utterly conditioned and more evident in urbanized industrial society. There is a growing awareness of the opposite sex and a need for approval and contact with them. The way this need manifests itself differs from culture to culture. With the emergence of adulthood, the adolescent behavioural characteristics are replaced by more positive and stable patterns. Of behaviour. But it depends upon how the individual child passes through the stages of socialization.

**Behaviour of Parents Which Affect Children**

<b>Parental Behaviour</b>	<b>Effects on Child</b>
<ul style="list-style-type: none"> <li>• Lack of love, affection and sympathy and denial</li> </ul>	<ul style="list-style-type: none"> <li>• Repression behaviour, introvert and day dreaming emotional complexes, imagination, aggression.</li> </ul>
<ul style="list-style-type: none"> <li>• Excess love, affection</li> </ul>	<ul style="list-style-type: none"> <li>• Excessively dependent, extremist</li> </ul>
<ul style="list-style-type: none"> <li>• Ignored behaviour</li> </ul>	<ul style="list-style-type: none"> <li>• Conflicting personality</li> </ul>
<ul style="list-style-type: none"> <li>• Allowed freedom</li> </ul>	<ul style="list-style-type: none"> <li>• Development of free will</li> </ul>
<ul style="list-style-type: none"> <li>• Ideal</li> </ul>	<ul style="list-style-type: none"> <li>• Identification (wearing shift of his parents)</li> </ul>
<ul style="list-style-type: none"> <li>• Birth order of child</li> </ul>	<ul style="list-style-type: none"> <li>• Overdependent</li> </ul>
<ul style="list-style-type: none"> <li>• Sound parental child-rearing behaviour</li> </ul>	<ul style="list-style-type: none"> <li>• Creates dynamic personality with creative thinking</li> </ul>
<ul style="list-style-type: none"> <li>• Parent-child interaction</li> </ul>	<ul style="list-style-type: none"> <li>• Sociability</li> </ul>
<ul style="list-style-type: none"> <li>• Children's need satisfaction</li> </ul>	<ul style="list-style-type: none"> <li>• Helping nature</li> </ul>
<ul style="list-style-type: none"> <li>• Less talk with child</li> </ul>	<ul style="list-style-type: none"> <li>• Linguistic problem</li> </ul>
<ul style="list-style-type: none"> <li>• Parental absence and separation</li> </ul>	<ul style="list-style-type: none"> <li>• Isolation, loneliness, social adjustment</li> </ul>
<ul style="list-style-type: none"> <li>• Relationship between parents' cordial</li> </ul>	<ul style="list-style-type: none"> <li>• Cooperative behaviour</li> </ul>
<ul style="list-style-type: none"> <li>• Democratic guidance and suggestions, sociability</li> </ul>	<ul style="list-style-type: none"> <li>• Sociability</li> </ul>
<ul style="list-style-type: none"> <li>• Parent-child harmony</li> </ul>	<ul style="list-style-type: none"> <li>• Sociability</li> </ul>
<ul style="list-style-type: none"> <li>• Shyness, pride, self-awareness</li> </ul>	<ul style="list-style-type: none"> <li>• 2 years</li> </ul>
<ul style="list-style-type: none"> <li>• Affection for other children</li> </ul>	<ul style="list-style-type: none"> <li>• 15 months to 2 years</li> </ul>
<ul style="list-style-type: none"> <li>• Fear of ghosts, death and snakes</li> </ul>	<ul style="list-style-type: none"> <li>• 3 years</li> </ul>
<ul style="list-style-type: none"> <li>• Use of emotional display rules</li> </ul>	<ul style="list-style-type: none"> <li>• 48 to 60 months</li> </ul>
<ul style="list-style-type: none"> <li>• Begins to understand how two or more emotions can occur simultaneously</li> </ul>	<ul style="list-style-type: none"> <li>• 72 months</li> </ul>
<ul style="list-style-type: none"> <li>• Good relationship, exploration</li> </ul>	<ul style="list-style-type: none"> <li>• 80 months</li> </ul>

There are so many factors which influence the social development of children. These factors do not operate in isolation. The main factors are. Physical growth, intelligence, family, parent-parent relationship. Parent-child relationship and sibling relationships. Other social factors include school, peer group, culture and media. The interaction between the environmental factors and the child helps him to develop self-concept and perception about his environment. Personal appearance is an important factor in the context of social adjustment as personal hygiene a grooming create a favourable impression on others.

As a factor of social development, intelligence has significant influence. Dull children have difficulty in social adjustment. Very bright or gifted children are also likely to have problems as they are far ahead of their own peer group. Social insight (understanding the

dynamics of social interaction) helps a person to make social adjustments in a mature fashion.

. Good home atmosphere makes children well adjusted. Further, the mother child relationship is crucial in determining the course of child's social development. Maternal deprivation in early childhood has bad effect on personality growth. The mother provides the child with an atmosphere of security and acceptance. Over protective mothers tend to hold their children from everything which are seen as a potential source of danger. Such children become timid in future. They will be unable to meet the normal risk of life or develop any feeling of independence.

Over possessive mothers want to do everything for the child. Under this form of love, the child does not flourish. Socially, the child tends to be withdrawn and reserved and is unable to mingle freely lacking in self-reliance and independence. Thus, the nature of relationships between the mother and the child greatly influences the kinds of qualities traits and skills a child acquires and thereby determines the course of his social development. Further, social development of children having siblings is facilitated due to interaction between brothers and sisters. Also, siblings serve as a ventilation system for negative feelings and hostilities. Due to meaningful and enjoyable sibling interaction, the child looks forward to the company of his peer groups outside home. Apart from these, the nature of the family itself, the number of family members and its economic and social condition also affect the child's belief, attitude and behaviour.

However, the issues like whether joint or nuclear families facilitate the child's social development better or whether the children of working rather than non-working mothers are socially more matured, are highly debatable. What seems to be more important here is the quality of interaction and experiences that a child receives. Although joint families provide children with greater exposure to relationships and teach them numerous group values, they may also adversely affect child's development, if there are constant tensions and conflicts among family members.

Some other factors which influence social development of children are economic background and social status, child-rearing practices, culture and media. Often, peers serve as guides, friends and therapists. Culture setting has profound influences on children throughout their growing processes. Social developments are patterned by cultural norms. Social harmony and social tensions shape the personality of the child. As a whole, media has tremendous effect on socialization process giving it colour and varied dimensions. Media unfolds the potentialities and aspirations.

### **1.5 Socialization of Personality Development**

- Socialization is the process whereby an individual learns to behave in accordance with social customs and traditions. The human child possesses a tendency towards imitation, identification and role learning which he acquires through the process of socialization. Social interaction facilitators such as social interaction facilitators such as social institutions, associations, groups and traits, i.e., praise and blame, cooperation and conflict, submission and ascendancy influence the human child to form his personality.
- A social parent is one who raises and rears the child acting as a mother or father. Parents and children are complimentary and relative concepts. Without one, the other does not exist. Parenting is an ongoing process of learning. Parents and children influence each



other's behaviour at every point of interaction of interaction during their lifetime. Early training depends upon adequate stimulation. The natural teachers are parents. The natural place is the ordinary family home. The natural tools for learning are play things. The child's mind is greatly influences by behaviour and personality of parents.

## **6. Conclusion**

Family is the basic and basic and most significant social unit contributing the social development of a child. It provides the child with the biological heritage. Family is the first social group with which the child identifies. Relationship between parents determines the home atmosphere. A child who is used to love and harmony will always strive to maintain it. In an unhealthy family atmosphere, where there is a constant quarrelling and physical aggression between parents, the child is likely to feel insecured and indifferent. The fulfillment of his social needs of love, affection and belongingness are thwarted. As a result, children may develop negative behaviours such as bullying, teasing, arguing and timidity, which affect their ability to form friendship and relate to other. These children are likely to develop a pessimistic attitude towards society.

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## CHAPTER-26

### CONSTRUCTIVIST APPROACH IN TEACHING AND LEARNING PROCESS

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#### **ABSTRACT**

*The key features that have been taken into justification in the article contain, the view of human learning, features of constructivist learning, approaches of constructivist learning and traditional learning, the character of the teacher in constructivist learning method, learner's situation in a thoughtful learning approach and suggestions of constructivism for teaching and learning. It challenges to scrutinize and produce the data composed in the area of theoretical models used in teaching and learning during inquiry-based missions, and to recommend a new edge for shaping the classroom communications within a constructivist method. The constructivism in teaching learning procedures is principally mentioned to when persons are involved in creating their own thoughts, views and viewpoints. When learners fetch in their skills, ideas and views within the learning situation in order to gain an effective thoughtful of the ideas, then they are able to put into procedure, the theory of constructivism. In the constructivist method to learning, the students are well-aware and express their goals and ideas on their particular. But they need to take concepts and proposals from their teachers to make sure that they are on the right way. The Article deliberates the constructivist approach, how it has been criticized, and the successive growth of the constructionist approach. Constructivism is furthermost closely related with the Swiss psychologist Jean Piaget (1896-1980) whose epistemological theory is measured one of the most persuasive constructivist theories in education.*

**Keywords:** *Constructivism, Learning, Learners, Reflective Learning Approach, Teaching-Learning Processes, Traditional Learning.*

#### **Introduction**

##### **Definition:**

Constructivism is basically a theory, based on observation and scientific study, about how people learn. It says that people construct their own understanding and knowledge of the world, through experiencing things and reflecting on those experiences.

- “Constructivism is a philosophy of learning founded on the premise that, by reflecting on our experiences, we construct our own understanding of the world we live in”
- It is “based on a type of learning in which the learner forms, or constructs, much of what she learns or comprehends”

It is usually known that constructivism constitutes a very important method, although often challenged, hands-on and theoretical outlook in recent education study. The work of Piaget holds that data is vigorously created by the student and not passively spread by the educationalist. In addition, there is the essential constructivism, in which perception is measured adaptive in the logic that it is based on and regularly changed by a learner's

knowledge. Beyond that, there is the communal constructivist type of Vygotsky, who in a struggle to task Piaget's ideas established a fully cultural mindset emphasizing the prime role of communication and social life in meaning creation and understanding. The ultimate type of constructivism is emphasized by thoughts of sociology of systematic information, which claim that all realities is a public model in the boundary of skill and knowledge lessons. Its scholarships a temporary assessment of the numerous brooks of constructivism in trainings of education, people, science and technology. Earlier uncertain why people are so frequently enthusiastic around constructivism, it would be supportive initial to simplify what constructivism really is. In the article we get ahead to present a number of responses given to the final interrogation in the situation of numerous corrections from the humanities and the sciences. Outwardly, receiving to holds with constructivism would not only contribute to a justification of the misinterpretations among irritated participants but it could also contribute to the progress of an informative superlative preparation on the very empathetic of truth, given the searching part that education plays in the imitation of culture. Unusually, one of the most important suggestions of fundamental constructivism tasks the procedures by which specific students aggressively hypothesis their own information, programme, and it assesses the level of impact of constructivism in modern science education.

Instructive thinkers have long tried to appreciate how data is collected, shifted, and unstated from one specific to the following. If teachers could only recognize this procedure entirely, we could connect the influence of information allocation to improve the education consequences of our pupils. One of the developers of education concept, John Dewey, emphasized that information was spread from one group to the next by demonstration of data by the educated and re-construction of study material by the beginner, setting that individual's considerate of innovative data. In additional arguments, it is raised by students and made on previous skills. Constructivism postulates that beginners must willfully think about arising import when attending or viewing the teacher who is simplifying their knowledge surroundings, and with this remark, pupils construct their own information. Deviating though their individual concepts might be, Piaget, Brown and Thomas all highlight the attitude awareness that education happens through communal collaboration.

Analogous condition is being confronted by training establishments. Enlarged affordability and the resultant want to progress and spread the training they offer means that trainers must have notional and hands-on know-how in new methods for bringing training.

The concept of constructivism is accredited to Jean Piaget, who expressed the devices, by which data is adopted by the pupils. Through the developments of place and adaptation, people construct new information from their skills. When people integrate, they join new knowledge into a previously current basis, without altering that outline. This takes place, when the experiences of the individuals are ranged with their core illustrations of the world. In some cases, one may be incapable to fetch about variations in lookouts and outlooks, which may not be exact. People may not poster the procedures, but may know the effort from others. In divergence, when the involvements of the students oppose their core illustrations, then they may take about deviations in their observations of their involvements to be in accordance to the inner images. The events that are started within the classrooms commence with the explanation of the constructivist teaching. This is spoken within the events, education methods, knowledge approaches, assessment

The admiration of English in the universe has impacted English as Second Language global. English training that results in experienced English users is in countless demand in Western and Asian countries. Certainly, the manipulators' demand will high spot modifications in English Language Teaching practices. Hence, English as one of the most desirable foreign languages to be learned has knowledgeable continuous growth in its procedure and programs. It transpires because forthcoming verbal education from the viewpoint of the manuscripts wants a supplementary method which can allow pupils to progress the information and skills to deal with verbal and printed texts in public circumstances.

**Objectives:**

**Objectives of the constructivism are**

- Describe what constructivism is
- Identify the model for a constructivist approach
- Examine the difference between a tradition classroom and constructivist classroom
- Identify some ways the constructivism approach can be employed
- Compare educational delivery and setting for teachers continuing education and professional development

**Characteristics:**

**Eight characteristics of Constructivist Learning Environments:**

1. Constructivist learning environments provide multiple representations of reality.
2. Multiple representations avoid oversimplification and represent the complexity of the real world.
3. Constructivist learning environments emphasize knowledge construction instead of knowledge reproduction.
4. Constructivist learning environments emphasize authentic tasks in a meaningful context rather than abstract instruction out of context.
5. Constructivist learning environments provide learning environments such as real world settings or case-based learning instead of predetermined sequences of instruction.
6. Constructivist learning environments encourage thoughtful reflection on experience.
7. Constructivist learning environments "enable context and content- dependent knowledge construction."
8. Constructivist learning environments support "collaborative construction of knowledge through social negotiation, not competition among learners for recognition."

**Constructivism is:**

- Constructivism is child-centered, rather than curriculum based.
- Constructivism focuses on knowledge construction, not knowledge reproduction.
- It is a belief that one constructs knowledge from one's experiences.
- Everyone's view of the external world differs from others because of their unique set of experiences.
- The ideas and interests of children drive the learning process.
- Teachers are flexible- they are the facilitator.

**Perception:**

Constructivism is not a new concept; it has been around since the turn of the century and was supported & contributed by:

**John Dewey, (20 October 1859 - 1 June 1952)**

who was an American psychologist, philosopher, educator, social critic and political activist?

- Believed that learning should be engaging to the students... they will learn better if they are interested.
- Was a huge influence on our education system?
- Believed in “educating the whole child, physically, mentally, and socially, and not just on the dispensation of facts and information” (Cushman et al 395)

**Jerome Bruner, (1 October 1915 - 5 June 2016,)**

Very influential psychologist. His concern with cognitive psychology “led to a particular interest in the cognitive development of children... and just what the appropriate forms of education might be” (Smith) According to Jerome Bruner, Education shouldn’t focus on memorization, but experience. Educational environment that focused on: Traits unique to humans, how humans received these traits, how humans received more of these traits,

**Lev Semyonov ich Vygotsky (November 17, 1896 – June 11, 1934)**

A Russian psychologist and philosopher and is associated with the social constructivist theory. He believed that the influences of cultural and social contexts played an important part in learning and supports a discovery model of learning, He developed the social cognition theory which “asserts that culture is the prime determinant of individual development” because humans are the only creatures to have created cultures and therefore it effects our learning development. (“Vygotsky and Social Cognition”), Vygotsky believed that learning needs to be engaging. Vygotsky believed that learning takes place as children are interacting with each other and exploring their environment. He believed that learning is simultaneous to social interaction and exploration. In other words, he did not feel as though one was more important than the other.

**Jean Piaget (9 August 1896 – 16 September 1980)**

- who based his view of psychological development of children such that a child constructs understanding through many channels: such as reading, listening, exploring and experiencing his or her environment.
- Felt children were “active learners” who constructed new knowledge “as they moved through different cognitive stages, building on what they already knew” (Cushman et al 392)
- Piaget believed that children learn through organization and schemas. He believed that by organizing concepts and ideas, children place them into schemas. He believed that children are in control of the knowledge that they are provided and move forward in construct their own learning by taking part in social activities and exploration
- Developed the cognitive learning theory

**Piaget’s 4 Cognitive Stages**

- **Sensorimotor** - “learning takes place primarily through the child’s senses and motor actions” (Cushman et al 393)
- **Preoperational** - “children begin to use symbols and images” (Cushman et al 393)
- **Concrete Operational** - “children begin to think logically” (Cushman et al 393)
- **Formal Operational** - Children begin to think in an abstract way

**Five “E” steps****1) Engage**

In the stage Engage, the students first encounter and identify the instructional task. Teachers must engage students in their lessons in order for them to learn. Engage students by: guiding whole group discussions, asking students to explain what they learned, working together in small groups to complete projects or tasks.

**2) Explore**

In the Exploration stage the students have the opportunity to get directly involved with phenomena and materials. Students inquire, work together, form hypotheses, learn about new ideas and concepts on their own before coming together as a whole class. Students develop an idea of what they may think an object or idea is, then explore it further to see if their idea was accurate. Students use tools such as textbooks, the internet, scientific instruments and their creative minds to explore new concepts

**3) Explain**

**Explain**, is the point at which the learner begins to put the abstract experience through which she/he has gone /into a communicable form. The student will define and explain the current concept using their own words. The student will accomplish this using informational readings, group discussions and teacher interaction. Learners will support each other by sharing their ideas, observations, questions, and hypotheses.

**4) Elaborate**

To elaborate, the students expand on the concepts they have learned, make connections to other related concepts, and apply their understandings to the world around them. Students will expand their learning on the concepts by making connections to related concepts and applying their understanding to the world around them. This will help students make connections that will lead them to more inquiry which will lead to new understandings.

**5) Evaluate**

Evaluate, the fifth "E", is an on-going diagnostic process that allows the teacher to determine if the learner has attained understanding of concepts and knowledge. Constructivism encourages teachers to assess their students learning on an ongoing basis. In traditional classrooms, assessment would be paper tests taken by the students after the content was taught and in which they received a grade. In a constructivist classroom the teacher assesses the students work and adapts the lesson plan to meet the needs of the learner.

**Constructivism: What does this mean for...****TEACHER**

“In a constructivist setting... the role of the teacher is to organize information around conceptual clusters of problems, questions and discrepant situations in order to **engage the student’s interest**. Teachers assist the students in developing new insights and connecting them with their previous learning” (Hanley)

**STUDENT**

In the classroom, students must work on building upon the knowledge they already have.

“Inferences, elaborations, and relationships between old perceptions and new ideas must be personally drawn by the student in order for the new idea to become an integrated, useful part of his/her memory” (Hanley).

### **Constructivism: What does the teacher do?**

#### **Without Technology**

- Encourages students
- Learns and questions side-by-side with the student
- “Transmits” information to the students
- Collaborates with students to facilitate their own meaning
- Works with the teachers to build a learning foundation
- Develop a schema for themselves
- Build on existing knowledge

#### **With Technology**

- Provide activities while on a topic
- Provide technology for students to build onto what they already know
- Provide an environment for interactive learning
- Build their knowledge with assigned projects
- Use software to further learning about a topic
- Work collaboratively with classmates

#### **TRADITIONAL Classroom**

- Student primarily work alone
- Curriculum is presented part to whole, with emphasis on basic skills
- Strict adherence to a fixed curriculum
- Curricular activities rely heavily on textbooks of data and manipulative materials
- Students are viewed as "blank slates"
- Teachers generally behave in a didactic manner,
- Teachers seek the correct answers to validate student lessons.
- Assessment of student learning is viewed as separate from teaching and occurs almost entirely through testing.
- Student primarily work alone
- Curriculum is presented part to whole, with emphasis on basic skills
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- Teachers generally behave in a didactic manner,
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- Assessment of student learning is viewed as separate from teaching and occurs almost entirely through testing.

#### **CONSTRUCTIVIST Classroom**

- **Constructivist approaches:** can also be used in online learning, for example, tools used such as Wikis and blogs can enable to actively construct knowledge.
- **Oral discussion:** The teacher presents students with a ‘Focus’ question and allows an open discussion on that topic.
- **Mind Mapping:** In this activity students list and categorize the concepts and ideas relating to a topic.

- **Hands on activities:** These encourage students to manipulate their environments or a particular learning tool. Teachers can use a checklist and observation to assess student success with the particular material.

#### **Pros**

- This method of teaching helps students form questions and then work to analyze and answer them thus becoming better problem solvers
- a higher level of thinking occurs
- students like hands-on activities
- students feel a sense of ownership when hand-on learning occurs rather than just being told something
- Students can apply this learning style to any area and continue to build their understanding on the changing world they live in
- This learning style can be a fun, more involved environment for students and help better their school experience
- Focuses on student- centered learning, Students actively engaged in their learning process
- Teacher guides students in building their own understanding and knowledge.
- Technology and constructivism:
  - The internet allows for open discussion between students.
  - Computers allow for active learning.
  - Students learn use of technology through hands-on experience.

#### **Cons**

- Since this technique focuses on the students teaching themselves things about the world around them, this may take away from the fundamental's students need to learn in order to have basic knowledge.
- may lead students to take a majority rules attitude rather than an individual approach to decision making
- If the teachers do not implement this teaching style correctly, it could not be effective to students and they may not get what they're supposed to out of it
- Lack of teacher preparation for constructivist classrooms
- teachers may not take responsibility for poor learning
- Since it is not easy to let go of ideas or beliefs, it may be difficult for teachers to switch to constructivism from another learning style and they may not incorporate all of the required steps
- Difficult to break the cycle of those who have been taught in a classroom where they were expected to solely absorb information.

#### **Supposition**

Constructivism in teaching-learning process is primarily put into practice in higher educational institutions among adult learners. The primary feature of constructivism is, learners are provided with the right to bring in their experiences within the classroom setting and acquire an efficient understanding of the academic concepts. The role of the teachers is primarily those of a mentor and guide. Since the teachers are experienced and possess adequate knowledge and information in terms of subjects and concepts, it is their job duty to adequately guide and lead the students in the right direction. The students are required to



establish mutual understanding and good terms and relationships with their teachers. The teachers help them to overcome various problems and challenges and achieve their academic goals. They usually help them to accommodate new experiences in acquiring academic understanding. Through interaction, teachers as well as students contribute in enhancing each other's knowledge and understanding.

In order to acquire an improved understanding of the academic concepts and achieve academic goals, the learners need to be motivated towards the implementation of job duties. In constructivist learning, the students are mostly engaged in self-directed learning. It is vital for them to work on a continuous basis to augment their skills and abilities. They are given independence to put into operation the practices and approaches suitable to their needs and requirements, but they have to work in collaboration and integration with their teachers and fellow students. As in traditional learning, individuals may work on an individual basis, but in constructivist learning, they have to work in groups. The understanding of the concepts and other information is normally acquired through participating in various tasks and activities. Activities are put into practice on a frequent basis. These are either formulated by teachers or students themselves. These normally take place simultaneously at different levels. Finally, it can be stated that constructivist teaching-learning processes help students to become independent in enhancing their learning, develop interactive skills and form mutual terms and relationships with others, i.e. teachers and fellow students.

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## CHAPTER-27

### MULTIDISCIPLINARY AND HOLISTIC EDUCATION: A REVAMP OF INDIAN EDUCATION SYSTEM BY NEP - 2020

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#### **ABSTRACT**

*On July 29, 2020, the National Education Policy 2020 came into force by the Government of India. National Education Policy (NEP) 2020 redesigned and reconfigured the education system in India, starting from the school level to higher studies with the focusing on global needs of education making it more responsive and relevant to the developmental needs and interest of learners at different stages of their development. The policy aims to provide holistic education to produce engaged, productive and contributing citizens and equitable, inclusive and plural society as envisaged by our Constitution. India needs an education system aligned with the aspirational goals of the 21st century while remaining rooted to India's values, systems and ethos. NEP 2020 is crafted to provide an integrated yet flexible approach to education, keeping the interconnections of various phases of education. NEP 2020 is an end-to-end educational roadmap for the country with the broad view of encompassing holistic development kindling the true potentials of the individuals.*

**Keywords:** *Holistic, integrated, development, flexible.*

#### **INTRODUCTION**

Education is the cornerstone of a society. The most important investment we can make collectively and individually is in education. It amounts to an investment in the development of a nation. No country has achieved self-reliance without education of high quality. Education should have equality, accessibility, affordability, accountability and reachability among all. National Education Policy 2020 is a comprehensive document and its main purpose is to improve the education sector by making it inclusive, holistic, multi-disciplinary and more fruitful. There is no doubt that multi-disciplinary education is extremely significant in this post modern society of 21<sup>st</sup> century. There has been a lot of emphasis on holistic and multi-disciplinary education in the new and NEP 2020. India has a long tradition of holistic and multidisciplinary learning, from universities such as Takshashila and Nalanda to the extensive literature of India combining subjects across fields. A holistic and multi-disciplinary education, as described so beautifully in India's past, is indeed what is needed for the education of India to lead the country into the 21st century and the fourth industrial revolution. A holistic and multidisciplinary education would aim to develop all capacities of human beings – intellectual, aesthetic, social, physical, emotional and moral in an integrated manner. Such an education will help develop well- rounded individuals that possess critical 21<sup>st</sup> century capacities in fields across the earth's humanities, languages, sciences, social sciences and professional, technical and vocational fields, an ethic of social engagement, soft

skills such as communication, discussion and debate and rigorous specialization in a chosen field.

### **WHAT IS MULTI DISCIPLINARY EDUCATION?**

Multi-disciplinary education is centered on the idea that education be based on wholeness or interconnectedness. Essentially, a multidisciplinary curriculum focuses on a vast array of topics that reflect the student as a whole person made up of body, mind, spirit and emotions. This obviously differs from a traditional curriculum that typically stresses primarily one facet of a person: mind. The multidisciplinary curriculum then would require that the development of the body would receive equal attention as development of the mind.

Multi-disciplinary education is also referred to as interdisciplinary education in the relevant literature. It mainly encourages a pedagogical approach utilizing several different academic disciplines into an integrated lesson unit. For example, elementary students studying the colonial period in America will learn about the subject not just in their social studies class but in literature and Science. Multidisciplinary education allows for both collaborative teaching and holistic learning. One of the prime emphasis given in the NEP 2020 is on holistic and multidisciplinary education as the fundamental component of every level of education. Universities will be the sources to generate and disseminate new ideas and knowledge. These are the effective ecosystems for interactions among diverse disciplines.

Multidisciplinary and holistic learning is an ancient method used in Indian education system as well as the other parts of the world. This is the reason that such type of education system was advocated by different scholars. One can trace the evidence of such an education system in ancient Indian literature and practices. It is seen in the Indian Gurukul system where students had to learn Science, Mathematics, Geometry along with vocational skills, professional skills, soft skills, ethics, morality, human values and so on.

### **NEED AND IMPORTANCE OF MULTI DISCIPLINARY EDUCATION**

- NEP 2020 advocates the promotion of holistic education to ensure the comprehensive development of students.
- Imaginative and flexible curricular structures will enable creative combinations of disciplines for study and would offer multiple entry and exit points, thus, removing currently prevalent rigid boundaries and creating new possibilities for lifelong learning.
- Research is also improved and enhanced through holistic and multidisciplinary education approach.
- Multi-disciplinary and holistic learning is an innovative medium through which students can learn sciences, technologies, mathematics, humanities, professional skills, ethics and so on at the same time.
- Holistic learning aims at overall development which means now students can have knowledge or mastery across fields through access to infrastructure, trained teachers and other facilities at the higher education institutes.
- Multidisciplinary approach is recognised as one that leads to holistic development as it brings about not only development of knowledge but also skills and life changing values.
- The ability to study an issue from different perspectives leads to development of critical thinking, analysis, logical thinking and problem solving.

- This approach generates competencies of application of knowledge, communication and flexibility along with values of respect, tolerance and appreciation for different perspectives.
- In doing so, multi disciplinary education leads to what has been referred to by NEP 2020 as the development of ‘well rounded individuals that possess 21<sup>st</sup> century capacities.’

### **STEPS TO MULTIDISCIPLINARY EDUCATION**

- Towards the attainment of holistic and multi disciplinary education, the flexible and innovative curriculum of all higher education institutions shall include credit based courses and projects in the areas of community engagement and service, environmental education and value based education.
- Environment education will include areas such as climate change, pollution, waste management, sanitation conservation of biological diversity, etc.
- Value based education will include the development of humanistic, ethical, constitutional, and universal human values, etc.
- As the world is becoming increasingly interconnected for Global Citizenship Education, a response to contemporary global changes, will be provided to empower learners to become aware of and understand global issues and to become active promoters of more peaceful, tolerant, inclusive, secure and sustainable societies.
- Finally, as part of holistic education, students at all Higher Education Institutes will be provided with opportunities for internships with local industries, businesses, crafts persons, etc., as well as research internships with faculty and researchers at their own or other Higher Education institutions or Research centres.

### **CHALLENGES TO MULTIDISCIPLINARY EDUCATION**

- In higher levels of academia, there are several challenges to multi-disciplinary education. One of which is the language barrier. Advanced and specialized disciplines have their vocabulary terms often alien to those outside the discipline.
- Multidisciplinary education is a further attempt to educate the whole child. On practical level, this requires that curriculum subjects not be broken down into smaller fragments.
- Another requirement of multidisciplinary education is that the individual student’s abilities, needs and interests need to be taken into account when constructing lesson plans and teaching methodology.
- There is lack of training in interprofessional collaboration.
- Also there is lack of appropriate mechanism for timely exchange of information.

### **SUGGESTIONS**

- There must be change in the course syllabus making it more interdisciplinary and multidisciplinary.
- There must be changes in the recruitment process of the faculty members based on their teaching experience, quality of teaching and research contribution. This process should take place at the faculty level rather than at the leadership level.
- Senior faculty members should decide what type of faculty is required in their department and major importance should be given to the applicants having exposure across multiple disciplines.

- The departments of institutions should be different than core subjects and the teachers should be provided with the autonomy to teach with novel approaches.
- Professors of different disciplines can come together and discuss a particular topic to present students with multiple perspectives.
- Students should be encouraged to take optional subjects outside their own departments and which are not related to their major subjects.
- Non-traditional subjects should be encouraged and all this can only be successful if the head of the department is having visionary leadership.
- Multi disciplinary research centres should be started having adequately qualified professors.

### **CONCLUSION**

Thus, National Education Policy 2020 aims at developing individuals humane, intellectual aesthetics, social, physical and emotional capabilities in an integrated manner through multi-disciplinary exposure. NEP 2020 calls for proper training and imparting of knowledge to our youth generation so that they become an asset to the nation by aiming to provide socially useful with multi dimensional perspectives. To execute the provisions in the true spirit the government will need iron will, fund facility, infrastructure, regulatory, grievance address cells, professionally trained teachers and so on. The government also needs to take care that this step towards holistic education does not lead to commercialization of education. Multi-disciplinary and holistic learning is an innovative medium to bring quantum changes in education sector and a way towards overall development of students.

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## CHAPTER-28

### KNOW THY CUSTOMER: COLLEAGUES AS CUSTOMERS FOR EFFECTIVE IMPLEMENTATION OF TOTAL QUALITY MANAGEMENT IN EDUCATIONAL INSTITUTIONS

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“Long-term commitment to new learning and new philosophy is required of any management that seeks transformation. The timid and the fainthearted and the people that expect quick results, are doomed to disappointment.”

*Dr. William Edwards Deming*

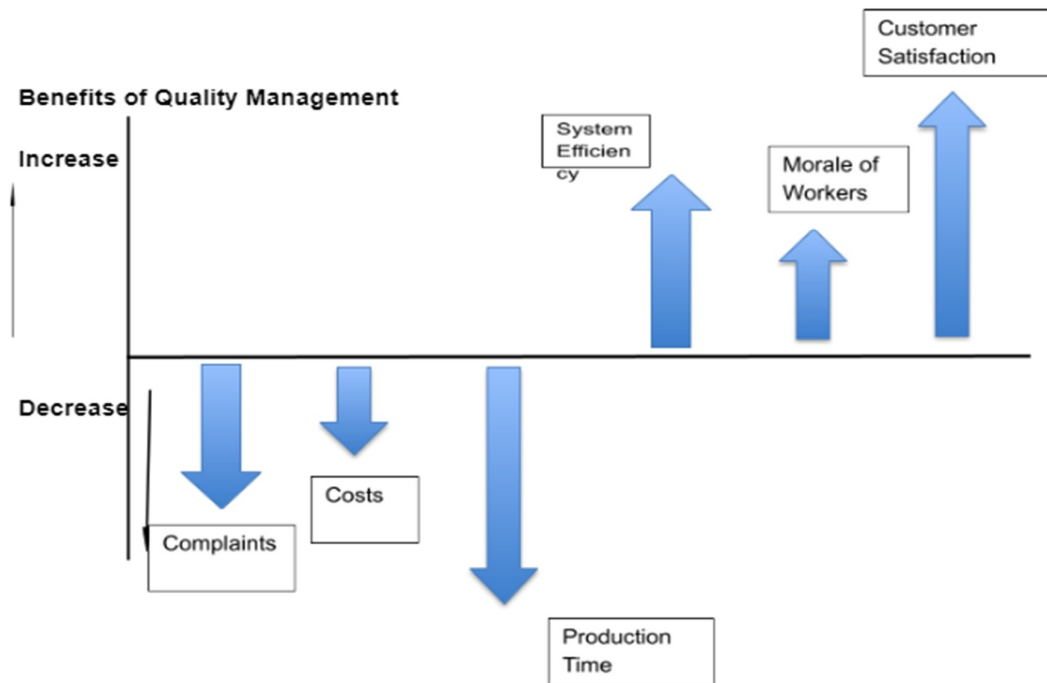
**Quality** must be matched to the expectations and requirements of customers and clients. Quality is what the customer wants and not what the institution decides is best for them. Quality translates into satisfying the expressed and implied needs of the customer. Quality is evaluated from the lens of the consumer by equating their perceptions of what was delivered vis a vis their expectations. This does not apply to corporate houses only, but also to not -for-profit organizations, where goodwill and brand value are material to an institution's success. Quality means 'conformance to a specification or standard' and 'effectiveness in achieving institutional goals', as Green (1994) defined it. Quality Is about people and systems. It has to be defined both by the institutions and its customers' (Doherty, 1994).

**Total Quality Management** (TQM) is an integrated and comprehensive system of effective planning and controlling of all functions within an organization in order to achieve customer satisfaction through products and services and move towards achieving customer delight. In higher education, TQM has five elements. (Chaffee & Sherr 1992, Miller 1991, Harris & Baggett 1992, Kovel-Jarobe 1993 cited in Sims, 1995). First, it is focused on an identified process or system that can be described and linked to other processes and to institutional goals. Second, it is designed to identify, understand, and meet customer needs. Third, it relies on data to define needs, describe problems, and arrive at solutions. Fourth, it involves those who make decisions about improvements and is sponsored by an appropriate manager or decision maker. Fifth, It respects individuals and their contributions whether they are customers, team members, administrators, or colleagues. Spanbauer (1995) stated that TQM in education is a management philosophy which puts systems and processes in place to meet and exceed the expectations of customers. It is a relentless quest for continuous improvement through documentation and the use of tools in a problem-solving atmosphere that is team action and good leadership practices.

The process of formulating business strategy requires both external and internal environmental analysis of an organization (Driouchi and Bennett, 2011). Despite the increasing recognition that quality of services or products was the key to competitive advantages (Doyle, 1994), and that employees were the drivers of this quality (Gummeson, 1994; Higón et al., 2009; Pereira and Malik, 2015), business strategies still revolved around

external market analysis (end customers) and scarcely on internal market analysis (employees).

### Benefits of Quality Management



Source: - Total Quality Management: L Suganthi and Anand A Samuel (2004)

Figure 1.1.

### Education and its Customers

Kanji and Tambi (1999) studied specially the application of TQM on the Britain higher education, while Hewitt and Clayton (1999) studied the complexity of applying to the higher education the principles of total quality and the lessons that are extracted of its application. The stakeholders for an educational institution are its students, parents, donors, management, staff and Government. As educational institution students are its prime and external customers who keep the institution functioning and meeting the needs of its external customers and satisfying them. A major part of an organization's plan is focused on students. Kanji and Tambi (1999), the customers of higher education are divided into groups of actors, who are linked to the educational process being the main: current students, potential students, employees, employers, government and industry. The authors have classified the customers in internal and external, emphasizing that the internal customer are who work to the satisfaction of external customers (Juran 1988). Hewitt and Clayton (1999) the most obvious educational stakeholders are “the educators and those being educated, those teaching within universities and those studying there”. Juran (1988), author of quality area, define as “external customer” every people that do not belong to an institution, but are affected by their products and as “internal customer” every people or organizations that make part of institution. But the internal customer is ignored who when well managed will lead to high quality performance to the key customer of the organization. The internal customers are the employees who render services to the educational institution which comprises the teaching staff, administrative staff and support staff. TQM focuses on students as well as colleagues within the organization as



customers. Each member of the staff gives and receives services is a customer-oriented approach, it's more than being nice and ever smiling to customers, It's about listening and entering into a dialogue about people's fears and aspirations. Internal customer relationships are vitally important in educational institutions to function efficiently and effectively. The best way to deploy the internal customer focus is to help individual members of staff to identify the people to whom they provide services. This is known as 'the next in line' analysis.

### **Colleagues as customers- The next in line**

In an educational institution the following are the internal customers

<b>Service</b>	<b>Service provider (supplier of service)</b>	<b>Service receiver (Customer)</b>
Internal marks for end semester examination	Subject teacher	Examination department
Academic calendar	Department faculty	Academic calendar committee
Department report in College magazine	Faculty of the department	College magazine committee
Sports data for preparation of Annual report	Sports Director	IQAC/ Vice Principal
Research Publications	Faculty	Research Coordinator
AQAR data for Research	Research Coordinator	IQAC
Placement data	Placement cell	IAQC and NIRF coordinator
Activity conducted Report	Department/ Faculty/Committee	IQAC/Admin staff for reporting to University/Management
Website Reporting	Department/ Faculty/Committee	Website Committee
Student enrollment data	Administration staff	IQAC/Examination department/Management
Student participation in competitions /events	Competitions/events committee	IQAC/Admin staff for reporting to University/Management
Computation of tax liability and tax deducted at source	Staff -Providing documents relating to investments / payments made u/s 80 C to 80U	Accounts and finance department
Reimbursement of claims for attending conferences/ faculty development programmes	faculty/staff to provide relevant documents for the financial year	Approval and passing of claim by accounts and finance department

Issue of books/ reference material	Library staff	Teaching/ administrative staff
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**Table 1.1. Internal Customers**

Once the institution identifies the need to draw up the next in line chart and create awareness about quality of service provided by the internal customers it creates a culture of TQM. As per Deming's PDCA model (Plan- Do-Check-Act). Answers to certain questions will set the process rolling and continuous review of the system will lead to improvisation and reduce re-working thus reducing human effort and cost. Whom do you primarily provide a service to?

Who relies upon what you do to do their job properly?

Who are the people next in line?

What are their requirements?

Are they satisfied with the service rendered?

**Let's take a Case to put things into perspective: -**

Hersheys, an autonomous institute is in the field of imparting quality education which has a local presence and caters to local customers. The Programmes offered are designed by the Curriculum design and development board. This curriculum is transacted by the faculty of the institution.

**Service:** - Curriculum design and development (CDDDB)

**Service provider:** - Curriculum design and development board

**Service receiver (Internal Customers): -**

- a. Faculty
- b. Internal Board of Studies
- c. Internal Academic Council
- d. Internal Quality Assurance Cell
- e. Examinations Department
- f. Public Relations Officer
- g. Administrative Staff
- h. Library Staff

**What are the key requirements of the service provided by CDDDB?**

- Programme Design
- Courses covered
- Duration of the programme
- Programme and course code
- Credit allocation
- Detailing of summative and formative evaluation
- Reviewing Learning Outcomes and measuring it
- Validity of the courses
- Process of identification of advance and slow learners
- Timeline for submission of revised curriculum
- Meetings of Board of Studies and Academic Councils
- Procedure for drafting the curriculum and transacting it
- Reviews and Feedback
- Documentation Process

- Organizing faculty development programmes
- Internal Marketing

**Process: - Curriculum Design and Development**



**Figure 1.2. Process**

Inputs	Process	Output	Outcomes	Impact
Vision Mission Strategic Plan Students Faculty Environmental Factors Policies National Education Policy UGC Affiliating University	Meetings Orientation Programmes Research Discussions Drafting the Curriculum Feedbacks	Well drafted Curriculum	Compliance to regulatory bodies  Employability  Skill Building  Customer Satisfaction  Attainment of Vision and Mission of the organization	Institution Brand Value  Increase in the number of Placements  High level of Internal and External Customer Satisfaction

**Table 1.2. Process**

### **Key Drivers to TQM**

**Internal Customer focus:** - Education Institutions to recognize its internal customers for each process / activity in the organization. Draw up the relationship of Customer and Service Provider, defining the Service requirements and quantifying what leads to customer satisfaction. Formulating job description and specification for every employee, providing training at relevant intervals and continuous feed back from them. Lay importance on Internal Marketing strategies.

**Leadership:** - Leadership plays a significant role for introducing, implementing, assessing and sustaining the quality culture in an organization. The ability of the leader to take risk, to channelize the activities towards attainment to the vision and mission of the institution without compromising on quality.

**Continuous Improvement:** - To review the systems and process at regular intervals and bring in the required changes as per the demands.

**Performance Measurement:** - As a not-for-profit institution an educational institution should evaluate the financial and non-financial performance of the organization every year.

**Celebration:** - The organizations culture created by the effective leadership to focus on effective communication, dissemination of information, recognition of the contribution of each member working towards achievement of the goals and objectives of the institution. To nurture a sense of ownership among the internal customers and to celebrate once a goal is achieved before getting on to the next.

**Internal Marketing**

Internal marketing is a useful tool for communicating with staff to ensure they are kept informed about the latest developments, new policies, systems, processes in the organization and equally involved in offering feedback for process and system improvisation. The significance of internal marketing is to ensure that new ideas, methods, processes, measures, initiatives are well marked to the staff as they are the internal clients. The CDDB to conduct orientation programmes for faculty to disseminate the information and

Internal marketing as a concept, has been viewed the application of marketing approaches and tools to the organization's internal markets, who are employees within the organization (Gronroos, 1985; Gummesson, 1987; Rafiq and Ahmed, 1993, 2000; Piercy, 1995; Pereira and Fontinha, 2016). Rafiq and Ahmed (2000) pointed out that while customer consciousness and market orientation are becoming popular among practitioners (Augusto Cauchick Miguel, 2013) and Internal Marketing also having a positive impact on employees, and thus organizational performance (Ahmed et al., 2003), there is still hesitance and reluctance towards it

The conception and development of IM has been grouped into three phases by Rafiq and Ahmed (2000): (1) employee motivation and satisfaction; (2) customer orientation; and (3) strategy implementation and change management. This classification of literature into phases was further enhanced and extended by Hwang and Chi (2005) to include a fourth phase, thus, the enhanced set of phases included: (1) treating the employee as an internal customer; (2) developing customer-oriented behavior among employees; (3) human resources management (HRM) orientation; and (4) internal exchange of intelligence.

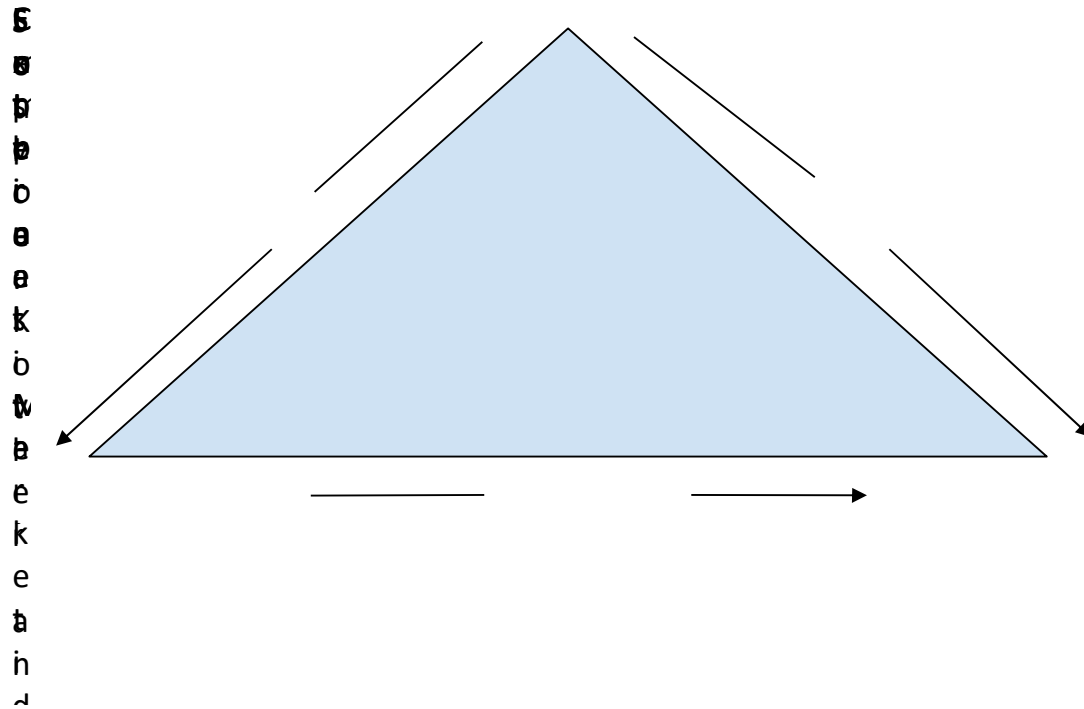


Figure 1.3.

From the above it is very clear that internal marketing plays a significant role in any organization. For Internal marketing to be successful it is important to find out what they want and to have a good idea of the standards they require. Notions of status and hierarchy do not enter into this relationship. The standards of service provided to someone junior in the institution is as important as the service provided to those who hold office.

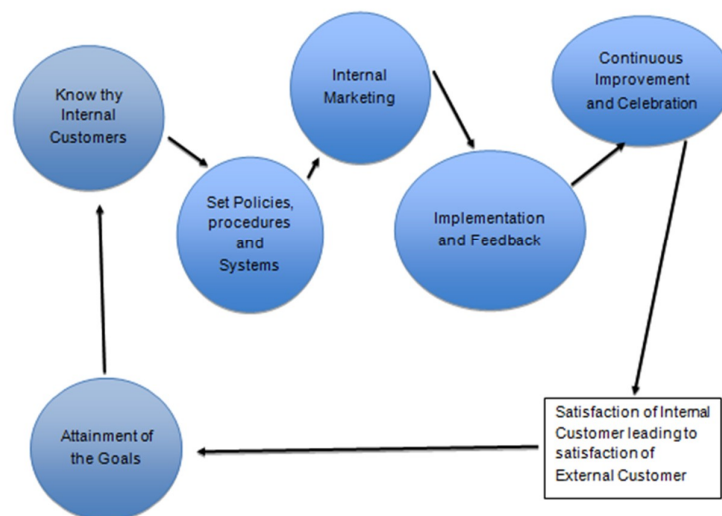


Figure 1.4.

### **Implementation of TQM for Internal Customers**

#### **The Road Ahead - Quality is everybody's job, but quality must be led by Management**

In the field of education institutions need to focus on of internal customer's management. Draft Internal Customer Management Policy, Document the entire Process and create awareness of the same among colleagues. Once this is in place and in action this will lead to increase in the satisfaction among its prime customers (Students). For Successful implementation of any system all the internal employees along with management need to come together, work collaboratively, treat each one with professional ethics and respect and value every internal customer's requirement and offer valuable and satisfying service.

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## CHAPTER-29

MANGROVE AND THEIR ASSOCIATES FROM RAJAPUR TEHSIL  
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In Maharashtra the mangrove diversity is found in coastal districts (i.e., Palghar, Thane, Mumbai, Raigad, Ratnagiri and Sindhudurg) towards the west side. Mangrove are typical shrubs or tree adapted for survival in saline habitat along coasts or brackish water. Mangrove are salt tolerant plant, also called halophytes.

The word 'mangrove' has derived from a Portuguese word 'mangue' for swampy soils at the margins of estuaries and the Spanish word 'mangle' from combination of both words an English word become forward 'grove'. Mangrove ecosystem are tropical and subtropical in occurrence, but from tropics localized in very low altitude. Mangrove ecosystem is usually referred to as halophytes. Typical mangrove usually loves to saline soil, while mangrove associate has grown on either along with saline soil or not. Mangrove are generally shrubs and trees that belong to the families Acanthaceae, Arecaceae, Combretaceae, Lythraceae and Rhizophoraceae. Mangrove are grown in salt marshes, along tidal estuaries and on muddy coasts and that usually have prop roots.

Ratnagiri district has long coastal line of about 237 km and Rajapur tehsil is towards the southern side of district. We have detailed survey of mangrove and its associates plants of Rajapur tehsil and during this investigation of mangrove ecosystem, total 17 species of mangrove and 33 species of mangrove associates were recorded from the tehsil. The present study gives the diversity of mangrove and its associate plants.

The checklist of mangrove and mangrove associates plants of Rajapur tehsil of Ratnagiri district are provided in table 1 and table 2 respectively.

**Table 1. Checklist of mangrove of Rajapur tehsil of Ratnagiri district:**

Sr. No.	Botanical Name	Family
1	<i>Acanthus ilicifolius</i> L.	Acanthaceae Juss.
2	<i>Aegiceras corniculatum</i> (L.) Blanco	Myrsinaceae R.Br.
3	<i>Avicennia alba</i> Blume	Acanthaceae Juss.
4	<i>Avicennia marina</i> (Forssk.) Vierh.	Acanthaceae Juss.
5	<i>Avicennia officinalis</i> L.	Acanthaceae Juss.
6	<i>Bruguiera cylindrica</i> (L.) Blume Enum.	Rhizophoraceae Pers.
7	<i>Bruguiera gymnorhiza</i> (L.) Savigny	Rhizophoraceae Pers.
8	<i>Ceriops tagal</i> (Perr.) C.B. Rob.	Rhizophoraceae Pers.
9	<i>Cynometra iripa</i> Kostel.	Fabaceae Lindl.
10	<i>Excoecaria agallocha</i> L.	Euphorbiaceae Juss.
11	<i>Kandelia candel</i> (L.) Druce	Rhizophoraceae Pers.



12	<i>Lumnitzera racemosa</i> Willd.	Combretaceae R.Br.
13	<i>Rhizophora apiculata</i> Blume	Rhizophoraceae Pers.
14	<i>Rhizophora mucronata</i> Lam.Henslow	Rhizophoraceae Pers.
15	<i>Sonneratia alba</i> Sm.	Lythraceae J. St.-Hil.
16	<i>Sonneratia apetala</i> Buch.-Ham.	Lythraceae J. St.-Hil.
17	<i>Sonneratia caseolaris</i> (L.) Engl.	Lythraceae J. St.-Hil.

**Table 2. Checklist of mangrove associates plants of Rajapur tehsil of Ratnagiri district:**

Sr. No.	Botanical Name	Family
1	<i>Acrosticum aureum</i> (L.)	Pteridaceae E.D.M. Kirchn.
3	<i>Barringtonia acutangula</i> (L.) Gaertn.	Barringtoniaceae DC. ex F. Rudolphi
2	<i>Barringtonia racemosa</i> (L.) Spreng.	Barringtoniaceae DC. ex F. Rudolphi
4	<i>Caesalpinia bonduc</i> (L.) Roxb.	Fabaceae Lindl.
5	<i>Caesalpinia crista</i> L.	Caesalpinaceae
6	<i>Calophyllum inophyllum</i> L.	Calophyllaceae J. Agardh
7	<i>Cassytha filiformis</i> L.	Lauraceae Juss.
8	<i>Cerbera manghas</i> L.	Apocynaceae Juss.
9	<i>Clerodendrum inerme</i> (L.) Gaertn.	Verbenaceae
10	<i>Crotalaria verrucosa</i> L.	Fabaceae Lindl.
11	<i>Derris scandens</i> (Aubl.) Pittier	Fabaceae Lindl.
12	<i>Derris trifoliata</i> Lour.	Fabaceae Lindl.
13	<i>Drimia indica</i> (Roxb.) Jessop	Asparagaceae Juss.
14	<i>Eleocharis dulcis</i> (Burm. f.) Trin. ex Hensch.	Cyperaceae Juss.
15	<i>Erythrina stricta</i> Roxb.	Fabaceae Lindl.
16	<i>Fimbristylis dichotoma</i> (L.) Vahl	Cyperaceae Juss.
17	<i>Hibiscus tiliaceus</i> L.	Malvaceae Juss.
18	<i>Hydrophyllax maritima</i> L.	Rubiaceae Juss.
19	<i>Ipomoea pes-caprae</i> (L.) R. Br.	Convolvulaceae Juss.
20	<i>Malachra capitata</i> (L.) L.	Malvaceae Juss.
21	<i>Millettia pinnata</i> (L.) Panigrahi	Fabaceae Lindl.
22	<i>Pandanus odoratissimus</i> L. f.	Pandanaceae R.Br.
23	<i>Premna coriacea</i> C.B. Clarke	Lamiaceae Martinov
24	<i>Remirea maritima</i> Aubl	Cyperaceae Juss.
25	<i>Salvadora persica</i> L.	Salvadoraceae Lindl.
26	<i>Scaevola taccada</i> (Gaertn.) Roxb.	Goodeniaceae R. Br.
27	<i>Schoenoplectus articulatus</i> (L.) Palla	Cyperaceae Juss.
28	<i>Sesuvium portulacastrum</i> (L.) L.	Aizoaceae martinov.
29	<i>Spinifex littoreus</i> (Burm.f.) Merr.	Poaceae Rchb.
30	<i>Stenophyllus barbatus</i> (Rottb.) T. Cooke	Cyperaceae Juss.

31	<i>Thespesia populnea</i> (L.)	Malvaceae Juss.
32	<i>Vitex trifolia</i> L.	Lamiaceae Martinov
33	<i>Vitis pallida</i> Wight & Arn.	Vitaceae Juss.

**Figure 1. Some photos of mangrove of Rajapur tehsil of Ratnagiri district (Maharashtra):**



**Importance of Mangrove:** Mangrove are very important role as shoreline protectors, provide erosion control and shoreline stabilization. Mangrove improve water quality by filtering pollutants and trapping sediments from the land, and they also reduce coastal erosion. Mangrove provide habitat for the of terrestrial organisms, and many species of coastal.

During present work 17 taxa of mangrove and 33 taxa of mangrove associate have been collected from Rajapur tehsil of Ratnagiri district of Maharashtra. Out of which total 42 taxa of dicotyledons belonging to 23 families while 7 taxa of monocots belonging to 4 families and one species of pteridophyte belongs to the family Pteridaceae have been reported from coastal area of Rajapur tehsil. The families viz. Fabaceae (seven taxa), Rhizophoraceae (six taxa), Acanthaceae, (six taxa) Lythraceae and Malvaceae (three taxa each) are the dominant mangrove families in the region represented by high number of taxa while *Avicennia* is the dominant genus consists of three species, followed by *Rhizophora*, *Bruguiera*, *Sonneratia* with two species each.

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## CHAPTER-30

### CHALLENGES OF WAREHOUSING MANAGEMENT

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#### **Introduction:**

Warehousing plays important role in business development of India. Agriculture marketing, rural banking, financing and food security processing sector developed in the India through the warehousing facility. Warehouse maintains the balance of agricultural commodity markets. Ware houses stores the finished goods in harvest season and available for supply of agricultural commodities during off season in the market. Hence, it solves the problems of pressure of agriculture market and market rate of agriculture goods which are the main problems of agriculture marketing India. In India transportation and logistics business are well developed and they can cooperate for improving warehousing. The warehousing system is developed from traditional 'godowns' to modern facilities of warehousing in India.

In India maximum handling and warehousing facilities are provided by traditional methods. For loading, unloading and handling of goods. Some warehouses which are mechanized they have used new technology for handling like as forklifts or hydraulic hand pallet trucks. These traditional method conditions clearly indicate that shortage of organized and good quality warehousing and storage infrastructure for agricultural and nonagricultural commodities in India. The Indian warehouse has increased due to constant changes in consumer demand agricultural and nonagricultural products in India. Increased demand of customer is create chances of improvement of operations of warehouses of Production Company and agricultural producers for good service level and decreased cost of product. The latest new technologies are creating in the logistic very few new technologies are available and used in this development of India. Due to the liberalization of Indian economy only face to competition is available for development.

#### **Objectives of study**

1. To discuss the challenges of warehouse management in India.
2. Suggestion on challenges of warehouse management in India.

#### **Challenges of Ware Housing Management**

##### **1. Globalization-**

India has accepted the globalization. The competition is increased in the world market. All countries produce the various produce in the market but they cannot provide always the same level of workmanship but lower production cost destroys the Indian business. Because lower cost of production can create more demand from the customer. Well warehouse management will save money and time through automated processes and good delivery order services in the world.

**2. Time Management-**

Time is more important for every business and persons for development. Indian business spent the maximum time to procedures ready to fulfill orders and ship them out. Order picking should not take so much time that it cost business money.

**3. Managing Warehouse Space**

Real estate is a tremendous asset. Indian industries have not sufficient space in the future. Indian Business can use the all possible space from available for warehouse. Business can increase storage systems, as well as racking and pallet patterns in India.

**4. Communication**

Lack of communication is challenge in warehousing management. Effective and sweet communication increases the productivity and relations in business. Every Indian business not connected to business of other countries causes of lack of communication. Involvement of every person is important for warehouse management and it is the difficult for Indian warehousing business.

**5. Inventory Accuracy**

Stock should be always store in perfect place in warehouse. Tracking system of goods can be tracing the areas. Sometimes warehouses management not maintained correct receipts and purchase orders.

**6. Customer Expectations**

Now a day's customer of warehouse have learned to expect more than ever about shipping time, accuracy, expenditure of warehouse and good customer services. Customer satisfaction is the backbone of the warehousing industry. Warehousing business Provide the full facilities to customers when business get specific requests from customers, business must give them exactly what they want. To do otherwise means risking disaster.

**7. Redundant Processes**

Sometime various processes are repeated in Indian warehousing operations. Due to repeating the same process labour cost are increase in warehouse. They are using modern automated technology.

**8. Product Diversification**

Generally, every business depends on 80/20 pattern rule. Every business 20 percent inventory generates 80 percent of sales. 20 percent inventory is very important which is demanded from customers. Warehouse industries provide the service to customers. They can apply 80/20 pattern in business through generating quality services.

**9. Inaccurate Purchase Orders**

Nowadays A business is growing very fast in the world of competition. Sometime a lot of things happening that goods are not scrutinized or not recorded proper books of accounts or other records or unseen due to heavy number or purchase order and other more complex. It is difficult to match the records of warehouse and business offices. More times purchase order are inaccurate are provided to warehouse, they cannot match the proper information in proper time.

**10. Handling Product Damages**

In the warehouse operation goods are store in safe place for security. In this process many goods are broken in handling because latest technology are not using for handling goods. Sometime it is inevitable but it is more expensive to business.

**11. Lack of cooperation and coordination between departments –**

Industrial development is increased on large scale in the future in India. Various departments are working in the warehousing operations and other places in the business. Due to the lack of cooperation and co-ordination of all departments, problem should create in warehousing departments.

**Suggestions-**

1. To appoint trained staff in warehouse and available training programs to untrained staff.
2. To provide the financial and other facilities to warehouses in India for developments.
3. To maintain good coordination and cooperation in warehouse and other departments in the business.
4. To effectively manage time, guesswork in the location of stock must be eliminated in warehouse.
5. Business should use the right applications, software and more useful online-based cloud management software which can bring greater accuracy and transparency to entire warehouse operation in the business.
6. An effective warehouse is going to account for individual customer preferences by automatically creating the right type of labels.
7. Business should create collaborative activities with the cooperation with government, policy makers, entrepreneurs, investors, logistics services providers, manufacturers, sellers and farmers.
8. Warehouses can be eliminated by using barcode technology, which is found in warehouses that use modern automated systems.

**Conclusion:**

Warehousing departments are working in maximum business in India. Warehouse sector is importance in the Indian economy, the Indian warehousing sector confronts several challenges for the successful implementation. Financial and other facilities should provide to warehouses by government. The challenges and concerns need to collaborative activities with the cooperation with government, policy makers, entrepreneurs, investors, logistics services providers, manufacturers, sellers and farmers.

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## CHAPTER-31

### CRYPTOCURRENCY MARKET & INDIAN GOVERNMENT OVERVIEW

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**Abstract:**

*Currency is considered to be such a medium through which the goods & services are exchanged in the market. A new currency that is crypto is one of the largest distributed networks all across the computers. Being decentralized in nature, this structure is out of the purview of government authorities. The blockchains, being the organizational method, makes sure to maintain the dignity of transactional data are an essential component of many cryptocurrencies. In June 2019 A statement was issued by the people's Bank of China that Jot would block. access to all cryptocurrency exchange in foreign and domestic exchange and the websites offering initial coin. The exchange of Crypto currencies is legal in India whereas it is not considered as legal tender. The RBI has banned virtually cryptocurrency trading in India to protect the Interest of the country through the circular issued on 6th April 2018. Government issues notices about the pitfalls of investing in the cryptocurrency markets are one of the most common actions identified across the survey jurisdictions. The purpose of such warnings, which are mostly issued by central banks, is to inform the public about the difference between actual currencies, which are issued and guaranteed by the government, and cryptocurrencies, which are not many of the warnings issued by different countries also highlight possibilities for illegal activities such as money laundering and terrorism arising from cryptocurrencies.*

**Keywords:** Cryptocurrency, Blockchains, Exchange, Trading, Decentralized, Illegal Activities.

**Introduction: -**

The exchange of -goods and services are done medium of currently in the market in 21st century the digital currency became a fashion and in in Vague. The electronic form of currency is known as digital type of currency, which is not available in physical form. In a research paper this concept was introduced David Chaum in the year 1983. E gold and mobile payment were widely in use from 1966-67 Cryptocurrency was Introduced in the year 2009. Crypto Currency is the union of Crypto & Currency. Crypto is a Greek word means hidden and of Crypto and currently is a Latin word currency means to run around. In the Year 1699 currency was used to show the flow of money between people. The essential Component of many crypto Cryptocurrency are blockchain an organizational method for ensuring integrity of transactional data. Industries including finance and law believe that block chain and related technology could disrupt them. In the year 2014 Bolivia's central banks has banned officially the currency or coins which are not regulated by the government, it gave example of Bitcoin. The National institutions of the country does not the approve Currency which Bolivia central bank forbade the citizens from denominating prices in any currency. The Algerian

Legislation has prohibited the purchase or sale of Crypto Currencies. It has no physical support such as Coins, paper money, Cheque or credit card payment. BITCOINS had become one of the booming currencies in the financial market. As the central regulatory body has overseen It had made Some Countries wary of its use and existence. Due to concern about being security risks of using hidden Payment Since 2017 Morocco has banned Bitcoin and other cryptocurrency. As per the foreign exchange office of Moroccan the transactions related to finance should be carried on only through authorized intermediaries with foreign countries. Bank by Al-Maghrib. It is punishable in Morocco by a fine. The use of Bitcoin, Accrue and other crypto Currencies are prohibited in North Macedonia the only European country. The crypto transactions are linked to criminal activities is a warning by national banks and investing un-Cryptocurrency is prohibited The Saudi Arabia Monetary Authority (SAMA) Committee has relished a warning draft to trade in unauthorized Securities market in the foreign exchange.

#### **Literature Review: -**

(Alonso & Luis 2019) The ability to discard the regulation of the government authorities had made Crypto currency market as one of the largest unregulated market in the world. (Afzaly Asif 2019) Some countries of Europe as Austria, Belgium & Croatia state there is no regulation or rulings using cryptocurrencies. It is almost finding a needle in a stack the way crypto currencies are dealt in. (Scharding 2019) Various illegal transactions like pornography funding, drug trading, money laundering etc. is encouraged by the monetary system of Crypto currency. The Stability of the people's lifestyles their activities and incomes are threatened by omnipresence of black markets in controlled economies. (Baldimtsi 2017) As of now the development of technology had grown the deals in the black market exponentially. Numerous opportunities have been the provided by advent of Bitcoin which has revived black markets with its quasi-anonymity, and it has become difficult to trace the of the operators and u identity of the operational user. (Miller 2016) The Structural changes of the operation of black markets are induced by the cryptocurrencies. The sale of weapons is also encouraged and carried in a smooth manner through crypto currencies on the dark web.

#### **Objective of the Study: -**

1. To understand the concept of cryptocurrencies.
2. To analyze the complications faced by crypto currencies in financial market.
3. To study the Crypto market and Indian government view towards crypto currencies.

#### **Research Methodology: -**

This paper is purely based on the secondary sources of the data collected from books, journals, thesis and articles, web links. This paper also attempts to understand the role and benefits of crypto currency market and its impact on economic system. A meticulous literature review is performed to synthesize the previous research conducted and to understand the same from financial perspective.

#### **Cryptocurrency and India Government Overview: -**

The crypto currencies are not considered as a legal tender in the market of India but there are various countries that had increased their investment in crypto currencies and made it legal.



- **RBI On Cryptocurrency: -**

RBI issued a circular stating a ban on April 6, 2018. trading through cryptocurrency India, in its wisdom to protect the interest of the Country. The Cryptocurrency trade was prohibited in domestic exchange with a sweeping regulation.

- **Supreme Court and Cryptocurrencies: -**

The financial Services firms were banned from trading in virtual currency or Cryptocurrency by the Supreme court in 2020 with quashing the order by RBI.

- **Petition (Civil) No. 528 of 2018: -**

The petitioners came up with these purity petitions with challenging the said Statement and circular that not to restrict or restrain banks and financial intermediaries regulated under RBI norms that not to ingress the services of banks to those that are involved in the crypto asset transactions. Internet and mobile Association of India known to be Specialized industry body the petitioners in the first writ petition. The second court petition was filed by those who provided the platform for dealing in crypto currencies and the founders of those who deal in crypto assets. Some of the petitioners in this petition were tech savy's who had been awarded by reputed institutions with graduation certificates in Information Technology.

- **Supreme Court Judgement: -**

Cryptocurrency is it's a mystery to the public being contention of its legality. BITCOINS were declared as non-legal tender by the highest court in the country. The financial System are warned Since 2013 by the RBI through its press releases. regarding risks of use of cryptocurrencies On February 28, 2019, the inter- ministerial Committee had recommended certain measures in relation to cryptocurrencies in their report which included complete ban Cryptocurrencies. A bill termed as crypto token and crypto assets (banning control & regulation) was been prepared by this Committee in 2018 but currently the fate of this bill is unknown. The use of cryptocurrency Perse was never banned Regulated financial institutions who were Providing services to business dealings exchange/ trading of cryptocurrencies, a circular by RBI in 2018 was issued to being the same. which confused the entire Indian cryptocurrency trading Industry. Various writ petitions lead by crypto trading entities challenged the validity of the circular before the Supreme Court - Supreme Court thoughtfully stuck down the Circular on cryptocurrency in its decision, internet and mobile Association v/s RBI. RBI was within its rights to Safe guard the public interest and the interests of depositors and banking Policy was said by Supreme Court. The supreme rejected the argument that RBI was enjoying excessive power. As been the circular was issued in the interest of banking Policy, depositors and public.

- **Government's Stand: -**

Indian Government has been warning against investing in digital currencies, As these Schemes give high returns to early investors, it is said Ponzi Schemes by the Government. The draft of the bill mentioned that the sale or purchase of the crypto or issuance of the crypto will attract a penalty of fine and an imprisonment of 10 years.

- **Inter-ministerial committee on virtual currencies headed by Subhash Chandra Garg: -**

1. All forms of Private Cryptocurrencies Should be banned.
2. Anyone dealing in them should be imprisoned lo years Should be imposed and fine of 25 crores should be imposed.
3. The government & RBI may issue an official virtual currency.
4. A Specific group should be formed having department of economics affairs with the Participation of RBI department of financial Services for examine and developing appropriate market of digital currency.
5. Distributed ledger technologies are examined by this Panel as the underlying technology for cryptocurrencies and ack Owl eyed that they boast the improvement and potential efficiency including the financial system as well as conspiracy in government Services for citizens.
6. For the Processes of loan issuance tracking Collateral management fraud detection and claims management insurance and reconciliation Systems in the Securities market, the banks and other.
7. Financial firms' com DLT base system.
8. The Department of Economic Affairs has been asked to take necessary measures to facilitate the use of DLT identifying its use in the entire financial field.
9. For the development of DLT in respective F areas the regulators RBI, SEBI, IRDA, PERDA and RBI are needed to evolve appropriate regulations.
10. It has suggested the reduction in Compliance costs for know your Customer (KYC) requirements by use of DLT.
11. It has suggested that the digital money in India should function like bank notes through the RBI issuing official government back up.

**Conclusion: -**

The government issued various directives and notices on the drawbacks of investing digital currencies. The purpose of such warnings, which are mostly issued by central banks, is to inform the public about the difference between actual currencies, which are issued and guaranteed by the government, and cryptocurrencies, which are not many of the warnings issued by different countries also highlight possibilities for illegal activities such as money laundering and terrorism arising from cryptocurrencies.

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## CHAPTER-32

### SEARCH TECHNIQUES FOR RESEARCH ARTICLES IN DATABASES

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**Abstract:** *This Paper highlight on the search strategies and search techniques to retrieve the relevant information form the database. Every Database whether source or reference database have spent several features that will allow anyone to build searches and get the desired information. Sometimes most of the confused about search strategy and search methods. Understanding these search strategies and search techniques will allow anyone to search more efficiently and effectively*

**Keywords:** *Database, Search Techniques, Search Strategy*

#### **Introduction**

Databases are collection of records each of which contains details of different data item whether numeric text or image based which is usually available in a searchable format. the large number of journals articles, reference resources, etc. are available in the database and day by day it increasing. To find the relevant resource from them, it' s not a straight forward. To get the best journal article, reference resources etc. it is important to use effective search strategies and search techniques. the proper database search strategies and search techniques will directly affect the success of your search. Here one thing is to remember that searching is dynamic commands will vary and change, but search principles remain the same. Your ability to evaluate and modify result in a more effective and precise search.

#### **Search Strategy**

The Search strategy is the systematic process used to find the most relevant information on topic. search strategy can be done through the following step.

- a. State What you want to find: First have clear understanding of your question in one or two sentences, state what you want to find for example, Application of Information technology in college libraires
- b. Identify keywords and phrases: Keywords and key phrase indicates what the question is really about. Keyword provide initial search term for finding information.
- c. Select synonyms and variant word Forms: You need to identify broader terms, narrow term, synonyms or related terms (for similar or related information). For example: You also take the related term information technology for information and communication technology and academic library for college library.
- d. Create your search statement: combine synonyms keywords and variant forms of the words by using different search techniques. Every time you can run a search evaluate the result and improve search again for example: Information and communication technology AND College libraries
- e. Check your spelling: We know that a software returns with words match your keywords. It you mistake in spelling keyword; you may not get the desired results.

- f. Save Searches or creating Alerts: once you are satisfied with your search results you may want to save your search. Many databases provided the facility to save the result and email alert for new articles added to the database
- g. Taking Reference: Note all the reference in full as you find them. This helps you to get the primary articles.

### **Search Techniques**

The Search Techniques are divided in two categories

- a. Basic Search: this also called quick search or easy search. The basic search is useful to determine how big the collection of articles related to the topic is which help to determine how big the collection of articles related to the topic is which help in generating search strategies.
- b. Natural Language searching: With this type of search you may simply type in your search query plain English. Hence no need to learn any special commands
- c. Keyword Searching: It permits you to search a specific words or terms, regarding of where they may appear in the database record. They are best used when you are searching for new term, distinctive words, jargon or slang, for example, Information and communication technology, college library etc
- d. Subject Heading Searching: subject heading are official terms used to precisely describe the content of books, article, video or other materials and publications. Searching by using official subject heading is known as controlled vocabulary searching. The list of subject heading is generally called a thesaurus. With the help of this you can locate relevant materials on your topic. If the terminology used to describe a topic has changed over time, both older and newer words can be brought together under one heading. this feature can help you identify other useful subject heading for example:

Keyword    Library Science

Boarder Term   Libraries

Related Term   Library Science

Narrower Term   Bibliographic instruction, Libraries and students

### **Advanced Search**

The Advanced search functions give more control to the users and allows for more refine search. Multiple search terms in multiple fields can be searched for simultaneously. The advanced search should be used when the collection of interested articles is large and needs to be narrowed. It is also useful when information form more than one filed would help in locating item of interest such as when looking for an author with a common name, which can be narrowed by combing names with the subject.

A) Boolean Search: This Concept is given by British mathematician georage boole. Boolean search operator are three OR (Narrow your search), AND (broadents your term), Not (Narrow a search by excluding a specific term) for examples

Classification OR Cataloguing (it lists all the documents written on classification or cataloguing or both on)

Classification AND Cataloguing (It lists all the documents which are written on both classification and cataloguing)

Classification NOT Cataloguing (It lists all the documents which are written on classification not on cataloguing.

B) Phrase Search: it helps refine your search by allowing you to look for words together in a phrase, in the order specified. To search for a specific phrase, most databases requires quotation mark around the phrase. for example, "Information Literacy"

C) Truncation: Truncation is a facility that enable a search to be conducted for all the different forms of a word, having the same common root. Asterisk \* symbol or dollar \$ symbol is used in it.

D) Wildcard: A wildcard is a symbol used to replace or represent sent one or more character. question mark? symbol is used for example.

Organi? ation = organization. Organization

Wom? n = Women, women

E) Filed Search: database are collecting of records organization in a simple manner, by looking for term with certain: Filed" such as author, title, publisher, language, year of publication, type of publication etc. you limit or define your search more easily for example

Title: library and society

Author: J K Khanna

F) Proximity Search: Proximity search is the search techniques used to find two word next to near or within a specified distance of each other within a documents. The proximity operator are composed of a letter (Adj, Same, Near, within, precedes and not W/n and a number (to specify the number of words) for example

i) Adjacent: Right ADJ/2 work find "Right to Work" or "Right of work" but not work of right. It finds records that contains both words, in the same sentence, in the order given, where 'X' specifies the maximum of words allowed between the two search terms.

ii) Same: It retrieves records that have specified term in one filed of the record such a title. The term may occur in any order and in any sentence in the filed for example, Manuscript Same Conservation will retrieve records with the following words Conservation of the manuscripts.

iii) Near: Television N/2 violence would find "television violence "or violence on Television but not "television may be the culprit in recent high school violence" . it finds words within x number of words form each other regardless of the order in which they occur.

Iv) Within: Franklin W/2 Roosevelt would find "Franklin Roosevelt "or "Franklin Delano Roosevelt "or "Franklin D. Roosevelt "but not find Roosevelt Franklin. It finds words within x number of words form each other in the order they are entered in the search. type of within locators.

V) Within Paragraph: It used to find documents with search words that appear within the same paragraph

Vi) Within Sentence: It is used to find documents with search words that appear within the same sentence.

Vii) Within Segment: It is used to find documents in which your search appears in the same segment or within approximately 100 words of each other

Viii) Precedes: it is used to find documents in which the first search word precedes the second, but not more than the stated number of words. It is very useful in situation where a different word significantly alters meaning

Iv) Not W/N: It is used to find the documents in which the first search word is found. The second word need not be in the documents, but if it is it cannot be within 'n' words of the first word. Types of within locators.

IV) Not W/P (Not Within Paragraph): It used to find document in which at least one occurs of the first term appears in a paragraph that does not contain the second term.

ivi) Not Within Sentences: it is used to find documents in which at least one occurrence of the first term appears in a sentence that does not contain the second term.

Ivii) Not Within Segment: It is used to find documents that have at least one segment in which the first search term appears, but no the other search term.

Limiting Search: Many databases allow you to limit searches to specifies criteria such as format, language, publication date, etc. Theses are called limiting serach for Example

Library Automation /pdf, Library Automation /docx, Library Automation/ppt

Relevance Search: In many databases the plus + and minus – symbols are used as an alternative to boolean AND and NOT operators. Thus this operator is also know as implied Boolean, In it there is no space between the plus or minus sign and the keywords.

Public Library + India

Classification-cataloguing

Nested Search: Nesting allows you to place parentheses around string of searches using Boolean operators. It retrieves records in the order of connectors propriety for example:

Physiology AND (Human OR Eco)

### **Conclusion**

In order to search effectively it is important to become familiar with the database that is being used. To become familiar with the database, read the database guides, look at example in the guides and take the tutorials. Knowing the shortcuts and quirks of the database will save time by decreasing frustration and understanding the systems. The searching methods vary form database however most have a basic search and an advanced search function. Knowledge about the information resources. search strategies and search techniques will bring your search to a successful conclusion, even when you are not familiar with the topic.

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## CHAPTER-33

### OMICRON AN IMPACT ON INDIAN TEXTILE INDUSTRY

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**Abstract:**

*The present paper shows that the Omicron poses a hard threat to the existing economic growth. The impacts of lockdown and severe restrictions have a largely impact on the entire world. It is observed that without demand, there won't be any production-related activities. The Indian textile industry could be another loss. Indian People would start to lose their job and GDP would decline as well as demand would slow down with it. There is a possibility for a new wave by during year as World Health Organisation declared, we think that the economy would picking up and as well as Omicron destroyed.*

**Keywords:** *Coronavirus, Omicron, Indian textile industry, Agriculture products, Cotton etc.*

**Introduction:**

The present paper shows that the Coronavirus has a new name Omicron. Omicron is a speedily transmissible mutated version of the Coronavirus, first borne on 24 November 2021 in South Africa. Omicron is fast becoming the dominant virus. Omicron is now discovered in more than 57 countries and almost burden two years of restrictions as well as relax. Indianan more than 93 percent citizens have been vaccinated. Indianan more than 93 percent citizens have been vaccinated. The Indian economy had jumped up and things were about to get better but Omicron destroyed the hope. World Countries have renewed their terms of trade and covered new rules for international travel trade. The new omicron variant detected countries have Omicron cases such as United Kingdom, Germany, France, Netherlands, and Belgium etc. The Germany, France, Netherlands Belgium and United Kingdom developed nations are the sole drivers for the Indian textile and garment industry.

**Objective of the Study:**

The present paper focuses the omicron an Impact on Indian textile industry:

**Methodology:**

The data for the present study has been collected from existing secondary literature, such as books, journals, published and unpublished annual reports, Govt. Manuals/Orders, websites etc.

**Impact on Indian textile industry:**

The Indian agriculture products such as the raw material prices of cotton have taken a decline recently with prices ranging. The new omicron virus have impacted badly on cotton growers, but if demand for cotton products decline like last year, then it would be burden to buyers. For example, one thing to note here is that the Indian cotton production was already effected by pink bollworm in the Punjab and Maharashtra state. The cotton yield has thus decline by half share from last year. In the second wave had already collapsed more businesses, workers and farmers. The Omicron is expected to disrupt the industries again. According to economist

at a time when the global supply chain is already impacted with Coronavirus and lockdowns and Omicron is a threat to the industries.

The senior most economist that “The new omicron threat is that the ability to take easy loans is being wiped out from the market. There is nothing Micro Small and Medium Enterprises can do to ensure an uninterrupted supply chain management as they don’t have the financial capability and efficiency to do that”. In this connection, If we are about to see more and major infections around the world, surpassing the vaccine immunity, then the Omicron poses a hard threat to the existing economic growth. The impacts of lockdown and severe restrictions have a largely impact on the entire world.

### **Conclusion:**

The Omicron poses a hard threat to the existing economic growth. The impacts of lockdown and severe restrictions have a largely impact on the entire world. It is observed that without demand, there won’t be any production-related activities. The Indian textile industry could be another loss. Indian People would start to lose their job and GDP would decline as well as demand would slow down with it. There is a possibility for a new wave by during year as World Health Organisation declared, we think that the economy would picking up and as well as Omicron destroyed.

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## CHAPTER-34

### CORONAVIRUS PANDEMIC AND ITS IMPACT ON INDIAN MSME SECTOR

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#### Introduction

The Indian economy is mainly dependent on agriculture and industry. The share of MSMEs in the industry sector is very important. MSME is one of the most important sectors in the Indian economy and its contribution to the growth and development of the economy is immense. After agriculture, the second most important sector in India is the micro, small and medium enterprises. The sector is gaining more and more importance in terms of dynamic economies. At the same time, considering the national production policy, the share of MSMEs is also increasing and it is planned to increase it to 25% by 2022. The pandemic spread and the lockdown declared in March 2020, had a major adverse effect on the MSME sector. The micro, small and medium enterprises sector is one of the fastest growing sectors in India for almost 50 years. MSM is the largest contributor to the country's economy in terms of production, employment and overall exports. MSMEs play a major role in exports considering the industrial sector. This is why the sector is considered an important pillar of the Indian economy. It also contributes about 45% to the total production of Indian products and 40% to the total exports. The nationwide lockdown announced by the government in March 2020 lasted till about 3<sup>rd</sup> May 2020, which had a huge impact on economic activities and business activities. As a result, millions of jobs were lost, as well as the micro, small and medium enterprises sector became dominant and there was a significant decline in economic activity.

The description of MSMEs is handed by the Micro, Small, and Medium Enterprises Development (MSMED) Act of 2006. MSMEs are defined as “all enterprises engaged in product of goods pertaining to any enterprises or organization specified in first schedule of Industrial (D&R) Act, 1951 & other enterprises engaged in production and rendering of services subject to limiting factor of investment in plant & machinery and equipment respectively”. Following table provides the details of the new about the MSME sectors.

#### Revised MSME Classification:

Category	New Capital in Rs.	New Turnover in Rs.
Micro	10 million	50 millions
Small	100 millions	500 millions
Medium	500 millions	2500 millions

The Indian MSME is considered to be the second largest sector in India after agriculture as a whole. The sector serves as a breeding ground for new entrepreneurs and jobs, with MSMEs helping the sector to strengthen its economy and business ecosystem. Considering India, the

number of MSMEs is currently estimated at 63 million and employs around 110 million people. of which more than 6,000 products are manufactured for local and global use. According to DGCIS, MSME-related products in India are valued at \$ 147,390.08 million and MSMEs account for 48.56% of the sector's total exports for 2017-18. Micro, small and medium enterprises are playing a vital role in global trade systems. The contribution of micro, small and medium enterprises to the total GDP in 2019 is about 29%. MSMEs in particular have been a major contributor to India's exports so far.

### **Impact of Covid-19 Pandemic on MSME sector**

The MSMEs area was found to be one of the most insecure areas during the Covid-19 period. The main reasons for this are the number of industries involved, the size of the business as well as the availability of financial resources. The three major hurdles facing the Indian MSMEs sector are overall productivity, market penetration and access to greater financing? Businesses in the Indian MSMEs sector have declined by an average of 11% due to the lockdown in 2021, compared to around 46% during the nationwide lockdown period in 2020. Covid-19 seems to have adversely affected the Indian MSME sector. Nearly all businesses in India have been affected by the epidemic of Covid-19, mainly Micro, Small and Medium enterprises, which have suffered further losses due to reduced cash flow due to lockdown in the country. As a result, their supply chain was disrupted and workers were adversely affected. The migrant workers have also been adversely affected, mainly by migration of workers, restrictions on supply of raw materials, barriers to exports and imports and widespread travel bans, as well as closed malls, hotels and cinemas. All of this caused great suffering to the common people. The epidemic seems to have had a profound effect on those employed in the public and private sectors on a temporary basis. The loss of jobs for handicraftsmen, street workers, and daily wages workers has left them and their families starving. Overall, the epidemic has had a devastating effect on the employment sector. The Significant changes in the employment context from January 2021 to December 2021 can be reviewed on the basis of the following information.

Unemployment Rate in India during January 2021 to December 2021

Month	Unemployment rate (%)		
	India	Urban	Rural
January	6.52	8.09	5.81
March	6.50	7.27	6.15
May	11.84	14.72	10.55
September	6.86	8.64	6.04
December	7.91	9.30	7.28

Source: Centre for Monitoring Indian Economy Report of 2021.

The above analysis shows that the unemployment rate is constantly changing. This means that covid-19 has had the greatest impact on employment.

### **Government Response and Relief Package:**

At the government level, the tax return dates, the due date for filing income tax returns have been extended by another 30/90 days, thus giving relief to more or less taxpayers. Also, GST, the due date for payment of goods and services tax, has been extended till June 30, 2020, which is a relief to the taxpayers and MSME industry.

**Bank Credit Debt Relief:** During the Covid-19 epidemic, the Reserve Bank of India reduced its interest rates from 5.15 per cent to 4 per cent as compared to February and also announced a three-month moratorium on repayment of some term loans.

In the present analysis, an attempt has been made to study the impact of the COVID-19 epidemic on the Indian MSME sector. The micro, small and medium enterprises sector contributes significantly to the country's exports. The Covid-19 pandemic has created uncertainty in almost all areas as well as Industrial sector; it is affecting mainly the supply and demand of raw materials and finished goods and commodities required by businesses, as well as employment opportunities. Due to the continuous loss of various businesses, various small businesses had to exit the market in this Covid-19 epidemic. This had a serious impact on the industrial sector and employment. In the current scenario, the efforts and steps taken by the government are proving to be beneficial for MSMEs. These measures are important not only to get out of the pandemic but also to prepare for the bright future of the nation. In short, Covid-19 seems to have adversely affected the Indian MSME sector as well as other sectors.

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## CHAPTER-35

### POST-COVID-19 ECONOMIC RE-ESTABLISHMENT IN INDIA

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#### ***Abstract:***

*Evidently the impact on the economy is widespread towards reduction in the income of the people. The fall in the level of economic activities has hit very hard the daily wage earners. The revival package has to cover the loss of private consumption as well as private investment. This has also to include the financial support to the people who suffered loss of their livelihood and provision for saving the companies from impending bankruptcy. Most of the job loss has been in the unorganised sector of the economy. The victims of job loss in this sector need food and shelter immediately and jobs on normalisation.*

#### **Introduction:**

COVID-19 pandemic has taken the entire world under threat by surprise. It has created a threat to human life as no vaccine or medicine has so far been invented to control it. In order to contain the spread of this virus, the governments have accepted the guidelines of the World Health Organisation (WHO) to create social (physical) distancing within their territories. The infected persons are isolated from the rest of the population, and patients for a specified period of two weeks. Lockdown has been adopted as a model of social distancing. The citizens are asked to stay in their homes during the lockdown period. Except for essential services like health, supply of milk, vegetables, fruits, items of daily use, medicines or ICT services, every other economic and social activity is closed.

The supply of essential services is allowed through authorized persons or pass-holders in curfew bound areas and by the shopkeepers/ suppliers in non-curfew areas. All the institutions such as schools, colleges, universities, shops, market places, dhabas, restaurants, factories, construction activities, transport, cinema halls, etc. are closed. Advisories have been issued to be followed even in social ceremonies related to marriages and deaths. Borders of nations are closed to citizens of other countries. Within India, state boundaries have been sealed to stop the mixing of infected persons from outside states. The identified

Infected persons are put on quarantine for two weeks, while serious patients are admitted to the hospitals. All these measures have hit the economy very hard due to closure of a large number of economic activities. As yet no systematic estimates are available about the total economic loss during the lockdown/ curfew period in any country including India. Various international organisations like the World Bank, IMF, and other rating agencies have been projecting negative/zero growth of various countries. Although various agencies differ in their projections, they also point out towards substantial negative impact on various economies. The exact impact each on economy will depend on the period of lockdown and subsequently on the amount of revival package administered by the government. This article

attempts to examine the policy paradigm changes warranted and the level of expected revival package in India.

**Paradigm of Nation State in the Centre Stage:** The experience of managing the COVID-19 crisis in India brings out that it has been largely the affair of the union and state governments. Managing social distances, sealing of borders with other countries/other states/districts, issue of passes, identification of infected persons/patients, keeping suspected infected Persons in quarantine, admission of patients in the hospitals have been the task of the police/ civil administration and medical services in the public sector. The private clinics, hospitals and five-star private hospitals closed their establishments due to the fear of COVID-19. The task of feeding the poor or whose livelihood was lost was initially undertaken by the civil society/religious organizations, but later on this had to be undertaken by the government agencies through the Red Cross. This became necessary because the volunteers of civil society or religious organisations were not able to follow norms of social distancing. At several places, the police and local administration of village Panchayats/local urban bodies Were engaged in distribution of free ration to the poor and needy households. Most of the employers refused to pay their workers during the lock-down period. In spite of the appeal of the Prime Minister, not to remove any one from employment, many companies/ employers resorted to lay off or termination of services of some of their employees. This includes some airlines, media, both electronic and print, to mention a few. Without going into further details it can be stated that it is public sector/government employees who received their assured income.

The employees/workers in the corporate sector and informal sector faced unemployment and loss of income. The experience shows that in emergencies like COVID-19, the public sector/ government/state is the bulwark against them. It is also noted that it is the only concern of the nation state to protect its citizens. The global cooperation appears to be missing with sealing of national boundaries. This also led to cancellation of international flights, and export orders of companies were not complied due to threat of COVID-19 infection. The experience brings home an important lesson. In case of pandemic like COVID-19, it is the Nation State, which has to bear the brunt. As the uncertainty of the present situation is likely to continue for some time and also the world may experience new such challenges in the future, the Nation State must be sufficiently strengthened and put in the centre stage. The way the Nation State's role was reduced after 1991, when the policy of liberalisation, privatisation and globalisation was adopted, it has been sufficiently weakened. A large role was provided to market forces in areas earlier reserved for the public sector/governments. The private sector flourished at the cost of the state sector reducing the capacity of the latter to act in the hour of crisis. The weakness of the state to protect the health, employment and livelihood of its citizens was exposed in the present crisis. In the light of present Experience, the terms of discourse need to be changed in favour of state/ government administration. This can be done by bringing the state in the centre stage. In view of refusal to perform under the COVID-19 threat, the Government of Spain nationalised the private health care facilities.

The closure of boundaries by advanced countries point out the greater responsibilities of national governments to the life, health and jobs of the citizens. In the present circumstances, the private sector has to be regulated in terms of wage rate/salaries, conditions of work especially maintaining social distances during work, retirement benefits to worker/employees



and other social security measures. At the same time, natural resources and the ecological environment have to be saved from the greed of bigger and smaller players in the private sector. This has been brought out by Karl Polanyi in his book, *The Great Transformation*, which was first published in 1944 and reprinted in 2001. It is stated that the self-regulating Market or economy dominated by the free market brought miseries for the people of Europe in the form of massive unemployment, large inequality in distribution of income and wealth, poverty and destruction of community life during 1870s and 1880s. This created an urgency to replace the *laissez faire* policy by dominance of the state and regulation of the operation of private sector enterprises. Polanyi believes that Industrial society will exist and sustain without self regulating market mechanisms. The state has to regulate the labour market, especially the wage rate/salaries, condition of work and social security of workers/employees. Similarly, on land and natural resources, the market mechanism cannot be allowed a free role. Unchecked market forces destroy the nature and natural environment and consequently the sustainability of life is threatened. At the same time, the currency and financial markets cannot be allowed to play havoc with the lives of the people. The regulation of the private sector is of utmost importance, and dominance of the public sector allows making effective regulation of private enterprises. This enables the state to protect the health of the people, save their employment and ensure their social security. The existence of these three things makes people of the country confident and creative. The need for a strong public sector in health, education and social infrastructure has been brought out by the COVID-19 situation in the country.

The period of extended lockdown has improved the quality of air, water in the rivers and fresh water bodies. This is in spite of the fact that nothing has been done to check the flow of urban sewerage in the rivers. It is obvious that air pollution has vanished due to shut down of factories and stoppage of plying of motorised vehicles. Water quality has improved because no industrial waste was thrown into the rivers. These two sources can be identified as major factors of air and water pollution in the country. The weak Nation State/ government has not been able to control these two factors to save life sustaining sources in the country. In the post-COVID-19 recovery period, motorised vehicle owners and owners of factories must be made to pay for the air and water pollution in the form of environmental tax.

The amount collected through the environment tax must be put in the dedicated account to be used for saving the environment, biodiversity, placement of equipment to clean air at the source and clean the water at factories before it is thrown in the freshwater bodies.

### **Quantum of Package Needed:**

At this moment, the issue of the quantum and structure of the revival package is of utmost importance for re-emergence of the economic situation in the country. The size of the revival package depends on the loss

of private consumption suffered by the citizens due to loss of their income. The lockdown in the country has suspended many economic activities. The factories and processing units, especially dhabas, restaurants and hotels are closed. Producers of milk, vegetables and fruits and vendors suffered. Some media enterprises and some companies have resorted to lay off or retrenched some employees.

As a consequence, private income of the citizens has declined. The fear and uncertainty has made people stop purchase of durable goods such as vehicles, furniture, TVs, washing

machines, fridges, etc. The producers of these products have experienced loss of their business. There has been suspension of ordinary economic activities in the country. This includes stoppage of airlines, railways, roadways cars/ taxis, three and two wheelers, rickshaws, etc.

As the people are locked down to their houses and agro-processing units like tea stalls, dhabas, restaurants and sweet shops are closed the producers of perishable items are facing loss of their business and income. People are not approaching banks for investment loans. Evidently the impact on the economy is widespread towards reduction in the income of the people. Two components of this impact are visible. One is loss of income of citizens and short fall of aggregate demand. Two, the lockdown and fear of COVID-19 has lowered the business expectations leading to fall in the level of investment. Both the factors have reduced aggregate demand and shrinkage of economic activities. The fall in the level of economic activities has hit very hard the daily wage earners. Some of them faced hunger for some days. Some of them were fed by the civil society organizations and government agencies, but many remained away from their coverage. Similarly, the employees working in the private sector, who either did not get wages/pays during lockdown or were laid off or retrenched have been facing hardship. There are also some companies, which fear bankruptcy due to loss of business. The share market suffered major crashes. The deteriorating economic situation has badly affected union and state government finances due to fall in tax collection. The COVID-19 emergency has tremendously increased their liabilities. It is also the duty of the government to lead the country out of the crisis by preparing a revival package for the country.

The revival package has to cover the loss of private consumption as well as private investment. This has also to include the financial support to the people who suffered loss of their livelihood and provision for saving the companies from impending bankruptcy. Some countries like the US, UK and Japan have prepared estimates of revival packages for their economies. It is estimated that 8 per cent of GDP of each of these countries will be used for additional public expenditure to counter- balance the fall in private consumption (Varofakis, 2020). The euro zone has been s context, India would need to estimate a revival package by taking into account the loss of private consumption, decline in private investment and expected bankruptcy of private companies. Since the highest proportion of our workforce (more than 44 per cent) is engaged in agriculture, where the impact of the present crisis is likely to be less than that of the urban areas, the package of 6-7 per cent of GDP may be needed to put the economy back on track. This package has to be arranged by the central government as the states have little capacity to raise fiscal resources.

**Suggested Measures:**

The important question is where this public expenditure is to be made. Obviously COVID-19 has already exposed the weakness of our public health system. The public health system has been facing the pandemic bear handed. At present public spending on health sector has been less than 1.5 per cent of our GDP, it should be raised to 3 per cent of the GDP. At least additional 1.5 per cent of expenditure must be made to strengthen the public health system to meet continued challenge of COVID-19 and also possible such challenge arising in the future. The needs of hospitals, community health centers, dispensaries especially shortage staff of doctors, nurses, paramedical staff with proper salaries must be adequately met. The

updated equipment and protection gears should be provided along with the provision of minimum medicines. The second candidate most deserving for the package is the education in public sector. Minimum of 2 per cent of GDP of the country must be added to the existing low in this matter. In this expenditure made in this sector to move towards the ideal of 6 per cent, suggested by the Kothari Commission. Another priority area has to be revival of jobs in the country. The data indicates that unemployment level in the country has jumped from 6.1 per cent of the workforce to more than 23 per cent. Most of the job loss has been in the unorganised sector of the economy. The victims of job loss in this sector need food and shelter immediately and jobs on normalisation. The programmes like MGNREGA have to be doubled, and opened in urban colonies of the poor along with the rural areas. MSMEs have to be revived with financial support. The state government can play vital role in both the areas.

The union government must act swiftly to save some large companies from bankruptcy. Their operations are critical for revival of MSMEs. The companies need not be given free package, but can be provided concessional loans. The same can be extended to the farm sector as well. These measures have the capability to revive the economy in the COVID-19 phase.

**Conclusion:**

The shift in the policy paradigm is needed to put the Nation State in the center stage to play a critical role to revive the economy and keep it on the path of sustainable development while protecting the life and natural environment. The cooperation at the global level has collapsed at this moment, creating the dire need to strengthen the Nation State. The private sector cannot provide a lead role as it itself is a candidate for support from the governments. But, it should not be allowed to usurp the national resources of the country at the cost of common citizens. The private sector, therefore, has to be regulated by the government in the interest of state, society, natural resources and the people. The revival package has to be calculated keeping in mind the loss of private consumption, loss of investment and threat bankruptcies. The suggested revival package has to be jointly operated by the union and state governments. The package of additional expenditure to states must come in the form of grants from the union government. The state governments have the capability to operate the package to the last person in the street

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## CHAPTER-36

### RESEARCH SCENARIO OF AVIAN CESTODES FROM MARATHWADA REGION

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**Abstract:**

*Vertebrates are the important components of the ecosystem. They are very important from the ecological and economical point of view. Man uses many birds as delicious and nutritious food. Similarly, birds also produce some important products like meat, eggs and beautiful feathers. These birds are known to harbour a number of parasitic infection i.e. trematodes, cestodes and nematodes which cause deterioration in their health and increase the rate of mortality of hosts. The parasite does not have the capability to obtain food directly from the ecosystem and hence they have no option but to adopt to live in or on some other organisms and derive their food either ecto or endo parasitically from it. The flesh of birds are not properly cooked, cysts are entered inside the body of human and cause dangerous diseases to human beings.*

*Hence the study was undertaken on the status of research scenario Avian tapeworms of genus Cotugnia, Davainea, Raillietina, Valipora and Mogheia, from Marathwada region (M.S.) India.*

**KEYWORDS-** *Cestodes, Gallus domesticus, Marathwada Region, Research Scenario.*

#### INTRODUCTION

Helminths are the most common parasites infecting humans. The world's population numbers approximately 7 billion, with probably a similar number of human helminth infections. Helminths are transmitted to humans through food, water and soil, arthropod and molluscan vectors. Helminths can infect every organ and organ system. Prevalent in the intestines, they are found in the liver, lungs, blood and occasionally the brain and other organs. This chapter describes some human parasitic worms, their biology, epidemiology, pathogenicity, clinical aspects of helminth infection, diagnosis and prevention.

**Structure:** Adults, which mature sexually in the definitive or final host, are ribbon-shaped, multisegmented, hermaphroditic flatworms; each segment has a complete male and female reproductive system. An anterior holdfast organ (the scolex) is followed by a generative portion ("neck") and segments at successively later stages of development. Larvae encyst in various tissues of the intermediate host; larval cysts contain one or many scoleces of future adult worms.

**Clinical Manifestations:** Adult worms are found in the small intestine; these infections are usually well tolerated or asymptomatic, but may cause abdominal distress, dyspepsia, anorexia (or increased appetite), nausea, localized pain, and diarrhea. Larvae locate in extra intestinal tissues and produce systemic infections with clinical effects related to the size, number, and location of cysts. Some larvae may form massive cysts in liver, lungs, and other organs, including long bones and the central nervous system.

Thus, an attempt is being made to Report of Avian Cestode parasites from various places of Marathwada Region M.S., India.

## MATERIAL AND METHODS

For Taxonomic study, collected cestodes were preserved in 4% formalin. stained with Harri's Haematoxyline, dehydrated in ascending grades of alcohol, cleared in xylene, mounted in Canada Balsm. Camera lucida drawings were prepared and photomicrographs were taken by trinocular computerized research microscope. All the measurements are recorded in millimeter.

## RESULTS

During survey of avian cestode parasites, following Cestodes were reported by different authors from different localities of Marathwada Region, (M.S.) India.

**1.Cotugnia:** Diamare (1893) erected the genus Cotugnia with type species *C. digonopora* (Pasquale, 1890) collected from the *Gallus gallus domesticus*. Then *C. Polyacantha*, is added by Fuhrmann, in 1909. Meggitt in 1924 described *C. cuneatea tenuis*. Later on Baer, in 1925 added two species to this genus viz. *C. joyeuxi* and *C. parva*. Then *C. fleari* is described by Meggitt, 1927. Later on Johri added in 1934 three species to this genus i.e. *C. bahli*, *C. intermedia* and *C. noctua*. Then *C. taiwanensis* is added by Yamaguti, 1935. Tubangui et. Masilungan, 1937 described *C. rimandoi*. *C. magna* is added by Burt, 1940. Shinde, 1969 added two species i.e. *C. aurangabadensis* and *C. columbae*. Later on *C. srivastavi* is added by Malviya and Datta, 1970. Then *C. magdoubii* is described by Magzoubi and Kasim, 1980. Malhotra and Capoor, 1983 described *C. satpulensis*. *C. yamaguti* is added by Shinde, 1985. Kolluri in 1988 described *C. vishakhapatnamensis*. In 1994 *C. rajivji* is added by Jadhav et. al. Then *C. kamatiensis* is described by Kharade and Shinde, 1995. *C. Wongsawad* and Jadhav in 1998 added *C. chengmaii*. In 1999 *C. manishae* and *C. ganguae* are described by Shinde, while *C. mehdii* is added by Mahajan et.al. 1999, *C. alii*, is described by Shinde et.al., in 2002. Later on Jadhav et.al. in 2004 added two new species to this genus i.e. *C. sillodensis* and *C. lohaensis*. While Pawar et.al., 2004 added *C. singhi*. In 2005 *C. shankari* is added by Tat and Jadhav while *C. liviae* is described by Patil et.al. Later on *C. streptopelii* is added by G.P. Jadhav et. al., in 2009. Nanware et. al., 2010 added *C. hafezzi*. The *C. indiana* is added by Kasar et.al., 2010. Garad et. al., 2010 added *C. indiana minor*. Later on in 2011 Nanware et.al added *C. tetragona* and *C. orientalis*. Sanap et.al., 2011 added *C. murharii* from *Columba livia*. Shinde et.al., 2012 described *Cotugnia domestica* from *Gallus g. domesticus*. Shukla et.al., 2012 reported *C. mohekarii*. Nanware and Bhure, 2013 added *Cotugnia diamarei* from *Gallus g. domesticus*. Later on *C. singhii* was described by Sanap et. al. in 2013. Pathan et.al., 2014 described *Cotugnia osmanabadensis* from *Gallus g. domesticus*. Barshe et.al., 2019 added *Cotugnia rectangulata* from *Gallus gallus domesticus*.

**2. Davainea:** The genus Davainea was established by Blanchard, 1891 (Davainea, 1860) with its type species *D. proglottina* from *Gallus domesticus* (Linnaeus, 1758). Later on *D. minuta* is added by Cohn, 1901 from *Tringa totanus*, (Linnaeus). Fuhrmann, 1909 added *D. paucisegmentata*, from *Numida ptilorhyncha*. *D. himantopodis* is added by Johnston, 1911 from *Himantopus leucocephalus*, (Linnaeus). Fuhrmann, added three species in this genus viz *D. nana* in 1912, from *Numida ptilorhyncha*, *D. tetraoensis*, in 1920 from *Tetra urogalli* and *D. andrei*, in 1933 from *Perdix perdix*. Later on *D. meleagridis*, is added by Jones, 1936

from *Meleagarias gallopura*. Schmeltz, 1941 is added *D. baeri*, from *Gecinus nigrigensis*. Later on Shinde et. al., added three species viz. *D. indica* in 1972 from *Gallus domesticus*, *D. ambajogaiensis*, in 1977 from *Gallus domesticus* and *D. domesticus*, in 1981 from *Gallus domesticus*. *D. chauhani* is added by Chauhan, 1982. Subuhi Ashfaq and Shinde, 1988 added *D. jalnaensis*. *D. balasahebae* is added by Bargal, 1992 from *Gallus domesticus*. Bhaware et.al. 1992 added *D. retharei*, from *Streptopelia decaocta*. Later on Hiware et. al., 1993 added two species to this genus viz. *D. aurangabadensis* from *Vanellus indicus* and *D. thapari* from *Pellornerum ruficeps*. Then *D. osmanabadensis* is added by Mahajan et. al. in 1999 from *Gallus domesticus*. Lakhe et.al, 2004 added *D. muktabae* from *Acridotherus tristis*. *D. Shindei* is described by Jadhav et.al., 2008. from *Gallus gallus domesticus*, P.S. Patil is added *D. shindi* in 2008 from *Acridotherus tristis*. *D. ibisae* is added by K.V. Kalyankar et.al. in 2010 from *Bubulcus ibis*. Pathan, 2010 added *D. gunjotensis* from *Gallus gallus domesticus*. *D. yamagutii* is added by Dhondge et.al., 2011 from *Columba livia*. Recently Shinde et.al., 2013 added *Davainea columbae* from intestine of *Columba livia*.

**3. Raillietina:** Fuhrmann, 1920 reported the genus *Raillietina* with its type species (*R.*) *tetragona* (Molin, 1858, Syn. *Taenia bothrioplitis*) which infects *Gallus*, *Numida*, *Francolinus*, *Pavo*, *Lagopus*, *Colinus* as their hosts. Later on *Raillietina* (*R.*) *friedbergeri* (Linstow, 1877) reported from *Pycnonotus cafer*. Fuhrmann, 1908 added *R.* (*R.*) *micracantha*, *R.* (*R.*) *paucitesticulata* and *R.* (*R.*) *cryptacantha* from *Columba delegoguei*. Then *R.* (*R.*) *polychali* (Kotlan, 1921); *R.* (*R.*) *weissi* (Joyeux, 1923); *R.* (*R.*) *fragilis* (Meggett, 1931); *R.* (*R.*) *sequens* (Tunabngui et Masilungan, 1937) are added in this genus. W. Malclom Reid and Denis Nugara, 1965 reported *R.* (*R.*) *georgiensis* from *Meleagris gallopavo silvestris*, *M. g. domesticus*. Later on *R.* (*R.*) *waltirensis* (Kolari et.al., 1985) added from *Streptopelia chinensis suratensis*. Recently *R.* (*R.*) *microscolecina* Fuhrmann, 1908 (redescribed by Nanware et.al., 2010) ; *Raillietina* (*R.*) *rostellata* (Nanware et.al., 2012) and *Raillietina* (*R.*) *domestica* (Bhure and Nanware, 2013) are described from *Gallus gallus domesticus*.

**4. Valipora:** Linton, 1927 erected the genus *Valipora* with type species *V. mutabilis* from *Nycticorax nycticorax* in U.S.A. and Europe. He again added one species *V. parvispine* in 1927 from *Gavina inner*, U.S.A. and Europe. Later on Capoor and Shrivastava added *V. sultanpurensis* in 1974 from *Nycticorax nycticorax*. They also added one more species in 1987 *V. amethiensis* from *Bubulens ibis*, Sonune M.B. and Shinde G.B. added *V. Marathwadensis* in 1990 from *Turdoides caudates*, they again added one species *V. Maharashtrai* in 1990 from *Tringaglareola* from India. Jadhav, in 1994 added two new species viz. *V. yamaguti* and *V. Shindei* from *Columba livia* and *Bubo-bubo*, respectively. Then *V. kallamensis* species is added to this genus by Pawar and Shinde in 2003 from *Acridotherus tristis*. Then P.S. Patil and S.N. Borde added a species *V. nalinae* in 2007 from *Columba livia*. Recently *V. columbae* is added by D.V. Menkudale et.al. 2008 from the host *Columba livia*. Nanware et.al., 2010 reported *Valipora macrorostratum*. Kasar et.al., 2012 reported *V. singhii* from the host *Columba livia*. Later on no species is added to this genus.

**5. Mogheia:** The genus *Mogheia* was erected by Lopez-Neyra in 1944. As the type species *Mogheia orbuterina* (Moghe, 1933) from the intestine *Turdoides somervillei* in India. Later on *M. megaparuterina*, is added by Capoor and Shrivastava, in 1966. Then *M. bayamegaparuterina*, is described by Capoor, in 1967. Gaikwad and Shinde, 1981 added *M. asturi*. Later on in 1984 Gupta and Sinha described two new species viz. *M. copsychi* and *M.*

oriole. Gupta and Parmar, 1985 described *M. guptai*. Shinde et.al., described *M. govindi*, in 1986 and *M. parbhaniensis*, in 1986. Sonune, et.al., 1990 described two new species viz. *M. caudatusae*, and *M. turdoides*. *M. domesticus*, is added by Jadhav et.al, 1990. Then *M. hyderabadensis*, is described by Jadhav et.al., 1994. In 1999 *M. passerii* is described by Kadam, et.al. and *M. turdoidesi*, by Shinde et.al. *M. latuensis*, is added by Pawar and Shinde, 2002. Later on V.B. Garad and Sanjay Nanware, 2006 described *M. passariae*. Recently *M. ausae* is added by Gore et.al, 2008. Dhondge et.al., 2012 added *Mogheia domestica* in this genus.

Conclusively the present study indicates that, status of diversity Avian tapeworms of genus *Cotugnia*, *Davainea*, *Raillietina*, *Valipora* and *Mogheia*, from Marathwada region (M.S.) India.

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## CHAPTER-37

### INDIAN AGRICULTURE: POST DEMONETISATION AND THE WAY FORWARD

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#### **Abstract:**

*Demonetisation of 2016 was done with the primary objective of eradication of black money and corruption and movement towards digitalisation/cashless mode in every sector of the economy. The Indian agricultural sector was affected adversely in the short run however the long run effect has been encouraging. The paper discusses the macroeconomics of demonetisation as a monetary policy tool followed by its short run and long run impact on the agricultural sector. It examines the measures taken by the government to ease the conditions of the farming community and proposes measures to be taken in the future.*

**Keywords:** *Demonetisation, Agriculture, digitalisation, cashless economy*

#### **Introduction**

“Bowed by the weight of centuries, he leans upon his hoe and gazes on the ground, the emptiness of ages in his face, and on his back the burden of the world” said Edwin Markham many decades ago while talking about farmers.

Would this be a fitting description of the Indian farmer today nearly five years after the Demonetisation exercise? This paper tries to find out what the short run and long run impact has been, and what measures government had taken to help the farmers. The paper concludes with a few suggestions in this direction.

The term ‘Demonetisation’ can be traced back to the mid nineteenth century. The word is derived from French and Latin from ‘de’ meaning reversal and ‘moneta’ meaning money. In common parlance it means an action under which a currency is deprived of its status as legal tender money.

#### **Demonetisation in India**

Demonetisation is not new to India. It has been carried out twice before in 1946 and 1978.

In **1946**, the Government of India, decided to demonetise high denomination notes in India as a strategy to combat tax evasion. Rs 500, Rs 1000 and Rs 10,000 denominations were demonetised. According to official history less than 10 percent of the value of the high denomination notes was presented to the RBI. (RBI 1970:708-709). Thus its purpose as a minatory and punitive gesture towards black-marketing was not effectively served.

In **1978**, the government demonetised Rs 1000, Rs 5000 and Rs 10000 notes on 16 January. The purpose was to flush out illegally accumulated holdings of cash. These high value denominations were only 1.78 percent of the total value of notes in circulation. Immediately after demonetisation bank deposits, investments by banks in government securities, bank credit growth and Broad money supply rose. Increase in bank deposits pushed down the credit deposit ratio from 69.6 percent to 67.3 percent. Finally, all these adjustments were a onetime adjustment and they returned to the pre-demonetisation levels by mid 1978.



On November 8, **2016**, Rs 500 and Rs 1000 notes were demonetised which accounted for 86 percent of the value of currency in circulation as of March 2016. The Rs 500 notes accounted for 47.6 percent and the Rs 1000 notes for 38.4 percent of the value of the notes in circulation. A new currency of Rs 2000 denomination and a new series of Rs 500 were introduced. The **objectives** of Demonetisation were three-fold:

1. Eradication of black money and corruption (corruption not mentioned in the Gazette Notification of the Department of Economic Affairs)
2. Dealing with terrorism financed by counterfeit currency which was the work of ‘anti-national’ and ‘anti-social’ elements.
3. Move towards digitalisation or a cashless economy.

There are both parallels and differences with previous two episodes and the 2016 one. It was similar as all three were aimed at curbing black money. Though this time, security is an added challenge. The big difference obviously is the size this time. Previous ones barely impacted common people but this one is huge with 86% of currency out of the system.

### **Macroeconomics of Demonetisation**

On a purely macro-accounting level, commitments taken by countries in the process of de-cashing directly affect their saving-investment balance. The impulse may originate in any of the four sectors ie real sector, fiscal sector, external sector and the monetary sector. In the **real sector**, demonetisation would directly influence private consumption and private investment, generally by shifting the means of payments from paper currency to electronic means. It will lower transaction costs and reduce operations in the grey market thereby increasing GDP. However, there could be disruptions in Private investment financed by remittances and also increase of social tension and mistrust reflecting in GDP losses. The tertiary sector where cash payments are predominant may be impacted to some extent.

In the **fiscal sector**, the impact of demonetisation would be felt on both the revenue and the expenditure sides. On the revenue side tax collection will be better as electronic transactions leave a trail which will help to track tax evasion and get defaulters to pay the taxes. On the flip side, electronic payments may also lead to new forms of tax evasion which will hamper tax collection. The level of non-tax revenue earned by the governments from seigniorage i.e profit made by government by issuing currency, will be inevitably affected. Budgetary costs of demonetization will temporarily increase expenditure as it requires implementation of technically complex electronic payment procedures. Hence the overall fiscal impact seems to be ambiguous.

The impact on demonetisation on the **external sector** will most likely be marginal. If the fiscal balance improves, the current account would improve, leading to stronger exports, improved infrastructure, competitiveness, and business environment. If fiscal balance worsens, it may lead to additional imports of equipment and technology, which may temporarily worsen the current account.

On the **monetary sector**, it will affect the demand for currency and transmission of monetary impulses. The initial macroeconomic impact of demonetization in the monetary sector would originate from a drop in demand for currency. The transmission of monetary impulses may be faster as economic agents would have fewer non-interest bearing assets in the form of saved currency. Demonetisation would also help increase deposits which would help reduce the lending interest rate and make credit more affordable.

**Short run and Long run Impact of Demonetisation on the Agriculture Sector**

Demonetisation as tool of monetary policy affected the agriculture and its allied activities in a number of ways. In the short run the following observations were made

1. Lack of demand due to cash crunch
2. Decline in the price of agricultural produce due to low demand and high supply of produce.
3. Huge wastages of agricultural produce due to lack of storage facilities and low prices in the market.
4. Landless labourers most affected as employers had no cash to pay them and labourers did not have bank accounts.
5. Market arrivals affected as farmers faced difficulties in transporting their produce to the markets, various factors such as transportation cost, payment of commission to intermediaries along the way etc.
6. Dependence on informal sources of finance increased, cooperative banks were barred from exchanging and accepting deposits of demonetised currencies

Though demonetisation led to lack of demand and market distortions in the short run, however in the long run it ensured efficient market functioning and increase in demand and supply of agricultural produce.

1. Successful demonetisation ensured higher revenue collection by the government, which can be directed towards the agricultural sector.
2. Demonetisation helped in expansion of the financial sector across the rural areas of India. It led to opening of number of bank accounts, payment through financial instruments, financing through formal credit facilities and infuse banking habit among people.
3. Demonetisation and technology together has aided the agricultural economy by providing ease of doing business through electronic transfers and internet. It will hasten the process of digitalisation in agriculture. This will lead to greater participation in the National Agricultural Market (NAM) which provides a national electronic platform for farmers to sell their produce.
4. It also helped in earning higher foreign exchange as agricultural produce account for 15% of total exports.
5. By eradicating all the illegal cash currency in the economy and ensuring greater financial inclusion of the informal sectors demonetisation also contributed to lower cost of production, efficient Minimum Support Price and higher profits in the market.

As we can see, demonetisation has turned out to be a mixed bundle. Therefore in order to ease the stress on agriculture the central government made a number of immediate provisions especially for the farmers as the decision to demonetize currencies coincided with active agricultural operations. Those provisions were-

- a. Use of old denomination high currency for purchase of agricultural inputs from government agencies was permitted.
- b. All APMCs and Milk Cooperatives were directed to transfer the payment in bank accounts of farmers and help opening an account who do not have one.
- c. Consumer affair ministry procured pulses from farmers and government also assured farmers of buying any quantity of pulses at MSP.

- d. NABARD made available Rs 21,000 crores limit to the District Central Cooperative Banks (DCCBs) through State Cooperative Banks for Rabi agricultural operations like Wheat.
- e. As a relief to small agricultural borrowers (i.e., loans upto Rs 1 crore), RBI announced to provide additional 60 days time for repayment of dues.
- f. Traders were allowed to withdraw Rs 50, 000 per week from their KYC linked current account.

### **The Way Forward**

However, more needs to be done for making the demonetisation exercise a successful one. The primary objective of demonetisation was to build a cashless economy. But the theoretical possibilities of a cashless economy run up against numerous concrete obstacles in Indian society today. Rural India simply lacks adequate physical and financial infrastructure — pushing people away from cash presumes they have somewhere else to go. A large chunk of India's farmers continues to depend on commission agents for credit, consumption loans, and information and storage facilities. More important are the uncertain nature of rural employment, the social constraints (e.g., caste, gender) in accessing credit, and extremely low levels of education. Akodara, a tiny village in Gujarat became India's first digital village in 2015 with people of the village transacting through mobile banking. Dhasai, a village in Thane, Maharashtra too became cashless using mobile banking. Both these villages have high literacy levels which made this transition possible. Therefore, such examples could be the beginning of a cashless world but in order to achieve that goal for the entire nation structural change in the Indian society — stable employment, decent wages, low inequality (across caste, gender, and class), and high education levels- is the key.

According to the 2010-11 Agricultural Census, 95 percent of India's 13.84 crore operational holdings are of below four hectares (10 acres) size i.e they are small and marginal farmers. Thus not many farmers falling within this holding limit (barring those growing very high valued crops) would be drawing an annual income of Rs 5 lakh, which attracts zero personal tax liability with rebate. Agriculture can be treated as business with all expenses related to it being deductible from income. Farmers can also claim depreciation on fixed assets. All this will ensure that not only bulk of agricultural incomes will remain untaxed, but also incentivise farmers to undertake productivity boosting investment in their land. Small farmers need not fear if agricultural incomes are brought under the tax net. Once their real incomes are known it can be supplemented with direct payment programmes. Today for many rich individuals Section 10(1) of the Income Tax Act is simply a provision that facilitates tax avoidance through declaration of farming as a source of income. These so-called farmers should be exposed now by bringing them under the agricultural tax net.

Vakulabharanam (2005, 2008) argues that the state had offered various input subsidies, especially in the provision of fertilizers, electricity and credit in the pre-reform years. It had also provided infrastructural support (primarily in irrigation and electricity) and extension services to cultivators and minimum support prices for agricultural output. After 1990, the state has unevenly withdrawn this support to the farming community due to pressures of the WTO Agreements. The reduction of domestic support in terms of subsidy and credit on the one hand and drastic price fall of agricultural commodities in the international market on the other hand led to distress in the farming class. The cost of production has also increased

manifold over the years. Sen (1996) and Patnaik (2003, 2005) blame the withdrawal of state support to agriculture and the integration of agriculture into global markets due to structural liberalization as the main cause behind the declining fortune of agricultural sector. The Indian government should raise its voice at the WTO to link the amber box subsidy quota (farm subsidies to fertilisers, seeds, electricity and irrigation) to population instead of production and also voice its concerns against the WTO mandated subsidy limit of 10 percent for developing countries. Thus subsidy to deserving farmers should be given.

The M. S. Swaminathan Committee Report (2004-2006) had recommended that MSP should be cost plus 50 percent. The government has declared MSP for farm products but over two thirds of crops are being sold below MSP. A fair MSP will ensure that farmers get a price at least more than their production cost and hence make profit.

To wrap up, the action of the Indian government to eradicate the socio-economic problems of black money, corruption, counterfeiting and terrorist funding was indeed a bold move. Many operations linked to agriculture have been affected in the short run leaving many to debate on “how short is the short run?”. However, in the long run, the macro-economic picture of agriculture is not worrisome. One must remember that there is no long term gain without short term pain.

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## CHAPTER-38

### GENDER EQUALITY AND EMPOWERMENT OF WOMEN IN INDIA

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JMV Buldana

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**Abstract:**

*India is the fastest-growing economy in the world with almost half of the population as women. If the nation wants to get into the league of the developed nation, then empowerment of women is need for the hour. Women's empowerment removes gender inequality and leads to a balanced economy.*

*The effects of the COVID-19 pandemic could reverse the limited progress that has been made on gender equality and women's rights. The coronavirus outbreak exacerbates existing inequalities for women and girls across every sphere – from health and the economy, to security and social protection.*

*Women play a disproportionate role in responding to the virus, including as frontline healthcare workers and carers at home. Women's unpaid care work has increased significantly as a result of school closures and the increased needs of older people. Women are also harder hit by the economic impacts of COVID-19, as they disproportionately work in insecure labour markets.*

*Kofi Annan, the former secretary-general of the United Nations, once stated: "There is no tool for development more effective than the empowerment of women." Indian women are treading toward empowerment to make conscious, progressive decisions for themselves.*

**Keywords:** Gender equality, women, Empowerment, Covid-19, social, economic

**Introduction**

Gender equality is not only a fundamental human right, but a necessary foundation for a peaceful, prosperous and sustainable world.

Empowerment is the process that creates power in individuals over their own lives, society, and in their communities. People are empowered when they are able to access the opportunities available to them without limitations and restrictions such education, profession, and lifestyle.

The COVID-19 pandemic provides an opportunity for radical, positive action to redress long-standing inequalities in multiple areas of women's lives, and build a more just and resilient world.

Being a woman means being able to be powerful and assertive, yet kind at the same time. It means being compassionate and vulnerable towards those we love in our lives without feeling weak for doing so. It means striving for our goals even in the face of the adversity we may encounter along the way.

A woman does not only bring competition into the work field but also help in the collaboration of ideas and execute teamwork correctly. They help in bringing a perspective that values an open economy, modern, and social system. Our society still provides the inferior importance to the women. Some people still considers that women cannot do the

works that a man can do. These thoughts have created inequity among the two genders. We must apprehend the responsibilities of a woman before judging her capabilities.

Gender equality is when people of all genders have equal rights, responsibilities and opportunities. ... Gender equality prevents violence against women and girls. It's essential for economic prosperity. Societies that value women and men as equal are safer and healthier.

### **Gender equality in India**

Gender equality in India is the most desired state of form, which our Nation is craving to have for since long. Gender equality is no more a moral pressure or social issue but also a social, economic challenge.

To have a prosperous Nation, Gender equality in India is a much-required component. Therefore, promoting gender equality in India is a critical aspect of women's empowerment. The principle of gender equality is enshrined in the Indian Constitution in its Preamble, Fundamental Rights, Fundamental Duties and Directive Principles. The Constitution not only grants equality to women, but also empowers the State to adopt measures of positive discrimination in favour of women.

### **Women empowerment**

Empowering women is to give women the right. Women can have equal right to participate in education, society, economy and politically. Women can involve in society as they are glad to choose their religious, language, work and other activities

Women are known for delivering multiple roles effortlessly per day, and thus, they are considered the backbone of every society. Living in male-dominating societies, women play a wide range of roles, such as caring mothers, loving daughters, and capable colleagues. The best part is that they fit the bill perfectly in every role.

Along with Global Vision International's Women's Empowerment Project, The United Nations Development Program has created eight Millennium Development Goals, the third of which is directly related to women's empowerment in India. The goal is to eliminate gender inequality in education on both the primary and secondary levels.

### **Difference between gender equality and women empowerment**

Gender equity is the phenomena of being fair to women and men. Gender equality mostly requires equal enjoyment by women and men of socially-valued goods, opportunities, resources, and rewards. Gender equality does not mean that men and women should be the same, but equal access to opportunities and life changes.

Women's empowerment to ensure that decision-making at personal and public levels and access to resources is not only in men's favor. Both women and men can fully participate as equal partners in a productive life.

Gender equality and women's empowerment are two sides of the same coin: progress toward gender equality requires women's empowerment and women's empowerment requires increases in gender equality

### **Social Obstacles in Women's Empowerment**

In fact, women and girls in cities face a range of specific barriers and vulnerabilities in the form of gender based discrimination: gender inequality, violence against women, poverty, unequal participation in public and private decision-making as well as, barriers to education, employment, housing and basic services.

The Beijing Declaration at the Fourth World Conference on Women (1995) point 13 says, 'Women's empowerment and their full participation on the basis of equality in all spheres of society, including participation in the decision-making process and access to power, are fundamental for the achievement of equality, development and peace'.

#### **WHY NEED OF WOMEN EMPOWERMENT? •**

Empowering women is essential to the health and social development of families, communities and countries. When women are living safe, fulfilled and productive lives, they can reach their full potential. contributing their skills to the workforce and can raise happier and healthier children. They are also able to help fuel sustainable economies and benefit societies and humanity at large.

**WOMEN ARE DEPRIVED OF:** • Decision Making Power • Freedom of Movement • Access to Education • Access to Employment • Exposure to Media • Domestic Violence

**WAYS TO EMPOWER WOMEN:** • Providing education • Self employment and Self help groups • Providing minimum needs like nutrition, health, sanitation, housing • Other than this, society should change the mentality towards the word "women". • Encouraging women to develop in their fields they are good at and make a career. decision making of women in social, political and economic life of the nation.

#### **Indian Government's development-oriented schemes for women**

Women's empowerment is valuable for the development and advancement of the family, community as well as the nation. Hence, it must be a leading concern of the Indian Government to bring women into the fore of the development strategy by empowering them via numerous development-oriented schemes.

Titled "Empowerment of Women through Education with Special Reference to Beti Bachao-Beti Padhao Scheme", a report by the panel tabled in Lok Sabha on Thursday said that since the inception of the scheme in 2014-15 till 2019-20, its total budgetary allocation was ₹ 848 crore.

The Government of India's MUDRA scheme to support micro and small enterprises and direct benefit transfers under the Jan Dhan Yojana seeks to empower women. Women entrepreneurs account for about 78 percent of the total number of borrowers under MUDRA.

#### **Low level of female LFPR in India:**

Females spending disproportionately more time on unpaid domestic and care giving services to household members as compared to their male counterparts (Time Use Survey, 2019)

Need to promote non-discriminatory practices at the workplace like pay and career progression, improve work incentives, including other medical and social security benefits for female workers

- Under PMGKP announced in March, 2020, cash transfers of upto Rs.1000 to existing old aged, widowed and disabled beneficiaries under the National Social Assistance Programme (NSAP)
- An amount of Rs. 500 each was transferred for three months digitally into bank accounts of the women beneficiaries under PM Jan Dhan Yojana, totalling about Rs. 20.64 crores
- Free distribution of gas cylinders to about 8 crore families for three months
- Limit of collateral free lending increased from Rs. 10 lakhs to Rs. 20 lakhs for 63 lakh women SHGs which would support 6.85 crore households

- Wages under Mahatma Gandhi NREGA increased by Rs.20 from Rs.182 to Rs.202 w.e.f. 1st April, 2020

If we wish to see a nation that develops economically on the global front, then it's very important to have "Women empowerment". The actual women empowerment will come by making the women economically independent.

### **Conclusion**

Even though Indian women face numerous hurdles and challenges, it has not deterred their confidence and enthusiasm to bring about a powerful social change. They are forging a new path toward achieving social and economic empowerment.

"You can tell the condition of a nation by looking at the status of its women." This is a famous quote by Jawaharlal Nehru on women. The status of women depicts the social, economic and mental condition in a nation.

The spread of education and self-consciousness among women has led to their progress over the period. Women of today are empowered. Also, women are gaining advancements and success in each and every field.

Empowering women is essential to the health and social development of families, communities and countries. When women are living safe, fulfilled and productive lives, they can reach their full potential. contributing their skills to the workforce and can raise happier and healthier children.

"Limited gains in gender equality and women's rights made over the decades are in danger of being rolled back due to the COVID-19 pandemic," the UN Secretary-General said in April 2020, urging governments to put women and girls at the centre of their recovery efforts.

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## CHAPTER-39

### CASE STUDY OF SUSTAINABLE FISHERIES ACTIVITIES BY TRIBALS AND BIODIVERSITY CONSERVATION IN SATARA DISTRICT

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Conservation of biodiversity is the problem before the world during the recent times. Dwindling number of species and individuals of species are the topics of discussion, worry and research. The problem is not new as there are references of methods used for demonstrating the importance of biodiversity is clear from many traditional practices. The environmentalists all over the world are holding talks, conferences, workshops and summits for so many years. The earth summit was held in 1992 at Rio de Janeiro, which resulted in 'Convention on Bio-diversity' on 29th December 1993. The representatives of different countries defined Biodiversity deliberate on the status of Biodiversity. The brainstorming results in formulation of many common programmes and steps for the conservation of Biodiversity. Now the outputs indicate the lack of success of the policies due to problems in implementation, understanding and execution. Only the planning does not help in the proper outputs. The current Convention on Biodiversity 2020 continues along the same path with very good planning and promises. The execution holds the key to the success.

As is evident from the reactions from different walks of the society the importance of Biodiversity is variable. The urbanization and activities related to industrialization consider the Biodiversity conservation acts and laws as hurdles. Many ways are found to find loopholes in them and continue the deforestation and reduction on habitats leading to depletion of Biodiversity. The major cause for failure of the recommendations of summits, rules, regulations and acts is the understanding and practice. The individuals who need to understand Biodiversity and its importance are not aware. The overall trend is towards urbanization which is considered as an evaluation measure of success. The lack of awareness of many policy makers and reluctance in implementing the laws stringently provide openings for breaking the rules.

The wanton use of pesticides and an overdose of fertilizers is responsible for their share in destruction of many non-target organisms. Some important ones are the bees which lead to reduction in pollination and may in future of agriculture and horticulture. The anthropogenic activities resulting in constructions have reduced Biodiversity. Finally, in the recent times the maximum effects are seen on aquatic habitats. In the aquatic habitat the most important commodity is the fish. The rise in deaths of fishes is the ever increasing problem. This is more severe during the first rains when the excess of pesticides and fertilizers are washed off as surface run offs and enter the aquatic ecosystems. This results in mass fish kills which results in reduction in number of such animals and fish.

Satara District because of its geographical location and presence of many mountains blessed with heavy rains has substantial amount of fresh water bodies. The river Krishna along with its tributaries constitute to more than 250 kilometers of running water. There are six tributaries of Krishna river running from Satara District. The Venna river is right bank tributary of Krishna river and river rises in Mahableshwara and meet the Krishna river and this confluence take places at Sangam Mauli Satara, The Urmodi river is flowing from town Kashil, Satara, The Tarali/Kali Ganga river and Mand river are flowing from town Umbraj, Satara, The Kolamba river is the Left Bank tributary of Krishna and flowing from town Tasawade, Satara, The Koyana River is flowing from Taluka Karad and Koyna River is very famous for the Koyna Dam and the Koyna Hydroelectric Project in India. Koyna Hydroelectric Project is the 2nd largest completed hydroelectric project after Tehri Dam project in India. There are 7 large reservoirs of Krishna river like Dhom Dam, Kanher Dam, Koyana Dam, Mhaswad Dam, Morana Dam and Mornagureghar Dam. The Shivsagaris a reservoir in the state of Maharashtra, was formed after the Koyna River was impounded by the Koyna Dam and having length of 50 km. In addition, there are more than 200 seasonal lentic water bodies. In addition, in the recent years the farmers have constructed many agricultural ponds. The lentic water bodies and the constructed ponds are not available to the tribals for their livelihood but the lotic systems provide them with enough area for capture fisheries.

Fish capture in Satara district is done by many fishermen. These include tribals who depend on capture and sale of fish and other aquatic commodities for their livelihood. The tribes are Kathodis, Bhois and Kolis practice traditional fishing methods usually in the morning and sell the daily capture in local markets in the afternoon.

The capture fishery is done using different gears. The majority of fishes captured is using small nets and different traps. The nets used are cast nets of different sizes and gill nets. The traps are made up of Bamboo splits or constructed along the streams or rivers. The cast nets are constructed locally and operated in shallow waters of streams and rivers. The tribals have been using nets with different mesh sizes. When the study of the mesh size was done it was observed that the mesh size is kept medium so fishes of different size are captured. The best thing practiced by these fishermen is the release of fishes which are not consumed back in the water. This ensures the conservation of these species of fishes. The second important aspect is the use of medium sized mesh which enables small fishes and early stages of fishes to escape. This ensures the young ones escape and grow larger in the subsequent years. This also helps in fish maturing and breeding thus maintaining a steady number which amounts to sustainable fishing practice. The gill nets are spread or dragged for capturing fish. The mesh size of these nets is also adjusted similar to the caste nets. Thus in this case too sustainable fishing is practiced.

In Satara district and adjoining areas very interesting trap called as kuinis operated. this is a contraption prepared by using natural materials. The trap is constructed after the early rains. during this time the fishes which migrate upstream for breeding have climbed the streams and entered the springs and shallow waters. These fishes breed and lay eggs. The young ones hatch and feed in the shallow freshwaters. The adults who are exhausted due to the migration rest for a few days and start downstream migration. The traps are constructed at places where the fishes have travelled upwards and are going to come down. These fishes are

trapped in the kuin trap. The most astonishing fact about this trap constructed by illiteratetribals is that there is no artificial material used in the trap all the materials are natural. The mesh size of the collecting basket attached at the lower end of the trap. The mesh size of this bamboo or cane basket is such that the small sized fishes and animals can pass through the gaps. Thus only the spent fishes are captured and the young ones carry moving downstream where they grow.

Some fish also show an interesting activity which is upstream migration. All such fish show upstream movements when the conducive environmental conditions such as muddy waters, rains, lower temperatures and darkness. The mature fish move upstream in groups and breed in shallow waters along the roadside or waterlogged fields. During this journey they have to move in shallow waters above the road or over land with flowing waters. During this they have to climb small walls, natural rock formations and are vulnerable to attack by the consumers. Along with these humans can capture them even with bare hands or hand operated nets, utensils or buckets. It is easy to collect them and during such period it is observed that hundreds of kilos of fish are available in the market and at very low price. All the fish are gravid and thus there is loss of one generation of fish if they are collected before spawning. This is happening regularly. The most significant fact is that there is not a single tribal individual selling such captured gravid fish. When contacted and asked the reason they said that the fish is heavy and filled with eggs and milk which are the terms they use for eggs and milt. According to them the fish must breed and hence such fish must not be captured.

There are few exceptions where even the tribals have started some malpractices but overall they look after the wellbeing of the fish population and number of species are maintained by them. Such so called illiterates are looking after the environmental wellbeing and sustainable fisheries activities and the learned are not able to implement them. These individuals through the traditional knowledge received from their fore fathers actually practice conservation without planning or learning them. On the other hand, the learned are not able to practice the planned activities. So it is now time for the learned to learn from the illiterates regarding sustainable development and conservation.

## CHAPTER-40

### ROLE OF BLOG IN DIGITAL LEARNING

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**Abstract:**

*A blog is a great place to get out information about a business especially if it home based. Creating a blog is also beneficial for education use. A blog is a system that allows a single author (or sometimes, but less often, a group of authors) to write and publically display time-ordered articles (called posts). A blog, therefore is and has always been more than the online equivalent of a personal journal. Though of consisting of regular (and often dated) updates, the blog adds to the form of the diary by incorporating the best features of hypertext: the capacity to link to new and useful resources. But a blog is also characterized by its reflection of a personal style and this style may be reflected in either the writing or the selection of links passed along to readers. Blogs are, in their purest form, the core of what has come to be called personal publishing. Author in this chapter wants to bring readers notice role of blog in digital learning.*

**Keywords:** Blog, Teaching, Learning

#### **1. Introduction**

A blog is a great place to get out information about a business especially if it home based. Creating a blog is also beneficial for education use. A blog is a system that allows a single author (or sometimes, but less often, a group of authors) to write and publically display time-ordered articles (called posts). A blog, therefore is and has always been more than the online equivalent of a personal journal. Though of consisting of regular (and often dated) updates, the blog adds to the form of the diary by incorporating the best features of hypertext: the capacity to link to new and useful resources. But a blog is also characterized by its reflection of a personal style and this style may be reflected in either the writing or the selection of links passed along to readers. Blogs are, in their purest form, the core of what has come to be called personal publishing

In the hands of teachers and students, blogs become something more again. The Web is by now a familiar piece of the educational landscape and for those sites where personal publishing or chronologically ordered content would be useful, blogs have stepped to the fore.

##### **1.1.1 What is Blog?**

blog is a kind of social media tool that allows one to share ideas with authentic audiences and to engage those audiences in conversation. Most blogs look something like journals, with a series of “posts” appearing on the blog in reverse chronological order (newest posts at the top, older posts below). Blogs can address any number of topics, from travel to food to parenting to politics, and they can be written by single authors or by groups of writers.

Typically, blogging software is very easy to use, but also flexible enough to allow for customization in both style and structure.

### **1.2 Five Major Uses of Blogs in Education**

Crooked Timber's Henry Farrell identifies five major uses for blogs in education.

First, teachers use blogs to replace the standard class Web page. Instructors post class times and rules, assignment notifications, suggested readings and exercises. Aside from the ordering of material by date, students would find nothing unusual in this use of the blog. The instructor, however, finds that the use of blogging software makes this previously odious chore much simpler.

Second and often accompanying the first, instructors begin to link to Internet items that relate to their course. Mesa Community College's Rick Effland, for example, maintains a blog to pass along links and comments about topics in archaeology. Though Mesa's archaeology Web pages have been around since 1995, blogging allows Effland to write what are in essence short essays directed specifically toward his students. Effland's entries are not mere annotations of interesting links. They effectively model his approach and interest in archaeology for his students.

Third, blogs are used to organize in-class discussions. At the State University of New York at Buffalo, for example, Alexander Halavais added a blog to his media law class of about 180 students. Course credit was awarded for online discussion, with topics ranging from the First Amendment to libel to Irish law reform. As the course wound down with a discussion of nude bikers, Halavais questioned whether he would continue the blog the following year because of the workload, but students were enthusiastic in their comments.

Fourth, some instructors are using blogs to organize class seminars and to provide summaries of readings. Used in this way, the blogs become "group blogs"- that is, individual blogs authored by a group of people. Farrell notes: "It becomes much easier for the professor and students to access the readings for a particular week-and if you make sure that people are organized about how they do it, the summaries will effectively file themselves."

Finally, fifth, students may be asked to write their own blogs as part of their course grade. Educational Technologist Lane Dunlop wrote about one class at Cornell College: "Each day the students read a chunk of a book and post two paragraphs of their thoughts on the reading." In another class, French 304, students were given a similar exercise. Using a French-language blogging service called Monblogue, Molly, a business student, posted a few paragraphs every day.

A blog owner can edit or update a new entry without worrying about page formats or HTML syntax. Sebastian Fiedler, a media pedagogy specialist at the University of Augsburg in Germany, has been monitoring the rise of blogs for a number of years. "Many lightweight, cost-efficient systems and tools have merged in the personal Web publishing realm," he writes. "These tools offer anew and powerful toolkit for the support of collaborative and individual learning that adheres to the patterns of contemporary information-intensive work learning outside of formal educational settings."

### **1.3 Professional Uses**

Now blogs are even used in the professional world with a targeted audience to help and build credibility and name recognition. Readers can add comment to posts. Example of educational uses:

1. A group of bloggers using their individual blogs can build up a corpus of interrelated knowledge via posts and comments. This might be a group of learners in a class, encouraged and facilitated by a teacher, or a group of relatively dedicated life-long learners.
2. Teachers can use a blog for course announcements, news and feedback to students.
3. Blogs can be used with syndication technologies (below) to enable groups of learners and teachers to easily keep track of new posts. Advantages of blogs in education 1.
4. The opportunity and incentive for students to take ownership over their ideas and voice.
5. In education communication is a vital skill. Communication is key with the students but with the parents as well.
6. Through creating a blog for yourself and your students you open a new way for your students to communicate with other students.
7. You as the teacher can post websites that are beneficial to their learning or even post games for them to practice certain skills.
8. If a student or parent has a question about the homework, they can post it. If you do not respond right away, another parent or another student may be able to answer it for them.
9. It is a great way to communicate with parents and keep them involved in what is going on in the classroom with their child, even if they cannot physically be there.
10. Record group progress on a project.
11. Talk about shared classroom experiences.
12. Copy and paste thought-provoking quotes from other blogs and then offer their own thoughts on the topic.
13. Ask professional writers to edit their blogs, or provide feedback. (Lorrie Jackson 2010)
14. Increases the students' motivation to take an active part in the learning process, since blogging is fun and interesting (Anamaria Dutceac Segesten)
15. Develops the communication skills of students that are less internet-savvy through peer-to-peer learning
16. Blogging increases student interaction with course materials.
17. Blogging increases student opportunities to interact with each other.
18. Blogging gives students an extra touch point for interaction with the professor.
19. Student blogging is a powerful tool for enabling new forms of communication and interaction between all the members of your classroom community.
20. Blogs allow students to give voice to their passions.
21. Blogs invite feedback.
22. Blogs provide opportunities to engage in civil discourse.
23. Blogs provide opportunities for regular writing practice.
24. Blogging allows students to experiment with multiple media formats.
25. Blogs can create opportunities for positive change (Susan Lucille Davis)
26. Faculty members use weblogs to post class announcements, syllabi, assignments and more in addition to offering students a forum for discussing class topics.
27. Blogs are easy to set-up and administrate in contrast to other technologies.
28. Blogs makes easier to publish all types of resources (text, images, video, etc.) to the Web when compared to traditional web publishing.
29. Blogs allow instant publishing with just one click

30. Blogs have the ability to reach a large audience without losing information quality and allowing for different levels of detail.

#### **1.4 How Do Blogs Encourage Learning?**

- Blogs cultivate learning because they encourage students to express their own thoughts and opinions while allowing them to see things from the perspective of their peers.
- Blogs allow students to play an active role in their own education, giving them a place to solve difficult issues, examine potential resolutions, and actively do the legwork required for critical thinking.
- Blogs allow students to express their creativity by offering an outlet for exploring different subjects, which naturally permits expression of individuality by both students and teachers.
- Because blogs are capable of supporting many media types, they are a diverse choice for including visual references in several different forms. Students may choose to include supporting photos, audio clips, videos, and more, which can be exciting, engaging, and add to the unique nature of a blog post.
- Blogs allow students to communicate with other groups, while traditional writing is just for the reading pleasure of their teachers. Their written blog entry could be seen by anyone, from peers to strangers around the world.
- Blogs allow the student to contemplate their thoughts, and they offer a unique opportunity for the student to look back and observe their progress or evolution over a period of time. Students can read through their old content, helping them to notice and appreciate changes they've made, ways in which they've grown, and things they've learned along the way. They are able to visually see proof of their education and progress.
- Using blogs in education offers a unique learning opportunity for students because they are acquiring a useful skill while also honing their own writing talent. That proficiency can easily translate to jobs and other projects down the line.

#### **1.5 The benefits of Educational Blogging**

As time has gone on, we have come to realize that blogging brings many educational benefits. Years later we are still discovering new advantages for our students. **The diagram below summarizes the most powerful benefits I've found from blogging** (Kathleen Morris).

##### **Benefits:**

- Social skills
- Global connections
- Authentic audience
- Classroom community
- ICT skills
- Home school
- Maths
- Literacy
- Internet safety

- **Social Skills and Confidence:** while some people may be quick to say that blogging and online social media can inhibit social skills, we see blogging as a terrific starting point. It can help certain individuals to practise their skills and transfer them into the “offline world”.
- **Internet Safety:** Everyone will agree that teaching students to be safe online is an important issue. You can’t just do one off lessons on cyber safety. Cyber safety is not a separate subject. Through being heavily involved in blogging, my class has opportunities almost daily to discuss cyber safety issues and appropriate online behaviours in an authentic setting. Blogging is an excellent way to learn about being a responsible member of an online community.
- **Literacy:** Blogging helps in improving students’ literacy skills. Not only were skills improved, but engagement levels increased. Reluctant writers wanted to write for a purpose and students were using blogs to purposefully communicate and converse with others. Now blogging is part of literacy curriculum so teachers use blogging to explicitly teach English conventions.
- **Maths:** While using blogging as an avenue for teaching and learning literacy may be more obvious, blogs can also be used for maths. Just two examples are our daily use of Clustrmaps and our world, Our Numbers blogging project we’re currently involved in.
- **Home-School Connection:** Many parents and families have love using the class blog as a “window into our classroom”. Through commenting, families can be a part of what is happening in our classroom and have real time access to their child’s education. Encouraging parent participation in your blog is something I have written about recently.
- **ICT Skills:** Blogging assists students to become more ICT literate which is a crucial 21<sup>st</sup> century skill. Through blogging, we’re able to incidentally discuss many ICT skills such as keyboard shortcuts, Creative Commons, researching online and troubleshooting.
- **Classroom Community:** Creating a class blog requires teamwork and collaboration. Students and teachers learn and share together. A real sense of classroom community can be developed through blogging and establishing a class identity. A class blog mascot can be a fun way to represent your classroom community.
- **Authentic Audience:** In the traditional classroom, the only audience of student work was the teacher and sometimes classmates and parents. Blogs provide a much larger audience for student work and an avenue for feedback and self-improvement through commenting. Students really take pride in the work that goes on the blog and want to do their best for their impending audience.
- **Global Connections:** Blogging can help flatten the classroom walls and over the years we have got to know many classes across the world who we call our “blogging buddies”. The benefits of these connections are priceless. A sense of understanding and tolerance develops and students can learn a lot about the world in which they live.

## 6. Conclusion

In this way, Blogging has emerged as an important and significant digital space in this technologically advance century. However, the education sector is yet to tap the manifold possibilities which inculcating blogging is slowly catching up in the Indian education setup. Many educators slowly catching up in the Indian education setup. Many educators are thinking about it, but are unsure where to even start or how to get started. Blog is a shortening



of Weblog. A Blog is an online journal, a personal diary. A collaborative space in which you can share with the world. You can create your blog to be whatever you want it to be. Essentially blogging makes anyone a columnist. When blogs were first created, they were used by people who wanted to share their voice.

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## CHAPTER-41

### NEWER TRENDS IN SCIENCE: NEED TO LOOK OUT FOR 2022

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**Abstract:**

*The scientists all over the world have worked continuously in the public domain, as the coming years will be important for research, development, innovation and technological progress. All of us want to forget 2020 and 2021 in a hurry. The novel virus SARS-CoV-2 (COVID-19) emerged in the whole world as a pandemic. This was the greatest global disaster since World War II. Since then scientists and health workers have collaborated between science organizations, research institutions, and governments to lead to the development of several vaccines developed by Pfizer-BioNTech, AstraZeneca, Moderna etc. But science in 2020 many remarkable discoveries and major innovation took place and in future new opportunities will surely be tapped by scientists. The COVID-19 crisis has affected societies and economies around the globe and will permanently reshape our world as it continues to unfold. While the fallout from the crisis is both amplifying familiar risks and creating new ones, change at this scale also creates new openings for managing systemic challenges, and ways to build back better.*

*While the global pandemic has been a looming risk for decades, COVID-19 has come as a shock to society, health systems, economies, and governments worldwide. In the midst of extraordinary challenges and uncertainty, and countless personal tragedies, leaders are under pressure to make decisions on managing the immediate impact of the pandemic and its consequences, decisions that will shape the state of the world for years to come.*

**Keywords-** COVID-19, pandemic, health systems, research, economies.

#### INTRODUCTION

Ever since the identification of the cause of the outbreak of COVID-19 in late 2019 and its pandemic announcement in March 2020, research and development activities have been evolving into a broader understanding. Along with these efforts, several pharmaceutical and non-pharmaceutical remedies for prevention and control were recommended by WHO. COVID-19 has exposed fundamental weaknesses in the healthcare systems [1] and capabilities in a number of countries, both rich and poor. We have identified the challenges and opportunities that COVID-19 presented by linking the immediate need to curb the spread of the diseases. We studied key targets for achieving Good Health and Wellbeing that will help strengthen capacities of healthcare to control the virus.

#### Vaccine development

The quest to find an effective COVID-19 vaccine was one of the biggest trend in 2020. Most of the world's developed nations are still facing the pandemic. US and UK both opened the new year with their highest-ever daily total of new corona virus cases. This trend was the most urgent. To vaccinate the whole world, more drugs will be needed. Further, if we don't

vaccinate in a quick and efficient manner, mutated variants like Delta and Omicron may evolve periodically to create havoc in the globe.

So researchers must continuously work to expand the already-authorized vaccines [2]. These vaccines are currently at various stages of the drug discovery process, from testing and development through to clinical trials and post-market safety monitoring. Johnson & Johnson, for example, is currently testing a single-shot version of the vaccine (in contrast, the existing vaccines require two doses)[3] .

### **Further COVID recovery**

Governments have fully mobilized towards containing the spread of the virus. The life science institutions are under pressure to deliver favorable outcomes. This will involve maintaining, replacing, and strengthening the supply chain, that has been impacted by various lockdown measures. The hospitality sector and home food delivery services will direct its efforts towards sustaining the grocery boom.

### **Investigations into the origin of coronavirus**

Throughout 2021, a WHO taskforce was in an attempt to see the origins of the COVID-19 pandemic. But China had blocked access to the delegation to visit the country. The source of the virus remains unknown; may be wet markets, auto parts packaging, or a lab leak.

### **Action against climate catastrophe**

The growing awareness among the people for sustainable products and services has given priority for recycling, reduction of carbon footprint, green technology, and diversification from hydrocarbons. Companies have turned towards bio-based chemicals, plant-based chemicals, biodegradable plastics, biopolymers, recycled plastics etc. The green economy is on the verge of innovation [4]. In the next five years, the bio-based chemicals sector may achieve double-digit annual growth.

### **Space exploration**

Our knowledge of deep space will also broaden our scope. After a long delay, this year the long-awaited launch of the **James Watt Space Telescope** [5] will be seen. Its giant mirror, will tell us more about the history of the universe. Mars will be the nexus for space exploration in coming years. NASA's **Perseverance** rover will also touch to look for signs life in a dried-out crater lake. The latter mission will also deploy a small helicopter — the first powered flight on the surface of another planet. Another mission from the United Arab Emirates — **El Amal** (“The Hope”), the Arab world's first interplanetary spacecraft — will enter Mars' orbit. China's **Tianwen-1** has reached Mars and send a rover to seek life and water on the surface of the Red Planet.

### **Polar research**

After Arctic sea trials to test the ice-breaking capabilities, the **RRS Sir David Attenborough** research ship (formerly known as Boaty McBoatface), made its voyage to the Antarctic. This expedition has set our understanding of the polar regions.

### **Some More trends and developments to be expected in 2022**

#### **1. Artificial Intelligence (AI) and Machine Learning**

Artificial Intelligence, continues to be one of the new technology trends and is already known for its superiority in image and speech recognition, navigation apps, Smartphone personal assistants, sharing apps etc. Artificial Intelligence (AI) is the term to describe a machine's learning, logic, reasoning, perception and creativity which were once considered

unique to humans but now replicated by technology and use in every industry [6]. AI will be used further to help demand for services like hospitals, about resource utilization, detect the changing patterns of customer behavior, driving revenues and enhancing personalized experiences. The AI market will grow to a \$190 billion industry by 2025. New jobs will be created in development, programming, testing, support and maintenance, to name a few. AI offers the highest salaries today ranging from over \$1,25,000 to \$145,000 per year.

Machine Learning is also being used in all kinds of industries and creating demand for skilled professionals. Forrester predicts AI, ML, and automation will create 9 percent new jobs like robot monitoring professionals, data scientists, automation specialists, and content curators by 2025.

## **2. Robotic Process Automation (RPA)**

Robotic Process Automation, or RPA, is another technology that is automating jobs. It is the use of software to automate business processes such as interpreting applications, processing transactions, dealing with data, and even replying to emails. Many companies turned to RPA as a digital transformation hack. It's faster and cheaper than a complete platform overhaul, and it reduces dependence on human workers for high-volume, menial tasks. RPA cuts costs and distances people [7]. But estimates say that RPA automation will threaten the livelihood of 230 million knowledge workers. RPA is also creating new jobs where 60 percent occupations can be partially automated. RPA has career opportunities like developer, project manager, business analyst, solution architect and consultant.

## **3. Edge Computing**

This new technology of cloud computing AWS (Amazon Web Services), Microsoft Azure and Google Cloud Platform has been dominating the market. But they have realized the shortcomings of cloud computing in some cases. Edge computing [8] has solved some problems to bypass the failure caused by cloud computing and it can be used to process time-sensitive data in remote locations with limited or no connectivity and can act like mini data centers. By 2022, the global edge computing market is expected to reach \$6.72 billion. This new technology trend will create various jobs like Cloud Reliability Engineer, Cloud Infrastructure Engineer, Cloud Architect and Security Architect, DevOps Cloud Engineer.

## **4. Quantum Computing**

The quantum computing has been involved in preventing the spread of the coronavirus, and to develop potential vaccines, as it has ability to query, monitor, analyze and act on data. Another field is applications in banking and finance, to manage credit risk, for high-frequency trading and fraud detection. Quantum computers are much faster than regular computers eg. Splunk, Honeywell, Microsoft, AWS, Google are involved in making innovations in the field of Quantum Computing. The revenues for the global quantum computing market are projected to surpass \$2.5 billion by 2029.

## **5. Virtual Reality and Augmented Reality**

Virtual Reality (VR) and Augmented Reality (AR), and Extended Reality (ER) are the exceptional technology trends [9]. VR immerses the user in an environment while AR enhances their environment. This technology has been used for gaming, training U.S. Navy, Army and Coast Guard ship captains. In 2022, these technologies will integrate into our lives. AR and VR have large potential in training, entertainment, education, marketing, and even

rehabilitation after an injury. The global AR and VR market is expected to grow to \$209.2 billion by 2022.

## **6. Blockchain**

Many people link blockchain technology to crypto currencies such as Bitcoin, but blockchain also offers security [10]. It is the data you can only add to, not take away from, or change. One cannot change the previous blocks so it makes so secure. In addition, no one entity can take control of the data and you don't need a trusted third-party to oversee or validate transactions. Several industries are implementing the use of blockchain technology and thus have a demand for skilled professionals. The average yearly salary of a blockchain developer is 469K provided he has hands-on experience of programming languages, flat and relational databases, data structures, web app development, and networking.

## **7. Internet of Things (IoT)**

Another promising new technology trend is Internet of Things (IoT). Hence, IoT is the future, and has helped devices, home appliances, cars to be connected to the Internet. We have been benefitting from IoT as consumers. We can lock our doors remotely if we forget to when we leave for work and preheat our ovens on our way home from work, The IoT can enable better safety, efficiency and decision making for businesses as data is collected and analyzed. It can speed up medical care; improve customer service, and many other benefits which we have not even imagined. We are in the beginning stages of this technology but forecasts suggest that by 2030 around 50 billion of these IoT devices will be in used around the world [11], creating a massive web of interconnected devices from smart phones to kitchen appliances. The global spending on IoT may reach 1.1 trillion U.S. dollars in 2022. New technologies such as 5G are expected to drive market growth in the coming years. To be expert in IoT, one has to learn about Information security, AI and machine learning fundamentals, networking, hardware interfacing, data analytics, automation, understanding of embedded systems, and must have device and design knowledge.

## **8. 5G Technology**

The next technology trend that follows the IoT is 5G. The 3G and 4G technologies have helped us to browse on the internet, 5G services will revolutionize our lives by advanced technologies like AR and VR, gaming services like Google Stadia, NVidia GeForce Now [12]. It is also expected to be used in factories, HD cameras that help improve safety and traffic management, smart grid control. Telecom companies like Verizon, Tmobile, Apple, Nokia Corp, Qual Commare now working on creating 5G applications. 5G Networks will cover 40% of the world by 2024, handling 25% of all mobile traffic data making it an emerging technology trend you must watch out for, and also save a spot in.

## **9. Cyber Security**

Cyber security may not be an emerging technology, but as threats are constantly new, the hackers who are trying to access data illegally will continue to find ways from these security measures. To enhance more security a new technology is being used and cybersecurity will remain a trending technology. The number of cybersecurity jobs is growing three times faster than other tech jobs. By 2025, 60% of organizations will use cybersecurity risk to determine third-party transactions. It offers six-figure incomes, and roles can range from Ethical Hacker, Malware Analyst, Security Engineer, and Chief Security

Officer offering a promising career path for someone who wants to get into and stick with this evergreen trending technology.

### **DISCUSSIONS**

New trends in science are the combination of several disciplines that aims to get accurate insights from a bunch of data develop the technology, and algorithm to solve the complicated problems analytically. Today, data science plays a massive role in our life, and researchers realize how it is essential. Numerous research studies on data science have been published in recent years, but each focus on specific issues, such as data science and its impact on business, manufacturing, academia, and healthcare. Although technologies are emerging and evolving all around us, all these technology trends offer promising career potential now with a bright future. Most of these trending technologies are inviting skilled professionals. The time is right to choose one and get trained at the early stages to position the success now and in the future. This article will present a roadmap of new trends to benefit the readers to know about this field and realize how it is essential in several areas. In addition, it clarifies the mechanism of how data science work and what are the capabilities of the data scientist to be able to work in this field. It also shows the trends and future work of newer trends in data science.

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## CHAPTER-42

### ARTIFICIAL INTELLIGENCE IN BIOREMEDIATION- A REVIEW

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**Abstract:**

*Reducing pollution, protecting, and recycling raw materials are important socio-culture concerns. Minimization and reduction remain attractive approaches as valuable means of limiting pollutants. However, there are collaborative, energetic, and insecure features related with these processes that make them difficult to manage and control. Mytilus galloprovincialis (MG) is a rich source of Trace element (TE) as it develops close to industrial failures, is polluted with high levels of TE, and behaves like a biomarker of environmental contamination. Artificial intelligence (AI) is an efficient technique to deal with these difficulties. This review shows the ongoing advances in AI-based technologies for managing and controlling contamination minimization and reduction processes. Specifically, expert system, fuzzy process control system, and neural networks are accentuated and are proven to be the most frequently employed ways to deal with accomplishing process control. The results not only provide an overview of the current progress of the field of study but also provide research perspectives for more effective environmental process control, among other things, through AI-supported measures. It covers some difficult areas to enhance your research efforts, such as data availability and reliability, methodological validity, and system complexity.*

**KEYWORDS:** *Bioremediation, Artificial intelligence, Neural networks, Fuzzy logic.*

#### **1. INTRODUCTION:**

The term “bioremediation” refers to the reduction, degradation, detoxification, and mineralization of pollutants via biological mechanisms [1]. The objective of bioremediation is to transform the pollutants into less injurious substances using microorganisms and biomasses. Bioremediation technologies are grouped into in situ and ex-situ, depending on several factors such as source and concentration of contaminants, site characteristics and type, and cost-saving [2]. The bioremediation process undertakes a high degree of nonlinearity concerning physical, chemical, and biological reactions. In addition, bioremediation is controlled by several factors such as medium pH, temperature, aeration rate, agitation speed, and substrate to inoculum ratio [3]. Hence, there should be a significant effort exerted for developing adequate modeling methods that can address the performance of bioremediation. The term “modeling” is used to narrate a particular system using mathematical language that involves a set of factors, variables, and equations [4]. The designed models should be able to simulate, predict, and control the behavior of the system under study with appropriate accuracy. Modeling the bioremediation process is a necessary procedure for reactor design and performance prediction [5]. The bioremediation process lacks process information and can be approached through either a white-box model (also

known as a deterministic model, a physics-based model, or a knowledge-based model) or a black-box model [6]. In the white box system, process variables are converted into several formulas. However, this type of model requires all the information and many assumptions needed to improve the accuracy of the forecast [7]. The black box model is used to provide a good description of the system in case of inadequate knowledge of the process. Artificial intelligence, defined as a black-box model, can be used to predict non-linear and complex systems. Multivariate analysis is another reliable black-box modeling technique that can be used as a statistical tool for isolation, monitoring, and evaluation [8]. Other modeling techniques, such as hybrid and stochastic grey box systems, have been used in bioremediation studies to determine microbial activity. To develop a reliable model, you need to follow a series of steps. The procedure is as follows:

- (a) Problem identification
- (b) Model selection
- (c) Data collection and preparation
- (d) Model calibration and parameters estimation
- (e) Model validation
- (f) Testing and scenario evaluations. [9]

Calibrating the model is an important step used to find a reliable description of a particular dataset. During calibration, model parameters are adjusted to improve fit accuracy. The parameters used as initial conditions are described in the literature [10]. The validation process compares the measurements that were not used for calibration to the model output to obtain a reliable model. Model deficiencies can result from a variety of sources, including input and output data, system physical characteristics and configurations, operating conditions, and model structure [11]. Wastewater, hydrocarbons, dyes, pesticides, chlorine compounds, and heavy metals can produce some dangerous pollutants. Groundwater is one of the most important drinking water sources on the planet. However, over the last few decades, this important water resource has been threatened by many anthropogenic organic compounds introduced by human activity. The presence of these anthropogenic organic compounds in the aquifer is a serious health risk. Over the last few decades, a variety of physical, chemical, and biological techniques have been developed to purify petroleum-contaminated aquifers. Among these restoration techniques, in-situ bioremediation, which stimulates native microorganisms in the aquifer to break down existing petroleum pollution, seeks the most cost-effective results in organically contaminated areas. Often combined with other repair techniques. When performing in situ bioremediation of petroleum hydrocarbon-contaminated aquatic layers, the main issues are the supply of appropriate electron acceptors (such as oxygen), the bioavailability of the substrate (such as catabolic capacity, etc., the process of in situ bioremediation). Includes complex ones). Uncertain relationships between biomass, pollutants, nutrients, and proper management measures. The primary goal of the community, industry, and the government is to implement comprehensive remediation procedures to remove pollution and ensure environmental and economic efficiency. Control systems (based on artificial intelligence (AI)) are key technologies to achieve this goal. AI-based control systems are widely used in industrial processes. The meaning of each rule-based variable can be changed according to predetermined conditions. Simulation studies



have shown that this controller can support simple, comprehensive rule-based changes and simplifications [13].

## **2. NEW TRENDS IN BIOREMEDIATION:**

The present growth and development of modern societies are sustained by the stability of climatic factors. Global warming, polar ice meltdown, reduction of biodiversity, and extinctions of important wildlife species are common influencers in global climate change. Our environment is not only wasted but also destroyed by human activities [14]. Bioremediation is one of the ways to restore our environment from overwhelming damage. Besides, bioremediation is an eco-friendly approach within which microbial enzyme is employed to metabolize the contaminants as a nutrient for microbes [15]. For example, bioremediation by enzyme engineering can improve the function of microbial enzymes employing directed evolution, rational and semi-rational approaches. However, engineering enzymes in the data-assisted synthetic biology landscape could speedup the hunt for the “super-enzyme” from an environmental viewpoint. However, as this is a new frontier to the scientific literature body, only a handful of the kindest efforts are available at present [14].

### **1. SCIENTIFIC APPROACH:**

#### **1. DIRECTED EVOLUTION OF ENZYMES:**

Enzymes are biotic catalysts that can ease the most of reactions that occur in biotic systems. They are fundamental to sustain in life, and without them, these reactions would hold off on useful timescales [16]. Enzyme remodify by “directed evolution” was found in the year 1997. For example, directed evolution is accomplished in improving different kinds of biological catalyst, viz., Staphylococcal nuclease (100- fold), an efficient RNA polymerase, a Cre recombinase, a new enzyme work by synthetic transformation, or enzymes with industrial values [14]. It has also been used extensively to produce new variants of cytochrome P450 enzymes. These enzymes are able to make an exceptional variety of chemistry and are potential in particularly fetching targets because they can introduce functionality at previously unactivated positions [16].

#### **2. SYSTEM/SYNTHETIC BIOLOGY AND DATA-ASSISTED ENZYMEENGINEERING:**

Different information driven work processes have been started its alternative library and was enabled to design for the engineering of Machine learning-assisted biological catalytic engineering for example, various enzyme properties for enhancing biotic catalytic activity, specificity, enantioselectivity, and thermal stability [17]. Many approaches were attempted for developing recombinant microbes for discharging into the polluted site as a method of biological repair of organic pollutants and heavy metals during 1980s and 1990s [15]. Synthetic biology offers these possibilities for redesigning the chemical composition of biomolecules. It can also modify the natural DNA polymerase to catalyze a new type of genetic material called xenonucleic acid (XNA). Also, the industry in the field synthetic biology are the growing areas in the bioeconomy and include a wide range of enzyme applications (Figure 1) [14]. Many changes are needed to develop the best microorganisms for bioremediation that can benefit from the increased likelihood of synthesizing the entire genome for desirable biotechnology applications, including environmental catalysis. While the size of the bacterial genome is a viable option in the synthesis of DNA molecules, it is

also true that as the increasingly complex set of genes is put together, it becomes more difficult to achieve the desired results. For bioremediation, which extensively modifies the genetic composition of a microbial cell, the System-biology approaches to bioremediation changes must be persistent with cell survival and show in the context of the desired biological niche [15].

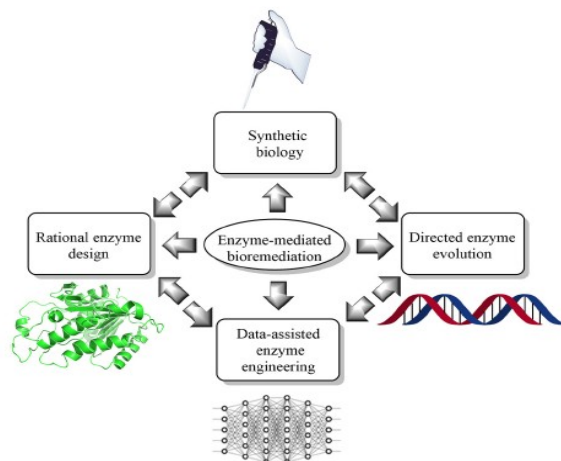


Figure1: Current state-of-the-art trends and technologies for enzyme-mediated bioremediation,

### 2.1.3 SOIL AND GROUNDWATER POLLUTION BY PAH:

Contamination from natural just as inorganic sources is a lighted issue in a few regions of the planet. Polycyclic Aromatic hydrocarbons (PAHs) are a gathering of natural contaminants that are plentiful in raw petroleum defiled regions. PAHs have various aromatic ring compounds and are ever-present in all principle parts of the climate, i.e., air, water, and soil [18]. These PAH's physiochemical and toxic properties elevate a significant concern over their impact on soil and groundwater pollutants [18]. Aromatic ring hydroxylating dioxygenase (ARHD) could be a key enzyme for this sort of the purpose of contamination, composed of an iron-sulfur flavoprotein and an iron-sulfur ferredoxin monetary unit. The advantage of this enzyme is that it can catalyzethe biodegradation of multiple PAH species and initiate 44 aromatic compounds [14].

### 2.2 MICROBES ASSISTED PHYTOREMEDIATION:

The collaboration of plants and microbes is to beproposed as a useful approach to bioremediation for all problems that can be caused by PAH'scontamination [18]. Phytoremediation in fusion with microbes goes about with the selected compounds and improve the rehabilitation process. Many researchers in this field have done extensive work with potential field applications [14]. In bioremediation process, genetic engineering techniques are employed for developing genetically modified microbes,yet they arefirmly controlledbecause of the different environmental hazards related to these microbes.In recent times, some of the more advanced technologies in bioremediation developed by scientists are genetic engineering, cultivation of recombinant microorganisms,cells from animals and plants,metabolic technology,nano-biotechnology, protein engineering,bio-separation and bioreactortechnologies [14]. These techniques reflect the outlook regarding refurbishment, at the same time, much research is needed to enforce thesecutting edge and alluring advances at the field level [19].

**2.3APPLICATION OF NANOTECHNOLOGY IN BIOREMEDIATION:**

Nanotechnology is one of the arising parts of science which draws in light of a legitimate concern for analysts engaged with changed subjects because of its size and compelling outcomes towards normal issues. By controlling molecule size down to the nanoscale, it incorporates an assortment of uses, including molecule plan, portrayal, assembling, and applications. Nanoworld is by all accounts an alluring and promising way to deal with filtering dirtied conditions [20]. As it was introduced earlier, several nanomaterials employed for the bioremediation of polluted environments, and removal of many pollutants/toxins under various situations is being practiced till now. Various nanomaterials were examined to deduce their capacity in cutting down pollution and with the assistance of microorganisms, contaminations can be taken out. For additional particularity, different criteria can be utilized, for example:

- |                                   |                        |
|-----------------------------------|------------------------|
| (a) Nano iron and its derivatives | (b) Dendrimers         |
| (c) Carbon-based NMs              | (d) Single-enzyme NPs  |
| (e) Designed polymeric            | (f) Biogenic uraninite |
| (g) Metals apart from iron        |                        |

The choice style of nanomaterial would depend on the character of the contaminant [21].

**3. OVERVIEW OF AI-BASED TECHNOLOGIES FOR ENVIRONMENTAL PROCESS CONTROL:**

Using AI to control atmosphere processes consists of several sub-processes that require management or automation. Several tiers can solve management and control difficulties in a pollution mitigation plant, for example. The minimum level contains equipment that monitors, records, and manipulates process variables. Devices are often linked to control structures that can implement control methods. The next stage is the observer's PC, that is linked to the control system with the help of communication network. Some of the main control activity like databases are overseen by the observer's PC. The observing host PC can be linked to the whole world as well as company's network [22]. In general, AI is the use of computers to emulate the processes of human thinking and decision-making. There are numerous methods to operate artificial intelligence and process control and administration of expert systems [23]. These features are most achieved by utilizing the features on the host PC, including computer instructions and Maintenance, configuration, facility arranging and improvement, scheduling, alert administration, and administrator choice help are only a couple of the administrations accessible. By expressing knowledge-based competence, expert systems may simulate human problem-solving. A knowledge database, an inference engine, and working memory are the three fundamental components of expert systems [24]. Facts and heuristics pertaining to the application domain are stored in the knowledge base. The inference engine searches the knowledge base for relevant rules and applies that rules to solve the problem. Memory is a storehouse for putting away new data that is produced when the derivation motor quests and chooses rules. Notwithstanding the three parts, master frameworks ordinarily incorporate different parts like UIs and depiction gadgets. Fuzzy logic was created as an option in contrast to traditional or parallel logic in the field of uses from modern interaction control to buyer products, aviation, and biotechnology. The role of fuzzy logic in various applications is to bridge the slit between Symbolic processing and numerical calculations to develop good rule-based voice control strategies [25]. To fill this slit, fuzzy

logic has widened the scope of control engineering to include what was previously out of scope when strictly binary logic was applied. Therefore, fuzzy logic forms the foundation for the execution of control strategies in the "broad sense" to enable decision-making or higher levels of control. The main difference between "fuzzy logic" and "expert systems" is the use of languages instead of numeric factors and the utilization of fuzzy conditions rather than careful articulations. Rules containing phonetic and off base information can be utilized as a valuable instrument for pondering troublesome interaction the executives and control circumstances. Neural organizations are a PC worldview demonstrated on the human cerebrum. Three significant likenesses to cerebrum work are the capacity to bar significant information from bigger datasets of insignificant data, the capacity to gain for a fact, and speculation from past experience to anticipate new results [23]. Artificial neural networks (ANN) models consist of input-output relationships that simulate human mental processes. This pattern is gaining popularity for two main reasons. Using very large scale integrated hardware, a comparatively cheaper, large-scale parallel processing with faster problem-solving capabilities can build a neural network. They can also learn various tasks and adjust to different tasks by selecting numerical "weights" [26]. For applications in the process business, both master frameworks and fuzzy logic attempt to reproduce the considering processes at least one experts in a specific region, while neural organizations copy the tissues of the human mind and their reasoning components. Master frameworks can make a critical commitment to the course of phonetically communicating information with a bunch of determinable in the event that principles. Fuzzy logic is utilized in the process business to control processes that are basically non-direct and multivariable, while neural organizations assist us with understanding the significance of our information. At whatever point you need information, you can utilize neural organizations to extricate interesting connections from your information [22].

#### **4. NEURAL NETWORKS:**

Some researchers have been dealing with displaying different natural cycles to help further interaction control research. Models are a useful design tool when you can predict reaction conditions and kinetics [27]. Accuracy of the simulation can be affected due to loss of relevant information by simplification of assumptions related to modelling. Neural network technology is an alternative to mitigate such defects. One of the fastest growing area in artificial intelligence is neural computing. Neural and digital computers have two major variations. Neural networks can solve problems much faster than serial digital computers because of their massively parallel hardware. Neural networks possess the potential to "learn." The most common neural network algorithm used is backward propagation. It is an example of an imaging neural network that approximates the function  $y=f(x)$  in sample  $x$ .  $y$  couple [28]. The point sources of the overall task was determined by the trained networks due their ability to recognize the most possible emanation boundaries of obscure sources. When noisy or ambiguous data was given neural networks were capable of tackling the issue. Nonetheless, it couldn't adjust to information other than the approval range of the chosen test set. Most of the neural networks used are multi-layer feed forward types, and these applications implement 3 main control techniques.

i. Neural networks for model-prognostic control:

The utilization of the neural organization for model prescient control is the most broadly utilized control innovation. In this plan, the regulator decides the variable profile that improves open-circle execution at explicit time stretches. The motivation behind the regulator is to limit future yield deviations from the set qualities, considering the limit conditions and the control grouping needed to accomplish the objective.

ii. Neural networks for counter-model-based techniques:

The two methodologies that neural organizations use in their backwards model-based systems are immediate opposite control and inner model control (IMC). In direct converse control innovation, the regulator is carried out as a neural organization model and runs in corresponding with the controlled framework. The regulator needs to figure out how to give esteems that relate to control boundaries. A more powerful and stable technique is the non-direct IMC strategy.

iii. Neural networks in adaptive control technology:

Neural networks also be used in traditional flexible control structures for random dynamic systems. These traditional adaptation methods can be either direct adaptation or indirect adaptation schemes [30].

Internet-based applications also contain neural control processes. Most of them use multi-layer feedforward networks with sigmoid or exaggerated implementation work. The above methods are primarily intended for small-scaled lab devices only. Process control applications can incorporate neural networks into their controls using direct or indirect control methods. In the direct technique, the neural network is prepared on the noticed info and yield information of the system, so the neural organization models the backwards elements of the system. The subsequent neural network model can be employed as a feedforward regulator. In the indirect technique, the neural network is prepared on the info and yield information of the active system, so the neural organization model addresses the forward elements of the system [29].

## **1. ARTIFICIAL NEURAL NETWORKS:**

Artificial neural networks (ANNs), like the nervous system of the human brain, are intelligent methods of advanced computing that quantitatively analyze information through learning and training (Figure 2) [31,32]. ANN is made up of many interconnected nodes, also called neurons, and is organized in layers that act as a processing system that can be used to solve special problems. The input layer receives the experimental data and sends the results to the final layer via a continuous hidden layer. Neurons in one layer are fully connected to neurons in the next layer by weights and biases [33]. The activation function is also used to transfer results between successive layers. During training, the weights and distortions are adjusted until the mean squared error (MSE) between the simulated output and the actual result is minimized [34]. After network training, some of the data is used in the validation and testing process to prevent over-fitting of the data and determine the level of stability of the trained network [1]. These methods lead to a high level of prediction accuracy even if the ANN receives noisy and / or incorrect input data [35].

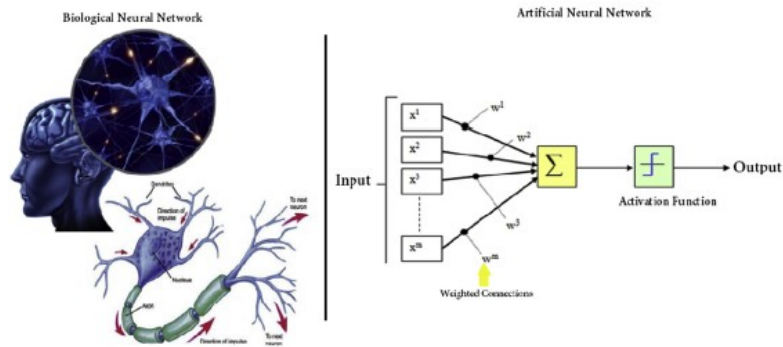


Figure2: Similarity between brain and artificial neural network

It has recently been replaced by Multiple Regression (MLR) in the development of predictive simulations of soil pollutants [36]. The main improvement in ANN is that the model is instructed to understand the non-linear and complex relationships between input and output arrangements and does not limit input or output space. Comparing the ANN and MLR models, we find that the ANN model is more accurate, has a higher correlation coefficient, and can perform inverse calculations [37]. Applications of ANN in situ bioremediation system, with the upcoming components:

1. Extraction well
2. Injection well
3. Filtration system
4. Nutrient addition system
5. Electronic Receptor Addition System
6. Monitoring well
7. Control system

The factors that are necessary for developing the process-control system are:

- Contamination level
- Required final contamination level
- Estimating Electoreceptor and Nutrient Requirements
- Groundwater extraction and injection flow rates
- Electron acceptor system
- Electronic Receptor Formulation System and Delivery System
- Refurbishment Period [38]

ANN is extensively used as a machine learning tool for water resource problems [39]. The ANN approach is used to determine aquifer limits from aquifer test data. The neural network was trained to acknowledge the normalized settlement pattern as input data and the corresponding aquifer limits as output data (Figure 3). Similarly, they are used to estimate aquifer limits from pumping test data for large boreholes [40]. We trained ANNs using draft and borehole diameter data as inputs and transmission and storage factors as output data. It was found that the results obtained by the proposed ANN method are often compared with the results obtained by the conventional curve fitting method. Similarly, recently, ANN has been notably used by many researchers for training and testing data [43].

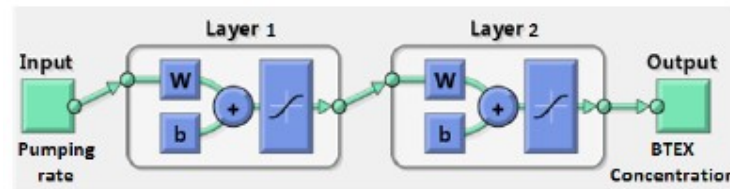


Figure3: Artificial Neural Network Configuration

## 2. Back Propagation Neural Networks:

Back propagation also known as Back engendering is trademark since it permits you to distinguish non-straight connections and utilize equal handling. This calculation has been applied to an assortment of genuine issues and has demonstrated effective in the capacity to show nonlinear connections. The conventional model is identical to a two-layer direct back spread organization, so it has more limited functionality than a full backpropagation algorithm. Momentum terms may apply to the modified gradient rule to avoid vibrations in the convergence process [29]. Neural network applications that use backpropagation are in alternative kind of neural network called radial basis functions [45]. The system implements an adaptive BPNN controller for an ongoing wastewater treatment process. To control the chemical oxygen demand (COD), hydrogen peroxide (H<sub>2</sub>O<sub>2</sub>) and ferrous chloride pump speeds are adjusted by the adaptive BPNN controller [46]. Suspended particles are settles by adding anion resin and solidified after the completion oxidation process. An internet based control framework was utilized to give the base measure of reagents to accomplish the necessary COD [48]. The exactness of the model is significantly affected by the decision of expansion of the fundamental capacity. This permits the organization to adjust to development. Backpropagation methods using the Levenberg-Marquardt (trainlm) calculation are generally utilized for network preparing. In this technique, the preparation cycle goes through two stages: in the forward stage the outer sign is sent from the info layer to the yield layer, and in the opposite stage there is a mistake between the anticipated and noticed qualities in the yield layer [47]. Sent will be spread in reverse to change the loads and bends. These cycles are rehashed persistently until the base MSE is reached. The second algorithm was proposed with a different strategy, as using a single extension may not be optimal for a particular feature. Uses a neural network representation with multiple resolutions. This structure uses a cluster of wavelets with different expansions. This allows the estimator to take into account some dominant frequencies of the estimated function. This multi-resolution network proposes two sets of matching rules that provide greater stability. The first adjusts the multi-resolution network coefficients based on the individual errors at each layer of the organization, and the second changes utilizing the general forecast mistake [49]. The last methodology enjoys the benefit that the Lyapunov soundness examination doesn't need hard limit conditions for the coefficients. In any case, utilizing complete mistakes additionally dials back the compromise cycle contrasted with the compromise interaction dependent on blunders in every level. Neural organizations that incorporate back proliferation, cycle, or spiral premise works regularly lead to long preparing times, neighborhood minima, and an absence of self-improvement capacities in web-based applications [29].

### 3. BIOPLUME III

Pollution is a serious problem in the 21st century. Rapid consumption of fuel, fertilizer, etc. slowly and gradually pollutes our environment. It can affect human health, so we need to get rid of pollutants from our environment. Contamination can be in the air, in the water, or in the soil. This study focused on groundwater remediation using in-situ bioremediation [50]. In general, petroleum hydrocarbon compounds are relatively easy to biodegrade and have a well-developed biological repair process. In-situ bioremediation is a common restoration technique used to treat petroleum-contaminated sites by promoting the growth and reproduction of natural microorganisms that promote the biodegradation of organic matter in the underground environment. This petroleum pollution can enter the groundwater environment from a variety of sources, including accidental chemical spills, toxic waste dumps, and improperly designed chemical transport and storage facilities [51]. Benzene, toluene, ethylbenzene, and xylene (BTEX) are some of the chemical contaminants naturally found in petroleum products such as crude oil, diesel fuels, and gasoline. BTEX is often found together at the time of contamination. After being released into the environment, BTEX dissolves in water and can be mixed into groundwater by osmosis and osmosis. Humans and animals can ingest these chemicals by spilling gasoline on their skin or immersing them in contaminated water [52]. Groundwater remediation by in-situ bioremediation can be modeled with BIOPLUME III, MODFLOW, etc. When a numerical groundwater simulator such as MODFLOW or BIOPLUME III is combined with an optimization model, the solved transport equation and the numerical simulator of the biological decomposition process are repeatedly called by the optimization algorithm to see if the pollutant concentration meets the requirements. You need to confirm. Using such simulators with direct optimization tools add complexity between objective functions, constraints, and decision variables. Therefore, indirect search is needed to reduce complexity. has been proposed that attempts to replace complex simulators with structurally simple and responsive proxy simulators (Figure 4). Such simulators make search problems much easier and faster. Researchers have utilized example acknowledgment instruments, for example, ANN, SVM, and GP as intermediary test systems for recreation models, alongside enhancement calculations like mimicked strengthening, hereditary calculations, and molecule swarm improvement calculations, and so on their outcomes show that utilizing an intermediary test system can essentially lessen computational time [53].

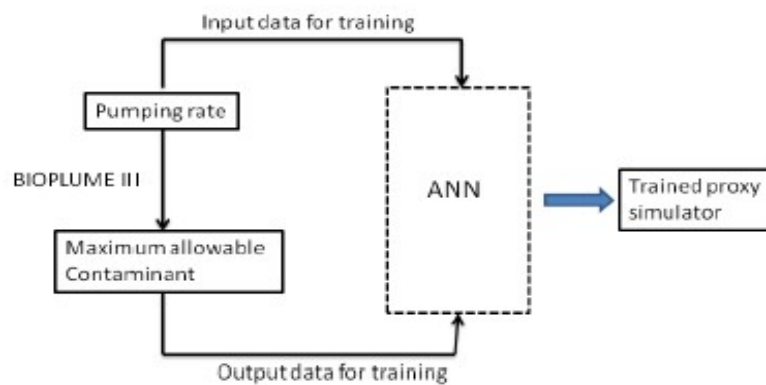


Figure4: ANN as the proxy simulator



## 5. FUZZY PROCESS CONTROLLER:

During the 1960s, Professor Lotfi Zadeh made a fuzzy set hypothesis to numerically address vulnerability and fogginess. This hypothesis reflects human thinking in its utilization of assessed data and vulnerability to start choices. It has additionally been utilized to foster formalized instruments to manage the exact characteristic for a wide assortment of issues [54]. Fuzzy set hypotheses and fuzzy logic extend the general binary logic to address the inaccuracy and variability of human experience. Fuzzy set hypotheses have different methods and many areas [38]. The crucial quality of fuzzy set hypothesis is that the gathering of individuals into classifications that don't have forcefully laid out limits. Fuzzy sets are useful at whatever point we must report uncertainty, dubiousness, and feeling in unique or numerical models of experimental peculiarities (Figure 5) [55].

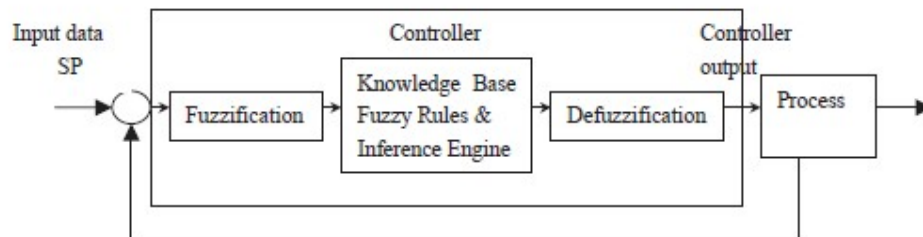


Figure5: General structure of fuzzy control system

### 1. EXTENSION PRINCIPLE IN FUZZY SET THEORY:

One of the foremost key note of fuzzy pure mathematics that may be accustomed to inferring smart mathematical ideas to fuzzy sets is that the extension principle. It directs an elementary downside in moving ridge construction applicable to digital processing [55]. Once the number interprets of a refined operate don't kind a structure for his or her closed linear span however kind solely a stargazer family that the development of relative moving ridge frames with fascinating spatial localization can't be allotted as within the classical multiresolution hypothesis of Mallat and Meyer. Expansion Principles offer the AN economical style set up for stable moving ridge filters with symmetry and unsymmetry properties and little support, as a result of refinable functions may be designed to own at random sleek Fourier changes, reduced help, and pleasant balance properties inside the spatial space. Excluding Extension Principles alternative style plans that don't need the integral convert of a refinable operation to create a frame are projected [56].

### 2. FUZZY PROCESS CONTROL OF BIOREMEDIATION PROCESS:

The research system consists of a large number of decision variables represented by a large number of rule sets. The guidelines are coordinated in a two-level progressive fuzzy control structure. First-level factors are identified with media states, for example, average porousness coefficient, penetrability, soil molecule size circulation, tuft size, isotropic, heterogeneity, and pH. The second level of the progressive system regulator has two branches. The fundamental construction of these two branch lines is comparable, yet the control activity contrasts relying upon the qualities of the area got from the results. In a branch, a simple site category determined by first-level rules (Figure 6). Branch II describes the categories of complex

locations. The subsequent level control system is partitioned into 3 parts with moderately free information restrictions and various control rules (Figure 7). Contains 3 layers:

Layer 1: Controller for extraction well siphoning rate.

Layer 2: Controller for electron acceptor and supplement alteration.

Layer 3: Controller for infusion well siphoning rate [38].

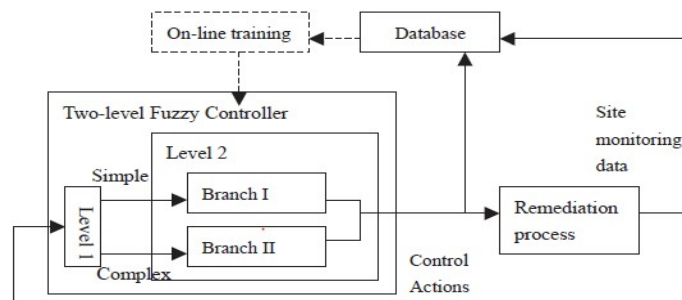


Fig. 5. Schematic of the closed-loop system.

Figure6: Closed-loop system

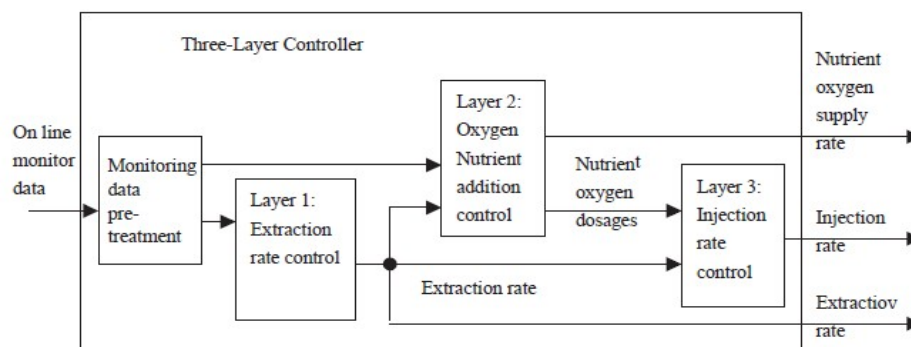


Fig. 6. Structure of the three-layer process control system.

Figure7: Three-layer process control system

### 3. APPLICATION OF FUZZY SET THEORY:

The applications of this theory can be found, for example, in artificial intelligence, computer science, medicine, control engineering, decision theory, expert systems, logic, management science, operations research, pattern recognition, and robotics. Mathematical developments have advanced to a very high standard and are still forthcoming today. During nearly the past two decades, the fundamental idea of fuzzy set theory has been briefed mathematically [55]. The theory of this field has greatly matured. Vitally there has been considerable development of the applications of fuzzy set theory to a wide range of problems [58].

### 6. BIOMARKERS FOR BIOREMEDIATION:

In recent times AI technologies are used to develop biomarker for the indication of pollution, and other biotechnological procedures. Biomarkers are portrayed by uncommon request in their sub-atomic designs (Figure 8). The majority of the first concern of biomarkers possess in their property to be quantifiable utilizing distinctive biochemical and atomic methodologies [59]. The utilization of natural markers or biomarkers at the sub-atomic and cell level is inspected as the main defender apparatuses for touchy impacts in ecological quality or biotechnological processes appraisal. Thus, a biomarker can be depicted as the proportion of the impact of poisons and additionally the host reaction in biochemical, cell,

and sub-atomic terms. The purpose of biomarkers is to distinguish between these biochemical changes and predict the onset of antagonism for well-being, and use an assessment of these early changes to make long-term changes at the population and local levels. The purpose is to prevent the impact. Many minor components (TE) happen normally and can achieve huge capacities in people to keep up with great wellbeing. Like that, a portion of the biomarkers are as per the following [60]:

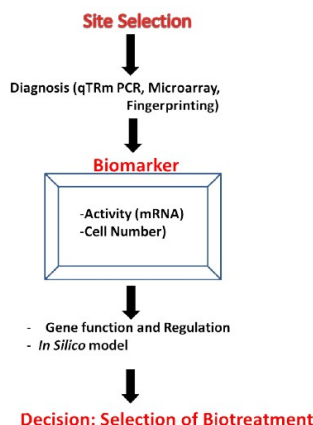


Figure8: Development of biomarkers based on biochemical-molecular

### 1. MYTILUS GALLOPROVINCIALIS:

*Mytilus galloprovincialis* is a repository of TE, but as they are grown rigorously near the industrial water outfalls, they become polluted. As there is a mutual interaction among the TE in MG there is a connection among the TE. These connections lead to a dynamic steadiness and in situ bioremediation of a specific TE involves complex and uncertain connections among other contaminants and it is difficult to understand their interactions [60].

### 2. CYTOCHROME P4501A INDUCTION:

The need for environmental markers for pollutants like dioxins, furans, polychlorinated biphenyls, and polycyclic aromatic hydrocarbons (PAH) freshly have found in the cytochrome P4501A (CYP1A), a sub-family plays a major role in the biotransformation of these pollutants [16]. The induction of CYP1A is activated via the cytosolic Ah (aryl hydrocarbon) receptor due to the showing of organisms to such pollutants [61]. The selection of fish having CYP1A based on exposure to specific classes of organic pollutants is used as a biomarker for pollution monitoring [59].

### 6.3 METALLOTHIONEINS:

MTs are cytosolic proteins of low relative atomic mass and well off in amino acids. Its omnipresent episode has been related with the inactivation of poisonous metal particles by restricting them to sulfur molecules of the peptide cysteine buildups [59]. MT-like proteins have been conveyed in many vertebrates including numerous types of fish [61]. The presence and job of metallothioneins (MTs) permitting mollusk bivalve species to gather and endure high measures of weighty metals depend on their metal taking care of by metallothioneins [59].

### 6.4 SIGNIFICANCE OF BIOMARKERS:

- Biomarkers can influence the development or gathering of electrons.
- Biomarkers are compelling early admonition signals for undesirable natural impacts.

- Biomarkers can show natural impacts, yet synthetic based observing frameworks can't [59].
- Recognizes both known and obscure pollutants.
- Sublethal and early discovery of impacts gives notice signs to restorative or preventive moves to be made [61].
- Biomarkers are more powerful at uncovering the general poisonousness of perplexing blends.
- Biomarkers are economical.
- Biomarkers have different degrees of specificity [59].

## **7. APPLICATIONS OF ARTIFICIAL INTELLIGENCE IN OTHER FIELDS:**

Computerized reasoning was made with the sole point of looking like or in any event, outflanking human personalities. It can't be overlooked that AI is being utilized surrounding us particularly in the fields of medication, advanced mechanics, law, stock exchanging, and so on Computerized reasoning as neural organizations and master frameworks has a few applications in practically all human exercises. These blends of high accuracy and low calculation time make AI a state of the art innovation. A portion of the classes on utilizations of Artificial Intelligence are as per the following [16]:

### **1. ARTIFICIAL INTELLIGENCE IN COVID-19 PANDEMIC:**

In these global health emergencies, the medical industry is looking for new technologies to detect and control the spread of the COVID 19 pandemic. AI is one of the technologies that makes it easy to track and identify high-risk inpatients and helps control this infection in real time. You can also predict corporate risk by properly analyzing previous patient data. AI helps fight this virus through population screening, medical assistance, alerts, and infection control suggestions. The following figure shows a common approach for AI and non-AI based applications [16].

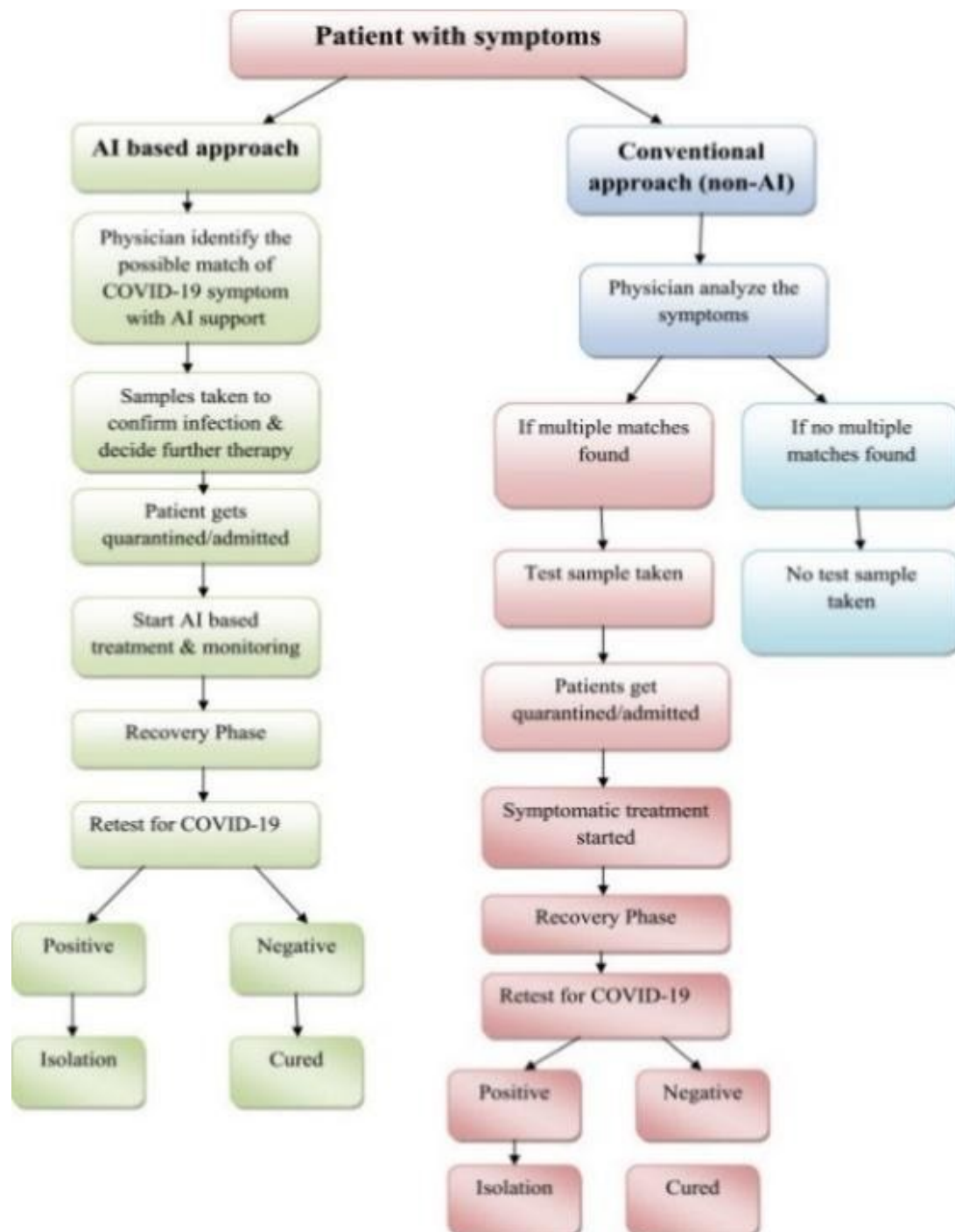


Figure 9: AI based approaches for COVID-19

## 2. GAMING INDUSTRY:

Playing games has always been considered a popular part of human life. Especially since the 21st century, the development of artificial intelligence and computational intelligence has led to rapid changes in various types of video games, both online and offline. Since its introduction in the 1950s, AI has been introduced into the play of video games, and games

have been widely used as a useful measure of signs of AI progress [63]. One of the most popular AI applications in the gaming industry is the use of chess (Figure 10). AI is also used on the Microsoft Xbox 360 to detect body movements. However, it is still in its infancy and further advances are being made for use in everyday applications [62].

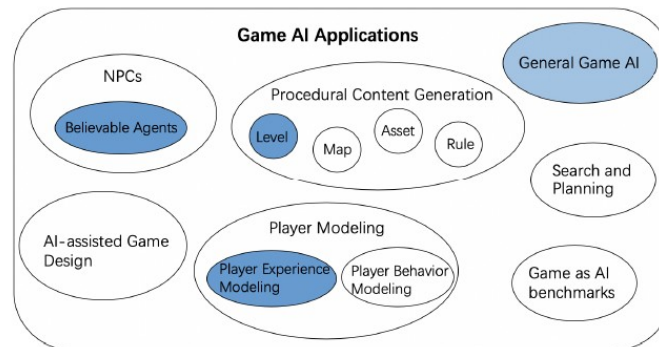


Figure 10: Application of Artificial Intelligence in Gaming

### 3. WEATHER FORECASTING:

Weather forecasts (especially precipitation) are one of the major and demanding operational tasks of meteorological services around the world. In addition, it is a complex procedure that involves several disciplines. Researchers in this area have divided the weather forecasting method into two major branches related to numerical modeling and scientific processing of meteorological data [64]. The most common method of precipitation prediction are numerical and statistical methods. Neural networks are currently used to predict weather conditions [62]. Alternatively, precipitation time series are treated as conditional and statistical methods commonly used for long-term prediction of precipitation are used. However, it is very difficult to use these statistical models to pre-determine the same or outstanding skills as all monsoons at the Indian level at the district level [64].

### 4. DATA MINING (OR) KNOWLEDGE LEVEL (EXPERT SYSTEM):

Master Systems are machines that are told to have absolute mastery in explicit spaces of interest. They are additionally evolved to tackle issues in specialty regions. These frameworks utilize factual examination and information mining to work out these issues by deriving the arrangements through an intelligent progression of yes-no inquiries. A specialist framework is comprised of 3 sections:

- Knowledge base-It stores all the data, rules, information, and connections that are required by a specialist framework to have absolute information in its space of interest.
- Inference motor- It looks for data from the information base on being shed an inquiry, investigations it, and reacts with an answer or idea in the manner a human master would.
- Rule-It resembles relying upon the explanation that connects the given conditions to the last arrangement [62].

In any information mining model, the crude information is the principal required info. In this part, we will gather and construct a dataset about environment related characteristics. The dataset may incorporate characteristics identified with the cascade, temperature, and so forth that will be met by environment and water area specialists. In the subsequent stage, to construct an environment and climate classifier, we will teach the model utilizing real

information. In the wake of preparing and assessing the model, it will be utilized for future estimating [65].

## **5. HEAVY INDUSTRIES:**

Industry 4.0 otherwise called the fourth unrest is another time wherein the business will manage advances like Robotics, Automation, Artificial Intelligence (AI), and numerous 6 more. The reception of robots in Industries overall is 7 on the skyscraper [66]. Artificial Intelligence robots have become exceptionally normal in weighty enterprises and are utilized in positions that are generally viewed as perilous for people. These robots can likewise expand proficiency, as they needn't bother with any break while working in this way improving of the intrinsic drawback of sluggishness in people [62].

## **8. RESEARCH PERSPECTIVES ON AI-AIDED PROCESS CONTROL FOR ENVIRONMENTAL SYSTEMS:**

Process control of environmental systems is an interdisciplinary concept that includes many factors with multi-component, multi-phase, multi-period, multi-reference characteristics. The goal is to achieve the desired environmental goals with minimal capital and operating costs. However, the ability to achieve this goal can be hampered by many of the limitations, constraints, and complexity that exist in emission control systems. Faced with these challenges, it is essential to identify effective approaches to achieving the desired goals. A detailed perspective is given below [49].

### **1. DATA AVAILABILITY:**

Lack of information on sources of pollution measures to minimize and mitigate them, and records of water quality and economic data often hinder the development of effective models or expert systems. In many cases, information about scaled fieldwork was insufficient to support AI-powered process modeling and control research. Therefore, researchers need to process the required data available to a limited extent, limiting the adoption of comprehensive analytical, integrated modeling, global optimization, and systematic presentation techniques. Improving data availability and quality has been suggested to be a prerequisite for useful process control research.

### **2. DATA RELIABILITY:**

Many environmental data are exposed to significant problems such as uncertainty, inconsistencies, and errors. Reliability and anxiety are the exact opposite. That is, high reliability usually corresponds to low uncertainty, but in reality, it is difficult to achieve both high reliability and low uncertainty at the same time. However, it is well known that high uncertainty means that the system is complex and unreliable, which can be worse than it would be without the data. To improve reliability and safety, it is desirable to validate the input data and then work hard before using it for AI-related research.

### **3. VALIDITY OF METHODOLOGY:**

Various technologies have been developed to support the mission of managing and controlling environmental processes. However, there are reliability and compatibility issues. In process simulations and forecasts, most neural network models can only reflect some of the influential factors due to the presence of uncertainty and the lack of quantified economic information. These affect the accuracy of the forecast. Therefore, when using neural network models to support decision-making, researchers are steadfast in gaining as much insight as

process managers do before claiming to do smarter and better work. It is necessary to carry out on-site work.

#### **4. SYSTEM COMPLEXITY:**

Natural methodologies normally have intuitive, dynamic, and uncertain elements. Intricacies exist in the willpower of gadget boundaries, a reflected picture of intuitive connections, strategy for AI-based modeling processes, understanding of studies yields, and execution of supported works [49].

Regularly, to measure and control such system, a few rearrangements have been done through method of method for embracing, for example straight, persistent, static, or potentially deterministic suspicions. These disentanglements are difficulties to the risks of gadget slip-ups and disappointments. Instructions to effectively reflect those intricacies without taking those risks has been a hard inquiry through the modelling researchers. The usage of any unmarried approach to remedy such issues will be challenged to dangers. Therefore, every time possible, its miles endorsed to apply an integration of multiple devices to address specific components of those complexities. This paper has offered a few hybrid processes that comprise various techniques. These may be greater flexibly followed to deal with greater open-ended investigations. For example, the ANN approach may be incorporated with fuzzy common sense to address greater complicated issues. The cap potential of fuzzy common sense to version qualitative understanding and constitute understanding in a logical shape can catch up on the weak spot in ANN of embedding understanding implicitly of their structural parameters. Applications of the hybrid processes to pollutants minimization and mitigation strategies might be a fruitful course of destiny studies [67].

#### **CONCLUSION:**

The prediction of pollutants for bioremediation process is accomplished using white-box and black-box models. ANN and fuzzy systems were likewise implemented for modeling, improving, controlling, and simulating bioremediation processes. It was developed as an intermediary test system instead of BIOPLUME III. This review showed that Levenberg-Marquardt backpropagation method can be applied as developing intermediary test system with superior execution. Issues of ecological pollution have caused extreme weight on the human culture and financial advancement. Pollution abatement through minimization and mitigation measures is a significant methodology for tending to such a test, where efficient process control would be fundamental for acquiring preferred efficiencies. AI technologies have been found to dominate in environmental conditions that are perplexing, non-linear, and uncertain. It is anticipated that many biomarkers should be recognized to verify the sentinel outcomes in order to more accurately determine the nature of the toxicological effects or mitigation measures. Artificial intelligence can be classified by problem solving or task types. Most of AI applications for pollution control and minimization fall into four wide task groups:

- i. process control
- ii. prediction or estimation
- iii. process modeling or simulation
- iv. process management that involves some comparison and evaluation of cost–benefit ratios of different solution scenarios.



The fuzzy link analysis techniques used to fuzzy unique input information are generated from fuzzy principles derived from pollution level considerations. This type of fuzzifying favorably combines input digital data with fuzzy rule-based etymological principles created as a function of information obtained from area specialists. The development of fuzzy controllers that integrate fuzzy set hypotheses and process control technologies for process control in complex ecosystems with uncertain boundaries is a breakthrough and promising method. This method allows fuzzy control of the system. This is almost indistinguishable from the actual situation. In future work, for example, neural fuzzy or other self-associating devices and genetic algorithms will be integrated into this network and become self-usable. Another component that upgrades the control framework is information logging, or a process module that records horrific situations such as floods, environmental changes, and new sources of pollution.

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## CHAPTER-43

### THE OPPRESSED PSYCHE OF FEMALE PROTAGONISTS IN SHASHI DESHPANDE'S NOVEL THAT LONG SILENCE

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#### **Abstract:**

*Shashi Deshpande is the foremost Indian woman writer of the twentieth century, always attempting to elevate issues concerning bourgeoisie Indian women from a pristine perspective. She has brought life to life vividly through literature. She rises to prominence among feminist writers in the latter half of the twentieth century. Shashi Deshpande's storey bounce works illuminate numerous psychoanalytic theories developed by Sigmund Freud and others, opening up new perspectives on the psychic realities of modern Indian women's lives. Her subterranean insight into the complexities of the human psyche has enabled her to profoundly submerge into the concealed impulses, faded memories, suppressed desires, and half-forgotten dreams of her female characters that lie submerged under the ocean of the 'unconscious.'*

*Deshpande's novels repeatedly deal with the dilemmas and sufferings of women in middle-class families, reflecting a realistic depiction of modern-day middle-class family life. Shashi Deshpande is one of the few Indian English writers to attempt the impossible: psychologically mapping the unconscious modes of thinking in individuals that direct their own action, movement, style, behaviour, mannerisms, and outlook on life. This paper attempts to elucidate the oppressed silence in the lives of Indian women and how they attempt to overcome it. This research also seeks to understand what causes a woman to remain silent and what eventually forces her to speak up.*

**KeyWords:** *Oppressed psyche, female, psychic conflict, divided self, sense of incompleteness*

#### **Introduction**

Shashi Deshpande's main concern in her works is the reality and truth of Indian women's lives, and this paper is primarily concerned with Deshpande's feminist concern shown in her work *That Long Silence*. *That Long Silence* is a work that expresses primarily the predicament, dissatisfaction, and disenchantment of women in this male-dominated society. It depicts the anguish and trauma endured by women in a patriarchal society. In this novel, Shashi Deshpande's feminism in the Indian sense emerges from the dilemma of a female trapped between opposing identities: tradition and modernity, family and profession, culture and nature.

Shashi Deshpande depicts the extreme dilemma of female she faces in Indian Male Dominated Society – her failure of identity in Indian Patriarchal and Traditional Bound Society – throughout the character demarcation of Jaya in *That Long Silence*. Despite being an English medium educated girl with a literary savour, Jaya, the novel's womanly protagonist, is thought to live a traditional passive life, such as: "Sita following her husband

into exile, Savitri, dogging death to reclaim her husband, Draupadi stoically sharing her husband's travails... (That Long Silence, 11)

Shashi Deshpande has depicted the internal and on the outside actions of her characters in their moments of passionate psychic struggle by taking a sign from the essential doctrine of psychoanalysis. Talented with a intense inspection and a inquisitive psychological insight coupled with delicate critical powers, she is flawlessly matched to undertake the hard-hitting task of enlightening the inmost dark indentation of the unconscious section of the psyche of her female protagonists.

### **Discussion**

It has been Deshpande's greatest endeavour in her extremely much-admired novel *That Long Silence*, to put across into light those shadowy areas of its heroine, Jaya's psyche that lie covered underneath the enormous chasm of her unconscious. Here the writer has traversed the deepest recesses of her (Jaya's) psyche where most of her discontented wishes lie suppressed. In this novel, Jaya has been depicted as a frenzied character that moves too far away from the ordinary course of life and at the end either lost her way into the dark and dreary labyrinths of psychosis or fall a prey to terrible neurosis. Her yearning for self-assertion runs counteract to the conventional norms of society that force her to suppress her approach and desires. This suppression when protracted causes an unfathomable sense of suffering, aggravation and stress which serves as a preface to her consequent neurotic reactions. Her diverse neurotic reactions such as restlessness, delirium, visions, nightmares, occurrence of split personality and hallucinating fits etc. bring forth the keen cerebral disturbance she is forced to undergo in her attempt to carve out her abnormal womanly personality.

Throughout the early on years of her conjugal life, Jaya face up to a long-drawn psychic clash between the instinctual strain of her id and the balanced practical demands of her ego. Due to absolute excitable mismatching among herself and her husband, she fails to accept affirmative retort or positive reception for her artistic sensibility from her husband. Moreover, being a man of conformist beliefs, he does not agree to her autonomy of accomplishment, thought or expression and thereby coerces her into observing entire peace in his presence.

On some occasions, this callous oppression of her instinctual demand makes her ego experience a harrowing variance. For instance, when her partner stalwartly objects to her writing a story which he thinks has a profound autobiographical connotation, she feels intensely wounded by his misconception. Her id for a moment goads her ego to respond piercingly to it. But the extremely after that instant, the coherent vigor of the ego discards this irrational instinctual order of the id and prefers to tolerate the distress of repression and oppression for the sake of preserving the contentment of her married life :

I had relinquished them instead, all those stories that had been taking shape in me because I had been scared – scared of hurting Mohan, scared of jeopardising the only career I had, my marriage. (That Long Silence, 144)

Jaya's husband, Mohan's being there forever strangles her; she not at all intended what she spoke, and she never spoke what she destined. Following each sexual interaction, he would attempt to act as a gentleman and would ask "Did I hurt you?", and she would say "No." This petite prescribed conversation was never planned at showing genuine apprehension or expressing genuine love. When Jaya said "No" she not at all meant it. Although she was not

harmed bodily, there were numerous other ways in which she was injured: she was hurt as this bodily relation was not a outcome of an exciting relationship; she was harmed as she in no way sought it yet could never say no to it.

Mohan was a person who could never revere Jaya because for him ladies were always inferior in men's lives. He gave treatment to her as a sheer possession and trodden her two times: he trodden the woman in her and then the author in her. He all the time tried to use her the way she was advantageous for his own household, societal and professional positions. Jaya recollects the tale of the stupid crow and the shrewd sparrow which she had often heard as a youngster. She does not reiterate the story to her children because of the apprehension that they might store up it in their subconscious.

The novel is an exploration of the silence of the modern Indian housewife and her oppressed position. Jaya manages to remain silent and suppress her feelings for a long period of time as she gives main concern to her role of a good wife than a good author. Though a good story writer, Jaya hardly ever writes novels or stories in magazines because of Mohan. Mohan felt that Jaya's initial story portrays their life and he rebukes Jaya for writing that story. On Jaya's written story Mohan thinks that the story is the imitation of their individual experience and feels that it is an infamy to expose their own life in front of the people around them. That's why he gives advice to Jaya for stopping to write stories. As an alternative, he suggests her to write a story that admires others and that does not imitate their life, and the result of this is a story called 'Seeta'. Mohan manages to arrange that and persuade her to write the story that rejoices everyone. Jaya feels humiliated when others came to ask her the story she writes. Even though Jaya feels low down in front of others, that's why she make a decision to stay numb and obey Mohan also though she loves to write stories. Here Jaya oppresses her psyche by keeping herself unexpressed.

The bullock cart, according to Jaya, is a metaphor for the husband and wife relationship. According to Jaya, in order to live a peaceful life, one must balance and accommodate with the other. Mohan did with another individual in his career when his job was in jeopardy due to unlawful dealings. It defends his actions by claiming that he did it for his family's sake. Even in this situation, Jaya remains silent. Even in this situation, she never blames or challenges Mohan. Because of Mohan's health, Jaya and the kids have decided to leave their comfortable lives and return to Bombay, where Jaya grew up.

The novel depicts the society's blatant gender inequality and discrimination. This gender discrimination is evident in Ramu Kaka's words when he shows Jaya the family tree. Jaya discovered only the names of boys in that family tree, and her name was missing. Our women, according to our society, must be subordinate to the male member of the family. Even though women hold the highest positions in society, it has long been customary for them to obey the orders of elders or others at home prior to marriage, as well as the words of her husband after the wedding. Jaya is clear that, while her brother loves her, he has more important things to worry about. According to her family tree, she is well aware of her priorities. Despite her talent, she does not want to cause a problem by speaking against her husband's wishes. By obeying her husband's words, she demonstrates her subordination to him. From small things like going to the movies to making changes around the house, she remains silent by not saying anything negative about him. When her husband discusses issues



with her, she never makes any suggestions. For all of these reasons, she decides that remaining silent is the only way for her to survive within the family.

The study explores that in order to be heard and gain an equal position in society, women must express their feelings freely and powerfully. Instead of uncritically accepting the roles assigned to them by the male-oriented culture, they must break their long restrained silence and free their psyche of all apprehensions in order to demonstrate that, like men, they, too, exist as autonomous individuals with their own identities.

Jaya remains silent in response to whatever Mohan asks; this silence irritates Mohan to no end. Mohan believes Jaya is mocking him because he has lost his job. There are many arguments about Jaya's attitudes after she arrives at the home in Bombay, and these attitudes create a negative image of her in the eyes of Mohan. Because of these changes and her fear of the current situation, she is being haunted by many mistakes she made in the past. The daily routines, both inner and outer silence, begin to haunt her in her dreams. She can't always tell the difference between reality and her thoughts. Jaya remains silent throughout Mohan's question, which Mohan misinterprets as her negligence.

Jaya was even denied the right to express herself in writing. Mohan determines the content and context of Jaya's inventiveness. He always maltreats Jaya's affectionate passion, whether on purpose or unintentionally. Jaya's dissatisfaction, which is more private and completely sexual, manifests itself in silence. Her internal conflict and chaos are so intense that she is unable to express them and must remain silent in order to avoid being bothered and disappointed by the society's rejection of her actions. Tradition distorts her adolescent longings into rigid rules and rituals. The couple hardly ever discussed love and sex with one another. For them, making love to Mohan was a quiet and tongue-tied affair. Mohan used to admire her, and the hostility would follow into:

“God, how terrible it was to know a man so well. I could time it, almost to the second, the whole process of our lovemaking, from the first devious wooing to the moment he turned away from me, offering me his hunched back.” (That Long Silence, 85).

Shashi Deshpande wants to advocate for women's rights and educate them about their rights in society. Her novels' strongest point is her depiction of a woman's inner world. Her female protagonists struggle to find their own voice and are constantly trying to define themselves.

That Long Silence is not an invasion of silence, but rather a silent close association with the exploited self straining for expression, for a tone to be heard. Deshpande has revealed Jaya's consciousness, which is half-heartedly receptive and submissively secluded, through close-ups and flashbacks. Jaya astonishingly believes that she is a failure as a wife and that she has a self-destructive outlook. She became agitated or strange as a result of the constant pressure on her nerves caused by pain and suffocation. She finds nothing meaningful in this life if it revolves solely around her husband's desires. Because of the constant disagreement and immense pressure of self delusion and living reality, she appears to be a split personality. Separation, distress and disturbance in marriage for a while cause dissolution and make women noncompliant.

Shashi Deshpande, like Virginia Woolf, reveals her characters' subconscious and unconscious psyches. Her female protagonists are sensitive, self-aware, brilliant, and inventive. They rebel against the traditional parental family and flee the suffocating atmosphere of the narrow-

minded society. Deshpande depicts the world of today's women. She has also portrayed the new Indian woman and her dilemmas, as well as her efforts to understand herself and preserve her identity as a wife, mother, and, above all, as a human being in the male-dominated Indian society. Her protagonists speak out against the role models of daughter, sister, mother, and wife, refusing to be the object of age-old patriarchal society's cultural and social oppressions. It is also true that they are intelligent and career-oriented middle-class women of a different era, but they feel suffocated and trapped in male-defined life codes. Jaya is portrayed as a woman who is exploited by patriarchy at all levels of her life, including familial, social, and finally private. She feels oppressed because her husband, who represents the male-dominated society, ignores and suppresses her personal feelings and emotions. On the surface, she appears to be content, but she is not. Emotional involvement is more important to her than sexual relationship. The husband and wife share a home and are experiencing emptiness, loneliness, and alienation. Saru's communication with her husband is clearly lacking, and this has resulted in the erosion of proper understanding between wife and husband.

### **Conclusion:**

Shashi Deshpande, a phenomenal Indian English writer, exposes togetherness and separation, presence and absence, reappearance and reunion; in detail everything related to the psychodynamics of relationships in her novels. In the novel, the protagonist, Jaya, is aware of the societal discrimination and unfairness directed at her and fights against the repressive and uneven nature of social norms and regulations that limit their potential and survival as a wife. In this novel, silence introduces not only a lack of communication but also a breakdown of indication to signify. Shashi Deshpande's female protagonists become trapped in the roles assigned to them by society, attempt to assert their individuality, are sensitive to changing times and situations, and revolt against traditions in their quest for freedom. They succeed in achieving self-identity and independence, and they choose their life partners based on their perceived need to lead a family life. Standing at a crossroads of tradition, they seek change, but within cultural norms so that they can live with dignity and self-respect. As a result, they are caught between a traditional upbringing and a modern-day desire for freedom.

Deshpande's novel uplifted the condition of women and raised her voice for treating women as human beings, and this work of literature suggests considering women on an emotional level rather than preventing her from collapsing because hers is a great sacrifice. It has been demonstrated that emotional suppression is more detrimental to women's marital satisfaction. Shashi Deshpande has succinctly described the plight of Indian women who suffer and die in silence. In society, their silent sacrifice goes unnoticed. Deshpande wishes for all women to break the long silence in order to survive in this male-dominated world. That Long Silence is a typical all-Indian English novel. Jaya creates a new image of the Indian woman who aspires to stand on her own two feet. The traditional suffering of women in patriarchal society must be broken with assertiveness, courage, and determination in order for them to achieve self-fulfillment and lead a peaceful life on their march to progress.

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## CHAPTER-44

### PHARMACOLOGICAL ACTIVITIES OF URTICA DIOICA: A CRITICAL REVIEW

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#### **Abstract:**

*Urtica dioica is a phenomenal herb; known for its 'stinging leaves', has been used in traditional medicines to treat numerous diseases for over centuries worldwide. The leaves and stem extracts possess anti-allergic, anti-inflammatory, anti-microbial, and antidiabetic as well as antioxidant properties. U. dioica is an entryway for new and successful compounds which may be valuable for drugs discovery and ultimately, a breakthrough in pharmaceutical industry. The aim of this paper is to portray U. dioica as a potential medicinal plant by focusing on its pharmacological activities and current knowledge of the various phytoconstituents present in the plant.*

**Keywords:** *Urtica dioica, stinging nettle, nociceptive, antihepatotoxicity, normoglycemic.*

#### **INTRODUCTION**

As indicated by the WHO, >80% of the total populace depends on customary medication for their essential medical services needs (Dar S.A. et al; 2013). Medicinal plants are storehouse of biologically active compounds which remain highly unexplored until today. One such plant is *Urtica dioica*, which has long history of utilization in conventional medicine since ancient times.

The genus name *Urtica* comes from the Latin word 'urere', signifying 'to consume,' on account of the stinging hairs. The species name *dioica* signifies 'two houses' on the grounds that the plant typically contains either male or female flowers (Ahmed M. and Parasuraman S., 2014). *U. dioica* is native to Europe, however now found worldwide as a weedy perennial plant growing in temperate conditions. It belongs to family *Urticaceae* (The Nettle family). The leaves are dark green above and paler underneath, elongated, inverse, cordate at the base and finely toothed (De Vico G. et al; 2018). The locals call it as "Bichu Booti" and even consume it as a nutritious food 'Saag' in the Himalayas. The plant could appear to be the detestable twin of the non-toxic, gentle smelling *Ajwain*. The *Bichu Booti* is dreadful to just the individuals who attempt to contact it. A basic brush through the plant could land oneself with skin loaded with rashes, a consuming or stinging sensation, hence the name "Stinging Nettle". The leaves and stems of the plant have many empty stinging hairs called trichomes, which carry on like hypodermic needles, infusing histamine, acetylcholine, and serotonin that produce a stinging sensation upon contact (De Vico G. et al; 2018).

Stinging nettle has been utilized for many years to treat ailment, joint inflammation, gout, dermatitis, iron deficiency, urinary tract contaminations, kidney stones, and hay fever and beginning phases of a developed prostate called BPH (Ahmed M. and Parasuraman S., 2014). For the most part, the leaves and hidden reinforcements of plant are used inside as a blood purifier, diuretic, skin aggravation, nephritis, haematuria, jaundice and menorrhagia. The

plant explains particular classes of regular blends of helpful importance including phytosterols, saponins, flavanoids, tannins, sterols, oily acids, carotenoids, chlorophylls, proteins, amino acids additionally, nutrients (Halder S. and Sharma A., 2017).

The leaf extract of nettle plant was one of the home grown cures by which the in vitro and in vivo studies have complemented one another (Dhouibi R. et al; 2020).

### **PHYTOCHEMISTRY**

The seeds and leaves of *U. dioica* contain nutrients, minerals and amino acids. Substance interest in *U. dioica* was triggered by reports that they cause bothering when interacts with skin. The leaves of *U. dioica* have sharp spines with stinging hairs that contains histamine and formic corrosive, which causes irritation. Many mixtures were already isolated by various scientists on *U. dioica*, viz., phytocsterols, lignans, carotenoids, unsaturated fats, phenolics and so on (Ahmed and Parasuraman S., 2014).

The familiar phytochemical compounds from *U. dioica* are flavonoids, tannins, unstable compounds and sterols. Three smooth-muscle triggering substances including acetylcholine, histamine, and 5-hydroxytryptamine (5-HT) have been distinguished in *U. dioica*. Formic acid, histamine and serotonin are additionally distinguished as the aggravation instigating specialists in the stinging hairs of *U. dioica*. Carvacrol (38.2%), carvone (9.0%), naphthalene (8.9%), (E)-anethol (4.7%), hexa-hydrofarnesyl  $\text{CH}_3\text{)}_2\text{CO}$  (3.0%), (E)-geranyl acetone (2.9%), (E) -  $\beta$ -ionone (2.8%) and phytol (2.7%) are classified as the principle parts of *U. dioica* essential oil. Rhizomes of *U. dioica* contain other natural dynamic mixtures, for example, scopoletin, sterols, unsaturated fats, polysaccharides and isolectins. These rhizomes contain a perplexing combination of agglutinin isolectins which in contrast most certainly regarding their amino acid constituents (Asgarpanah J. and Mohajerani R., 2012).

Studies on phytochemical assessments showed the leaves and rhizomes are wealthy in phenolic compounds. It was represented to contain particular cinnamic destructive auxiliaries, coumarins and homovanillyl alcohol, a piece of the phenolic blends were considered in derivatized shape using trimethyl silyl esters in GC-MS examination (Halder S. and Sharma A., 2017).

Phytochemical literature on *U. dioica* gave a feeble sign for the presence of alkaloids as there are no reports revealed elsewhere (Ahmed M. and Parasuraman S., 2014).

HPLC examination of concentrates produced extreme yields of chlorophyll a, chlorophyll b, beta carotene, and lutein. The report proved the presence of abundant chlorophyll and beta carotene in the leaves of *U. dioica* (Ahmed M. and Parasuraman S., 2014).

### **ANTIHEPATOTOXICITY ACTIVITY**

Since *U. dioica* is known to be powerful antioxidant, separating free radicals, it is relied upon to be defensive in hepatic ischemia-reperfusion injury of rodents. *U. dioica* displayed liver assurance impact by expanding the action of paraoxonase, arylesterase, and liver tissue catalase movement. Treatment with *U. dioica* diminished oxidative pressure bringing about a lessening in ceruloplasmin levels. Likewise, it was tracked down that treatment with *U. dioica* diminished the lipid hydroperoxide movement, showing that the cancer prevention impact of *U. dioica* had forestalled the development of an oxidant specialist, for example, LOOH i.e., Lipid hydroperoxides with formation of hepatic ischemia-reperfusion (Asgarpanah J. and Mohajerani R., 2012).

### **HYPO AND HYPERTENSIVE EFFECT**

In numerous ethnobotanical reports, the aerial part of *U. dioica* is perceived as a characteristic solution for hypertension. A diuretic impact prompted by an obscure guideline from the aqueous concentrate of aerial parts has been reported (Testai L. et al; 2002).

Testai L. et al; 2002 assessed a potential direct cardiovascular activity of the plant and did research on its system of activity. In aortic arrangements with unblemished and useful endothelial layer, pre-contracted with KCl 20 mM or norepinephrine 3  $\mu$ M, the unrefined watery and methanolic concentrates of the plant roots, just as sanitized parts inspired a vasodilator activity. The vasodilator movement was absent in aortic rings without endothelial layer. In aortic rings with flawless endothelial layer, the vasorelaxing impact was nullified by L-N-Nitro arginine methyl ester (L-NAME), a NO-biosynthesis inhibitor (nitric oxide inhibitor), and ODQ [1H-[1,2,4] oxadiazolo[4,3-a]quinoxalin-1-one], a guanylate cyclase inhibitor. Besides, potassium channel blockers (TEA, 4-aminopyridine, quinine, however not glybenclamide) threatened the vasodilator activity of the cleansed portion (fraction one) of *U. dioica*. A similar portion created a stamped reduction of inotropic action, in spontaneously beating atria of guinea-pig, and a checked, however transient, hypotensive action on the pulse of anesthetized rodents. It was presumed that *U. dioica* could create hypotensive reactions, through a vasorelaxing impact intervened by the arrival of endothelial nitric oxide and the kickoff of potassium channels, and through a negative inotropic activity.

*U. dioica* has customarily been utilized in the control of cardiovascular issues particularly hypertension (Dhouibi R. et al; 2020). In another review, it was found that the *U. dioica* roots remove hypotensive impacts by decline of vascular strain (Ahmed M. and Parasuraman S., 2014).

### **ANTI-INFLAMMATORY ACTIVITIES**

Concentrates of nettle leaf are utilized as mitigating solutions for rheumatoid joint pain (Dhouibi R. et al; 2020). *U. dioica* sting appears to be a protected treatment for outer muscle torment. It contains serotonin and histamine that are associated with the course of feeling influencing levels of nerve development figure which turn builds actuation of nociceptive (type of pain caused by damage to body tissue) agony neurons. The component of this plant analgesia could be hyper feeling of the tactile nociceptors causing a TENS-like impact (Transcutaneous Electrical Nerve Stimulation), a substance P exhaustion impact like that of capsaicin, a needle therapy like impact or a counter aggravation impact. A stinging rash may likewise have a powerful impact on patients' intellectual impression of agony. Leaf extracts from *U. dioica* acts by exchanging Type 1 helper T-cells (Th1) inferred reactions to Type 2 helper T-cells (Th2); thus it might hinder provocative occasions of rheumatoid joint pain. The mix of 50 mg *U. dioica* with 50 mg diclofenac showed comparable viability to 200 mg diclofenac and this is significant for patients experiencing non-steroidal calming drugs (Asgarpanah J. and Mohajerani R., 2012).

The discoveries by Dar S.A. et al; 2013 showed that the leaves of *U. dioica* are an intriguing wellspring of organically dynamic mixtures that might be applied for prophylaxis and treatment in people, advocating their conventional use, to treat diabetes, joint pain, and irresistible infections.

**ANTIDIABETIC ACTIVITIES**

The leaf extract of *U. dioica* has been accounted for to enhance glucose homeostasis in vivo (Dhouibi R. et al; 2020). Hydro-alcoholic concentrate of *U. dioica* has likewise shown successfulness on a few inflammatory markers in type 2 diabetic patients (Asgarpanah J. and Mohajerani R., 2012).

The in vivo study conducted by Dar S.A. et al; 2013 revealed that the greatest hypoglycemic action of the plant was seen with aqueous extract of *U. dioica* in normoglycemic (with normal blood sugar levels) rodents. This perception proposed that the mixtures answerable for the hypoglycemic movement of *U. dioica* were polar in nature; furthermore more dissolvable in water when contrasted with methanol. It was realized that in diabetes mellitus, the locales and component of pharmacological intercession in the orderly biochemical cycles are different. The major bioactive particles of aqueous extract of *U. dioica* as analyzed by HPLC–DAD investigation were hydroxycinnamic corrosive subordinates and flavonoids which may presumably have insulin like impact or trigger the pancreatic  $\beta$ -cells to deliver insulin which thus brings down the blood glucose level. Studies with various dosages (100 to 400 mg/kg bw) of the aqueous extract in streptozotocin-incited diabetic rodents showed that 300 mg/kg bw was the best dosage.

**EFFECT ON BENIGN PROSTATIC HYPERPLASIA (BPH)**

Benign prostatic hyperplasia (BPH) is the most widely recognized infection in maturing men. BPH prompts lower urinary tract symptoms (LUTS) with capacity, voiding, and post-micturition manifestations that unfavorably influence the singular's wellbeing related personal satisfaction by disrupting typical day by day exercises and sleep schedules. *U. dioica* proves to be advantageous in the treatment of BPH clinical symptoms (Men C. et al; 2016). A meta-investigation performed by Men C. et al; 2016 demonstrated that *U. dioica* to be a powerful and safe treatment for LUTS related with BPH.

In vitro investigations were led to evaluate the  $5\alpha$ -reductase inhibitory capability of this plant. Hyperplasia was instigated in rodents by subcutaneous organization of testosterone (3 mg/kg sc.) for 28 days. Concurrent organization of petrol ether and ethanolic extricates (10, 20 and 50 mg/kg po.) and disconnected  $\beta$ -sitosterol (10 and 20 mg/kg po.) was embraced. Estimation of prostate/body weight proportion, week by week pee result and serum testosterone levels, prostate-explicit antigen levels (on day 28) and histological assessments completed prompted reason that *U. dioica* can be utilized as a viable medication for the administration of BPH. These impacts are connected with two biochemical markers,  $\beta$ -sitosterol and scopoletin (Nahata and Dixit, 2002) (Asgarpanah J. and Mohajerani R. 2012).

**BIOLOGICAL ACTIVITIES OF SOME EXTRACTS OF STINGING NETTLE**

S. No.	Compounds	Source	Activities	References
1.	Ethanol Methanol Hexane, chloroform, and methanol Dichloromethane	Aerial Parts Flowers Leaves Stems and Roots	Anti-inflammatory	Namazi N. et al.;2011 Johnson T.A. et al.; 2013 Dar S.A. et al.;2013
2.	Ethyl acetate and Ethanol Chloroform	Leaves	Anti-microbial	Ghaima et al.;2013
3.	Ethanol Butanol and Ethyl acetate Methanol Diethyl ether	Aerial parts and Stems Leaves Roots Seeds	Antioxidant	Amiri Behzadi et al.;2016 Chahardeni et al.,(2009) Hudec et al.,(2007) Otlés and Yalcin (2012)
4.	Steroids, Water, Hexane and Ethanol	Roots	Antiprostatic	Wagner et al.,1994 Hirano et al.,1994
5.	Ethanol	Stems	Hematopoietic	Buchko et al.,2019
6.	Diethyl ether	Seeds	Hepatoprotective	Yener et al.;2009
7.	Hydro-alcoholic and Ethanol	Leaves	Hyperglycaemic  Hypoglycaemic	Namjou et al.,(2018)  Ahangarpour et al.,(2012)

**Table 1. Biological activity of stinging nettle (*Urtica dioica*) based on plant material (root, stem and leaf) and solvent extract (Harrison R.K. 1961)**

**CONCLUSION**

*U. dioica* have rich therapeutic worth and this plant is most ordinarily used to fix quite a bit of provocative problems. In society medication this plant was utilized for the treatment of joint pain, allergies, hay fever, etc. and this plant has shown presence of antiasthmatic, antidandruff, astringent, depurative, diuretic, galactagogue, haemostatic and hypoglycaemic exercises in pre-clinical examinations. This plant has been for some time utilized in conventional medication and food supplement by locals worldwide. Investigation of pharmacological and toxicological properties of *U. dioica* and its phytoconstituents are needed for new drugs discovery.



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## CHAPTER-45

### FEMINIST MOVEMENT IN INDO-ANGLIAN LITERATURE'

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#### **Abstract:**

*Feminism may be a movement that advocates granting identical political, social, and economic rights to ladies as those enjoyed by men. Throughout the planet, ladies are bereft of their basic socio-legal rights by a patriarchy order. Within the domain of patriarchy culture, girl may be a social construct, a web site on that masculine meanings get spoken and masculine wishes enacted. Feminism in Indian literature, as will be most typically planned may be an abundant elegant and immoderate conception that is most subtly handled underneath restricted circumstances. With advancement of your time, however, feminism has been accepted in Bharat, setting aside the patriarchy predomination to bound extent. Deed aside the activists and crusaders of the political and social state of affairs, maybe huge work of feminism is additionally accomplished through Indian literature. once the introduction of western education, considerably with the arrival of victimization in Bharat underneath nation Empire, reformist movements, promotion of women`s establishments, the liberty movement and then on, life had begun to alter another time. In post-Independence Bharat, wherever education of girls had already commenced, the new girl additionally had begun to emerge. Education had inculcated a way of individuality amongst ladies associate degreed had aroused an interest in their human rights. Today`s modern Indian English novelists are writing for the lots mistreatment the theme of feminism that not solely interests the readers however additionally affects them.*

**Keywords** - feminism, identity, sexual politics, education, society, rights, Indian English literature, womanhood new woman

#### **Introduction**

The feminist movement (also known as the women's movement, or feminism) refers to a series of Social movements and Political campaigns for reforms on women's issues created by the inequality between men and women.

#### **Definition**

**Feminism** is the belief that women should have equal rights to men. In consequence, the feminist movement fights for equal rights and opportunities for women.

**In broad definition:** it is women`s movement in 1960s to struggle for the equality of rights as social class. **In literature:** feminism is related to the ways in understanding literary works, in both production and reception

#### **Indo Anglian Literature**

Indo Anglian Literature refers to the body of labour by writers in Republic of {India Bharat Asian Country Asian nation} United Nations agency write within the West Germanic

language and whose native or co-native language may be one amongst the many languages of India. Feminism means that granting an equivalent right to girls as those enjoyed by men.

Feminism doesn't significantly concern|talk|speak|utter|mouth|verbalize|verbalise} equality and rights of girls however it's additional about compassion, respect and understanding from the male counterparts. Throughout the planet girls square measure empty their social and economic rights. Twentieth century has witnessed a growing awareness among girls concerning their wishes, sexuality, self-definition, existence and destiny. Women's efforts to hunt their independence and self-identity started a revolution everywhere the planet that was termed by analysts and critics as 'Feminism'. The modern writers square measure still attempts to supply liberation to the feminine world from the weakening socio-cultural constraints and oppressive myths of their various countries. In post-Independence India, wherever education of girls had already commenced, the new lady conjointly had begun to emerge. Education had inculcated a way of individuality amongst girls and had aroused an interest in their human rights. It absolutely was then that the feminist trend in Indian literature had appeared on the horizon and ladies came into conflict with the double standards of social law through ages and therefore the standard ethical code.

### **History "Feminist movement in Indo-Anglian Literature"**

The beginning of women's movements is often determined initial from a social movement within the nineteenth century. throughout the colonial amount women's movements in Asian nation were born out of a similar historical circumstances and social environment as earlier nineteenth century social reform movements, that angry a replacement pondering numerous social establishments, practices and social reform legislations. The women's movements philosophical and social content modified from time to time and continued into our times. The movement in its entirety are often divided into 3 distinct phases. Clinical test Social movement, national movement and social reform legislation within the colonial amount. Clinical trial Women's movements within the post-colonial amount. Phase III Women's movements in Asian nation since the Seventies. Difference between the 2 Terms: Indo Anglian and Anglo-Indian: Whereas Indo-Anglian literature is that the Indian effort in West Germanic, the Anglo-Indian literature is employed to devote the writing of Englishmen in English concerning Asian nation and Indian life. They tried to interpret Asian nation to the west. However, the presentation of Indian life is usually romantic instead of realistic. Their writings have an image wherever Asian nation could be a land of Rajas, Maharajas, God, Jugglers and Snake-charmers. Indo-Anglian literature on the opposite hand comes a lot of favourable and truthful image of Asian nation.

### **Indo-English Literature:**

The translated work of writers into West Germanic language from Indian language is that the Indo-English literature. The Indo-English literature is more divided into classical and fashionable Indo-English literature. Classical Indo-English literature needs a particular degree of interpretation and adaptation of that means, to accommodate with some latitude in translation becomes inevitable. As long as adequate editorial clarification and documentation accompanies the rendering, the translator are going to be in no danger of deceptive his reader into thinking that the rendering is literal. Fully literal translation in

any case, is not possible in literature, whether or not of ancient works or of modern; however, the degree of concreteness decreases in inverse proportion to the space in time between the initial composition and also the translation. Some allowance has additionally to be created for prevailing literary style and seruples at the time once the interpretation takes place. Similarly, some freedom could also be claimed by the interpretation of such works once he features a definite audience in mind. Fashionable Indo-English literature is that the literal translation of original. The first concern of translator, here, is that the fidelity to the initial. He's not given the liberties of the classical Indo-English literature, as a result of he's not separated in time and area from the initial author because the classical text translator is. The interpretation of poetry can continually need some creative alterations in translation however these ought to be unbroken in minimum if the interpretation is to justify itself. The literature in translation poses its own issues and has its own attractions and implications. First, there's a matter of literature translated from some Indian language into English by the author himself. Here over and over the word translation is inappropriate, for the author is beneath no obligation to stay to the sense of his original writing. For quite one reason, he takes variety of liberties once writing in English, although the theme and substance could also be taken from his add the Indian language. The foremost ill-famed example is that of the Gitanjali. English version of Gitanjali is totally different from the initial. English Gitanjali have some poems that the Bengali Gitanjali do not have, they're from alternative assortment of Tagore's poetry. There's a distinction of meanings between the poems of the 2. The work is fresh created instead of translated. This can be a sort of transcription. Such translation wherever fidelity to the initial work isn't the most concern comes between translation and creation. Tagore took liberties with the originals and rewrote them in English instead of trying a literal translation. He created occasional changes within the original. Typically, 2 or 3 original poems were combined into one. The reverse method of ripping one literary composition within the original into 2 was additionally followed. however, this can be not the purpose of main concern, the approval is there, wherever the tactic of translation followed by Tagore and also the proven fact that maybe he's the {sole} author within the world UN agency has rotated his own works into English to draw in attention of the planet to himself so on win the honour for literature.

### **Feminist-Literature.**

Women's literature is completely different from Feminist literature. Women's literature which ends up out of women's identity struggles creates new awareness in men and ladies whereas feminist literature expresses the shared experiences of women's oppression "Feminist literature highlights and condemns the inequalities and injustices within the treatment of ladies—the disadvantages women ought to bear on account of their gender". Its stress is on the ideology instead of on the literariness of the text. Feminism evolved as an opposition to structure or the dominant sexist ideology. It's customary for the much-cantered aesthetic to think about creative activity as act analogous to biological creation. So an art work is that the product of the interaction between the male creative person and therefore the external world that is considered female. A literary text during this read is that the outcome of a generative act involving the phallic pen and therefore

the virgin blank page. A lady author feels creative activity as a style of violation, leading to the destruction of the feminine body. In women's writing gender is known with gender. As a lady judges herself through her body the feminine self is usually known with the feminine body in women's literature. A lady considers her role of mother additional vital than a spouse. Whole obsessed on man within the world of his creating girl craves to possess a toddler for self-expressions as self-affirmation. Additionally, to sexual exploitation and betrayal the shortage of affection in man-woman relationship is a makeshift style of male oppression. Loveless relationships are unendurable for ladies. Kamala Das conceives of the male as beast wallowing in lust with a monstrous ego underneath that the ladies loses her identity. The sturdy want for freedom as well as the liberty to rebel forms the central strain in several of her poems. She enumerates the male felonies in her poems and builds up a structure of protest and rebellion in her poetry. When a toddler Kamala Das intimate with the bitterness of discrimination. She was a victim of patricentric prejudice. In her autobiographical book *My Book* her "father was an autocrat" (91) and her mother "vague and indifferent" (20). Her oldsters thought of her "a burden and responsibility and she or he was given in wedding to a relative once she was solely a faculty woman (82). So she was compelled to become a premature spouse and mother. Kamala Das was one amongst the foremost distinguished feminist voices within the postcolonial era. She wrote in her maternal language South Dravidian also as in English. To her South Dravidian readers, she was Madhavi Kutty and to her English patrons she was Kamala Das. On account of her in depth contribution to the poetry in our country she attained the label 'The Mother of contemporary Indian English Poetry'. She has co-jointly been likened to literary greats like poet due to the stall kind of her writing. United Nations agency write within the English language and whose native or co-native language may well be one amongst the many languages of India. It's co-jointly related to the works of members of the Indian diaspora, such as V. S. Naipaul, Kiran Desai, and Jhumpa Lahiri United Nations agency are of Indian descent. It is oftentimes cited as Indo-Anglian literature. (Indo-Anglian could be a specific term within the sole context of writing that ought to not be confused with the term Anglo-Indian). As a class, this production comes underneath the broader realm of postcolonial literature- the assembly from antecedent inhabited countries like Asian country.

Ashapura Devi- Ashapura Debi, was a prominent Indian novelist and poet in Bengali. Fountainhead of Feminism

Through the complete gamut of her literary works, the main focus is on gender bias (discrimination) and also the sexist attitude of men. Her short stories novellas still as larger novels vividly portray the emergence of representative materialistic Bengali girls – their repression, angst, growing awareness waking up of conscience and also the final revolt. Decision it revolt or revolution the manifestation provides a severe jolt to male chauvinists, effort them stunned! Ashapura's (female) protagonists spent a significant part of their day within the room preparation meals for his or her armies of families hanging out washed covering drying pickles, mango slices and bori (lentil dumplings) within the sun. Recreation or leisure comprised needlework/ embroidery, catching abreast of neighbourhood gossip that trickled in via house servant and occasional guests. Their "outside" was the roof (terrace) from wherever they might catch a glimpse of sun moon stars and clouds, a

splash of foliage. That was frowned upon by formidable mothers- relative-in-law. Ordinarily married at age eight or nine, these girls raised a bevy of off springs by the time they entered teenage! Throughout her life, Ashapura composed quite thirty novels, poetry, 10 volumes of collected works, besides children's fiction. However, it had been her powerful triplet that catapulted her to fame and glory. The 3 novels (written between 1964-1974) Pratham Protisruti, Subarnalata, and Bokul Katha depict the women's liberation from colonial to freelance Bharat.

### **Ecofeminism in Indian English Literature**

This topic seeks to stipulate the lineage of postcolonial ecofeminism in Asian nation in terms of each policy and fiction that expressly foreground ladies. I argue for a case to be designed for ladies writers, associate degreeed why they're necessary for the sector of literature and atmosphere in an age of accelerated and globalized technological development. whereas outlining ecofeminism as a field and therefore the forms it's taken in Asian nation in each policy and writing, It argue that women's relationship to the atmosphere is ambivalent, so disputing the school of thought of nature/culture and nonetheless straddling the gray area between these 2 binaries. This is often notably highlighted by ladies writing Indian fiction in English. The major Asian nation ecofeminism movements started in India at the later a part of nineteenth century. The contribution of major ecofeminism activists like Vandana Shiva, Mies and a bunch of others contributed to the movement through their works. Ecofeminism (Shiva, 1993) The Violence of revolution (1993), Women, Ecology and Survival in Asian nation (2010) and a number of others shared their views on affordable grounds of historical experiences of exploitation and domination of social organization. The impact of economic process, institution of industries by deforestation modernization et al. disjointed native traditions and culture of living. Quality of autochthonic individuals remodeled into market. Ladies became as a commercial tool and nature remodelled into money supply to the market individuals. The standard practices of the individuals reveal that Prakruti (nature) and Annapurna (Woman) aren't 2 totally different entities. They mutualist and ne'er be separated. However, the influence of manufacture, modernization and economic process created these 2 indivisible entities separated. Chipko movement, Ganga Bachao Andolan, Narmada movement and a number of caught the eye of world. Asian nation may be a land of agriculture. Introducing new technologies in agriculture disjointed formers and agriculture labour in Asian nation created them slaves to the land lords. At this juncture, ladies and nature exploited in several directions. So that they resorted democratic approach to shield themselves from the exploitation. It results in rethinking of gender, race and nature that deeply related to human and non-human relations. One of the key ladies novelists of Asian nation, Kamala Markandeya contributed her major a part of fiction with the themes of ecofeminism. Most of her works expose on East and West, Tradition and currency, Urban and rural life reflective within the shade of Economic, Social, Cultural and Political aspects. A number of of her works area unit examined here within the lightweight of Ecofeminism. "Some Inner Fury" (1952) comes 3 {different totally different / completely different} pairs of characters with different attitudes. The primary 2 area unit Kit-Premala, Mira and Richard. They dissent in their opinions and

objectives of life with totally different cultural backcloth, thanks to their love and understanding created them to be human in particular alternative hurdles. The last one is Indian national freedom struggle beneath British rule and nationalism. However, the writer handles these 3 advanced themes with the sense of humanity exhorting that the race, religion, colour and region all area unit mere before the love for humanity. Out of all the characters within the novel Mira is solely attributable with the weather of social reality tradition and complicated familial values. In "Nectar during a Sieve" (1954), Markandeya focuses on business and twenty first century technology within the pleasant rural atmosphere in Asian nation. Institution of industries and adopting machinery in agriculture forced the agricultural formers into daily wage labour notably ladies wherever they lost their land, live and natural support. The writer exposes the connection between human and nature at several places within the novel and stresses the ecofeminism concern by correlating market money approach and therefore the distinction in observe. She concludes by speech communication that each one the activities against Nature and ladies area unit the results of social organization. The novel will be taken in 2 ways in which. The primary one is that the finding all the weather of Ecofeminism within the novel and therefore the alternative one is that the social organization is that the root of ladies exploitation and destruction of nature. She additionally exhorts through the characters within the novel that the ladies alone will be the defender of the character. In "A Silence of Desire" 1956), Markandeya exposes the matter of married life in Indian society. She portrays the traditional adult female, a mother and a menage. The theme elevates the clash between confidence and cause within the lifetime of Sarojini and Danekar. Although Sarojini leads a devoted and tractable life, Danekar doubts regarding her character and suspects her. However the novel concludes by rectifying Danekar's mistakes in life and altered his opinion on ladies and nature in terms of purity and religion. Within the novel, "A few Rice" (1966), Markandeya deals with the theme of quandary of the Indian individuals created by the social and economic conditions of the Post freelance amount. The gout unskillfulness, black marketers, humiliations by the made individual's separation of joint families and a number of alternative place forth a conflict of concepts between fashionable Asian nation and standard concepts. The impoverishment, passion and troubles in life created Ravi to depart his village and settle within the urban life. Even when fifteen years of struggled life, Ravi strives for a few of rice. In spite of the many hurdles the novel stresses the hope for higher future than frustration and disappointment.

### **Women-Led Environmental Activism and Writing in India**

In India, the Chipko movement has gained painting standing and is currently cited as an extremely no-hit example of grassroots environmentalism in Asian nation. This movement is additionally key for the means within which it mobilized girls. This movement caused the thought of tree-hugging to prevent activities like deforestation, lumbering and mining. The movement originated within the Garhwal region of Uttaranchal in Uttar Pradesh, India. The state's increasing development and underdevelopment of the Garhwal region was instrumental within the conceptualization of this movement, wherever native girls were laid low with state-level selections like granting personal contractors harvest rights for the trees to manufacture cricket barmy. Because of excessive deforestation, the year 1970 saw its most devastating



flood and equally harmful landslides. In additional recent times, different girls UN agency have semiconductor diode environmental causes and movements square measure Medha Patkar, Mahasweta Devi, Arundhati Roy and C.K Janu. Medha Patkar heads the Narmada Bachao Andolan, a front consisting of social group individuals, adivasis, farmers, environmentalists and human rights activists against the Sardar Sarovar Dam being engineered across the Narmada watercourse in Gujarat, India. Mahasweta Devi, each Associate in nursing activist furthermore as a well-known feminist author, has dedicated a lot of of her policy and literature to the reason for betterment of social group individuals and their surroundings in Asian nation. Arundhati Roy, best called the booking agent lottery winner of The God of little Things, wields her wild pen for causes starting from the Narmada Bachao Andolan, to nuclear testing in Asian nation, and to the support of the separatists' demand for aazadi (freedom) in Jammu and Kashmir. The newest lady to come back underneath spotlight for fighting for Associate in nursing environmental cause is C.K Janu, as recent because the year 2003 ahead, Associate in nursing adivasi lady occupying the Muthanga forests in North Kerala. This was to protest the broken agreement between the adivasis and also the government to supply five hundred acres of land to every adivasi family. The figure of C.K Janu as Associate in nursing adivasi lady leading the cause has given the movement a dimension of subaltern identity politics additionally to social justice and ecological balance.

**Conclusion:**

English and Western science on the complete proved terribly fruitful. It developed a scientific and rational approach to life and educated Indians might shake off a lot of their conservatives and narrowness of outlook. Contact with West Germanic and literature was fruitful to the regional languages, because it junction rectifier to the expansion and development of artistic literature in these tongues. The utilization of English junction rectifier to the Indian Renaissance of the nineteenth century. Within the early decades of the century Indian look to the language with enthusiasm, and lots of of them tried their hand at written material in English. Raja Ram Mohan Rao's writings in English, the primary Indian to write down in English, brought wide influence on Keshab Chandra fractional monetary unit, Dwarka Nath Tagore and their Brahmo friends et al. the expansion of West Germanic brought the spurt of translations, variety of English classics were shortly translated into the assorted Indian languages and growth of the novel and therefore the story in regional languages was impressed. Land Classics were the models for the Indian writing in English. Bankim Chandra Chatterjee became the primary Indian author of novel in English. The Indian drama, just like the novel and therefore the story, was the results of the impact of English studies. The primary Indian play in English the Persecuted (1832) is that the gift of West Germanic. Feminism is outlined as cultural, economic and political movements that area unit targeted towards establishing legal protection and complete equality foe the ladies. There are a unit many novels in English literature of Bharat that really portrays the particular standing of the ladies in Indian Societies. However, the trendy aged girls have completed that they're equally competent just like the men and that they don't seem to be helpless in contrast to the past once men were thought of because the sole bread earners, in today's age girls too became direct cash earners of any home.

Today's up to date Indian English novelists area unit writing for the plenty victimization the theme of feminism, that not solely interests the readers however additionally affects them.

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## CHAPTER-46

MORPHOLOGY, PHYTOCHEMISTRY AND PHARMACOLOGICAL  
EFFECTS OF MYRTUS COMMUNIS L.*Nishi Sondhi<sup>1</sup>, Babita Sharma<sup>2</sup>, Priyanka<sup>3</sup>*<sup>1</sup>Assistant Professor, DAV University, Jalandhar 144012,<sup>2</sup>Head, Department of Chemistry, GBN Senior Secondary School, Sector-21D, Faridabad

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**Abstract:**

*The common Myrtle is a perennial, evergreen, multi-branched shrub or small tree with a slow to medium growth rate, which has no thorns and surface roots. This plant develops its natural population at an altitude that starts from sea level and extends up to 600-800m. The plant can reach a height of 3m in the first 5-10 years of its life and may reach up to 5m, if favorable conditions are provided.*

*M. communis L. has been used since ancient times as a spice, for medicinal purposes, as well as food preparation purposes. For long time, different parts of this herb like berries, branches, leaves and flowers has been used as a folk medicine. The plant has been known to contain other phytochemical compounds such as phenolic acids, tannins, flavonoids, glycosides and terpenes in different parts of the plant. Different parts of this plant and essential oil have been used for a variety of purposes such as cosmetics, flavouring of food and drinks, as well as possess several pharmacologic, biologic and medical activities such as anti bacterial, anti-inflammatory, antioxidant, analgesic, antimutagenic, anticancer, etc.*

*The main objective of this review is to project M. communis as a potent medicinal plant by highlighting its traditional applications as well as the recent findings for its pharmacological and clinical applications. Here we are also discussing the biological effects of myrtle, paying special attention to its significant use in the most common health diseases.*

**Keywords:** *Myrtaceae, limonene, flavonols, polyphenol, phenylpropanoids, anti-inflammatory*

**INTRODUCTION**

Myrtus communis L. (Myrtle) is an evergreen shrub belonging to the Myrtaceae family, which comprises of about 100 genera and 3000 species. Among the earth's more than one hundred myrtle species, M. communis has important cultural significance which is a native of the Mediterranean and Asia Minor. Like all evergreen plants with a pleasant aroma, it was also a symbol of strong life force (Heilmeyer 2007).

It is an evergreen shrub or small tree, 2.4-3m in height and branches forming a close full head, thickly covered with leaves. Leaves of the plant are small and green, 2-5cm long and aromatic after crushing such as in the case of eucalyptus. The taste of leaves is bitter and intensive, which is mainly due to its astringency (Gortzi et al., 2008; Ozkan and Guray, 2009). Flowers are star-like, white or pinkish, very fragrant, with 5 petals and sepals, and numerous stamens. The fruit is round blue-black berry containing several seeds. There are two fruit morphologies based on the color- whether dark blue or white. The dark color is more frequent, but there are also cultivated white colored types, which yield much larger

fruits than their wild types (Klein et al., 2000). The pollination is done by the insects, and seeds are dispersed by birds that eat the berries.

Myrtle berries, leaves, seeds and essential oils are natural sources of several nutrients and bio-active compounds with marked health effects.

A striking feature of the plant is the pleasant smell of its essential oil, which is present in numerous glands of plant parts. The oil composition is highly influenced by the geographic origin of the plant. The main compounds responsible for the flavour and scent of myrtle oil are monoterpenes: - 1,8-cineole, myrtenyl acetate,  $\alpha$ -pinene, myrtenol, limonene, etc.

The plant has been known to contain other phytochemical compounds such as phenolic acids, tannins, flavonoids, glycosides and terpenes in different parts of the plant.

From the time immemorial, different parts of this plant and essential oil have been used for a variety of purposes such as cosmetics, flavouring of food and drinks, as well as possess several pharmacologic, biologic and medical activities such as anti bacterial, antiinflammatory, antioxidant, analgesic, antimutagenic, anticancer, etc. The fruit decoction was used to bathe newborns with reddened skin, whereas the decoctions of the leaves and fruits were useful in sore washing. The leaves decoction is still used in some countries for the vaginal lavage, enemas and against respiratory diseases (Akin et al., 2012). Various combinations and numerous medicinal properties of its extract, oil and leaves demand further and more studies about the other useful and unknown properties of this multipurpose plant.

The aim of this review is to introduce *M. communis* as a potent medicinal plant by highlighting its traditional applications as well as the recent findings for its pharmacological and clinical applications. The biological effects of myrtle will be also discussed, paying special attention to the most common health diseases.

#### **TAXONOMICAL CLASSIFICATION: -**

*Myrtus communis* L. is taxonomically classified as:

Kingdom : Plantae  
Division : Magnoliophyta  
Class : Magnoliopsida  
Order : Myrtales  
Family : Myrtaceae  
Genus : *Myrtus*  
Species : *communis*

*Myrtus communis* is a plant which belongs to the family Myrtaceae which comprises of approximately 100 genera and 3000 species. Plants belongs to this family grows in temperate, tropical and subtropical regions.

#### **ORIGIN AND DISTRIBUTION: -**

*M. communis* is estimated to have originates from the Middle East, somewhere South of Caucasian but has spread as an ornamental plant. The plant grows abundantly in the North Western to Eastern Mediterranean and native populations are found in other areas as well, occupying an extensive area starting in the western parts of the Indian subcontinent and Pakistan, including West Asia, the Arabian Peninsula and the Mediterranean Basin and reaches West to the Atlantic and Macaronesia (Baytop 1997).

It is also distributed in Southern America, North-west Himalaya and Australia.

Myrtle has a fragrant flower, so cultivated in gardens of North-west Indian regions.

In Italy it grows on the islands, along the coasts and on the internal hills, where it represents one of the most important species (Cannas et al. 2013).

In Portugal, *M. communis* grows wild mainly in central and southern parts of the country.

**BOTANICAL DESCRIPTION: -**

The common Myrtle is a perennial, evergreen, multi-branched shrub or small tree with a slow to medium growth rate, which has no thorns and surface roots. This plant develops its natural population at an altitude that starts from sea level and extends up to 600-800m. The plant can reach a height of 3m in the first 5-10 years of its life and may reach up to 5m, if favorable conditions are provided. It has erect and compact appearance and a spherical oval shape, which forms a symmetrical canopy with medium density.

*M.communis* has simple leaves, with entire margins which is lanceolate to elliptical in shape, ending at a sharp apex. They are leathery with bright green on upper surface and greyish light green below. Leaves are 3-5cm long and contain tannins, flavonoids and volatile oils (Baytop 1999).

*M.communis* has a smooth surfaced, grayish red-brown color trunk, but over time gradually the bark is peeling off, it acquires darker gray shades. Flowers are star shaped which are solitary, hermaphrodite, actinomorphic, and white or slightly pinkish in color (Mahmoud *et al.*, 2010). The fruit is a round blue black berry containing several seeds with a length of 1.2 to 1.4 cm and 0.7 to 1 cm. The fruit initially is a green colored, then turns dark red and finally acquires a dark violet color at full ripeness.

The flowers are pollinated by insects (entomophilous species) and the seeds are dispersed by birds that eat the berries.



**FIG. MYRTUS COMMUNIS TREE FLOWERS**



### MYRTUS COMMUNIS FRUITS



### SEEDS



### TRADITIONAL APPLICATION: -

*M. communis* L. has been used since ancient times as a spice, for medicinal purposes, as well as food preparation purposes. For long time, different parts of this herb like berries, branches, leaves and flowers has been used as a folk medicine. Myrtle as a spice finds no wide application because of its bitterness, despite the pleasant odor. Myrtle is frequently consumed as an infusion and decoction for treatment of diseases like diarrhea, headache, excessive perspiration, epistaxis, bleeding, hemorrhoids, urethritis, skin diseases, pulmonary diseases, inflammation and leucorrhoea. Other uses of its leaves include cattle feed, cut foliage and potted plants. Food flavored with the smoke of myrtle are common in rural areas

of Italy or Sardinia (Gortzi *et al.*, 2008). some parts of the plants are used in food industry and its berries and leaves are used in formulation of sweet liquors with advertised digestive properties.

**Table:- Application of different *M.communis* L. parts**

<i>M.communis</i> part	Traditional application	References
LEAVES	<ol style="list-style-type: none"> <li>1. Food preparations: - liquors, flavouring meat and sauces</li> <li>2. Perfume and cosmetic: - hair tonic and stimulant</li> <li>3. Medicine:- orally used as antiseptic, anti-inflammatory, laxative, analgesic, haemostatic agent and externally for wound healing</li> </ol>	Messaoud <i>et al.</i> (2012), Gortzi <i>et al.</i> (2008), Clark (1996), Baytop (1999), Elfellah <i>et al.</i> (1984), Serce <i>et al.</i> (2010)
BERRIES	<ol style="list-style-type: none"> <li>1. Food preparation: - liquors, flavouring meat and sauces</li> <li>2. Medicine:- used orally for infectious disease such as diarrhea and dysentery and externally for skin diseases and wound healing</li> </ol>	Messaoud <i>et al.</i> (2012), Clark (1996), Serce <i>et al.</i> (2010), Ziyat <i>et al.</i> (1997)
BRANCHES	<ol style="list-style-type: none"> <li>1. Medicine:- remedy for asthma, eczema, psoriasis, diarrhea, gastrointestinal disorders and urinary infections, administered orally, applied by inhalation and externally</li> </ol>	Ziyat <i>et al.</i> (1997)
FLOWERS	<ol style="list-style-type: none"> <li>1. Medicine:- against varicose veins and for preparing capillary lotions for external use</li> </ol>	Le Floch (1983)

## PHYTOCHEMICAL COMPOSITION OF

### *MYRTUS COMMUNIS* L.:

The commonly known phytochemical compounds from *M. communis* are volatile substances, terpenoids, triterpenes, flavonoids, phenolics, tannins and fatty acids.

Myrtle essential oil is extracted from its leaves, branches, fruits and flowers through steam distillation, which is yellow or greenish-yellow colored with a refreshing odour. The composition of oil is quite variable depending on the geographic region of production, the season of harvest and the length of distillation (Tuberoso *et al.*, 2006; Sumbul *et al.*, 2011).

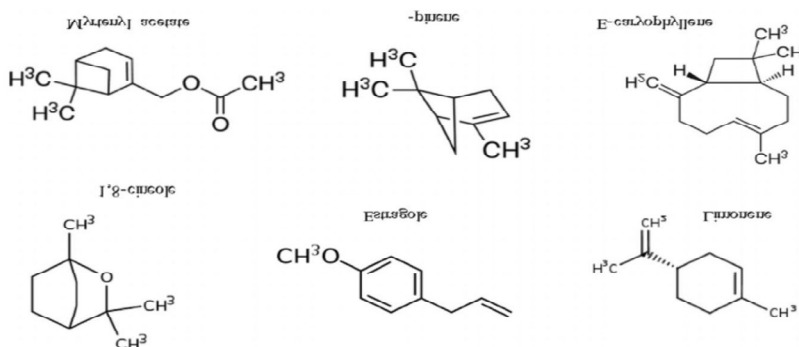
The major constituents found in the essential oil of leaves are terpenoid compounds (1,8-cineole,  $\alpha$ -pinene, myrtenyl acetate, limonene A, myrtenol B, tannins, flavonoids, galloyl-glucosides, gallic, caffeic, ellagic acids (Yoshimura *et al.*, 2008; Sumbul *et al.*, 2011; Asif *et al.*, 2011; Akin *et al.*, 2012).

The most abundant components found in the essential oil of flowers of *M. communis* were  $\alpha$ -pinene (48.54%), cineole (14.75%), myrtenal (5.01%), myrtenol (4.01%), myrtenyl acetate (3.45%), myrcene (2.09%), linalool (2.01%) and geraniol (1.67%).

*M. communis* fruit berries are rich in oleic acid (67.07%), palmitic acid (10.24%) and stearic acid (8.19%). Volatile oil of myrtle berries contains large amounts of monoterpene hydrocarbons and oxygenated monoterpenes with  $\alpha$ -pinene, 1,8-cineole, geranyl acetate and linalool as the main components. In addition to this there were also high percentages

of  $\alpha$ -terpineol, methyl eugenol, geraniol and myrtenyl acetate present in the extracts of berry. According to the method used for extraction and analysis, myrtle seeds have some concentrations of polyphenols, flavonoids and some common tannins. Other phenolic compounds have been also found in seeds in low concentrations, such as flavonols, anthocyanins and some hydroxybenzoic acid derivatives (Jabri *et al.*, 2016).

Most common monoterpenes and sesquiterpenes found in myrtle berry essential oil



### PROXIMAL AND NUTRITIONAL COMPOSITION:

The proximal composition of *M. communis* is strongly influenced by several factors, such as the genotype of plant, its geographical area, climatic conditions, cultural practice, the maturation stage and the maceration period of the fruits.

In fruits of *M. communis*, total soluble content varies from 15.5% to 24.0%, titratable acidity ranges between 0.01% to 0.44%, and pH values ranges between 4.39 to 5.64 (Fadda, Palma, d'Aquino, & Mulas).

Organic acids present in myrtle berry are mostly citric, ascorbic, tartaric, tannic and malic acids. According to the genotype studies, content of berry protein varies between 4.17% to 9.02%, carbohydrate value between 79.78% to 23.49%, oil concentration between 2.37% to 3.48%, dry matter between 24.28% to 89.73% and crude fibre around 17.41%. myrtle plant is also a rich source of lipids and fatty acids (Alipour *et al.*, 2014; Sumbul *et al.*, 2011). The content of total lipid content is about 28.97 mg/g in the berry fruit. The most abundant saturated fatty acids are palmitic and stearic; whereas linoleic and oleic acids are the unsaturated fatty acids.

**Table :-Most representative organic acids found in myrtle white and black berry**

Organic acid	Concentration	
	White berry	Black berry
Ascorbic acid (mg/100g)	1.43	2.82
Tannic acid ( $\mu$ g/100g)	23.63	52.46
Citric acid (mg/100g)	120.0	1104.85
Malic acid (%)	0.17	0.30
Tartaric acid (mg/100g)	0.29	0.30

### PHARMACOLOGICAL PROPERTIES OF *MYRTUS COMMUNIS* L.:

#### 1. Antioxidant effect:-

An antioxidant is defined as compounds that react with free radicals, neutralizing them and helps in preventing or reducing their damaging effects in human body. In order to prevent



oxidation, the addition of either synthetic or natural antioxidants to fats, fatty foods and cosmetics is done.

Antioxidants helps to protect the human body against damages induced by free radicals generated in diseases like cancer, alzheimer's disease, parkinson's disease, atherosclerosis, heart disease and sometimes even in aging process.

In order to avoid the use of synthetic antioxidants, there has been growing interest in searching and studing new natural antioxidant compounds to use in food and cosmetic industry. Aromatic and medicinal plants, such as *M. communis* are a source of natural antioxidants because of the activity of secondary metabolites (phenylpropanoids) and essential oils.

Several reports describe about the antioxidant properties of parts of myrtle plant. Berries of plant are used in making of liqueurs, jams and other food products. The methanol extract of the fruits of *M. communis* was evaluated for its antioxidant activities. The extract exhibited a high level (82.5%) of free radical. Antioxidant properties of *M. communis* leaf phenolic compounds (McPCs) were investigated on 2,2'-9-azino-bis-3-ethylbenzothiazoline-6-sulfonic acid. It showed that no synergic or additive effect between  $\alpha$ -tocopherol and myrtle extracts or caffeic acid in  $\alpha$ -tocopherol- enriched phospholipid dispersion, but myricitrin showed and additive effect thus promoted the total antioxidant activity. These data showed that myrtle extracts could be used as potential natural antioxidants, food stabilizers or natural health products.

The lactic acid fermentation of myrtle berries is a suitable tool for novel applications as functional food dietary supplements or pharmaceutical preparations.

## **2. Anti inflammatory effect: -**

In general, inflammation represents the normal and temporary response of the immune system to the presence of pathogenic antigens; however, its hyperactivation can cause tissue damage and may contribute to the onset and development of the most common human diseases such as metabolic disorders, cardiovascular diseases or cancer.

Several studies have indicated the anti-inflammatory properties of the essential oil of *M. communis* in animal models (Rossi *et al.*, 2009; Hosseinzadeh *et al.*, 2011; Maxia *et al.*, 2011; Amira *et al.*, 2012).

The 80% ethanol extract of *M. communis* L leaf possessed anti-inflammatory activity on rats by measuring the suppression of carrageenan-induced paw edema using aspirin as the standard drug.

Myrtle leaves extracts (different concentrations 2.5hr or 7 days) have been shown to protect albino mice stresses with xylene against acute and chronic inflammation.

Anti-inflammatory and antiproliferative properties of the ethanolic extracts of myrtle have important role in the treatment of in vitro acne lesions. The evaluation of anti-inflammatory activity by measuring 6-keto-prostaglandin F1 and [<sup>3</sup>H]-arachidonic acid metabolite production in keratinocytes stimulated for inflammation revealed that the extract significantly decreased all metabolite production from the cyclooxygenase and lipoxygenase pathways.

According to these data, it can be concluded that *M. communis* has a potent anti-inflammatory effect and can be used for the treatment of chronic inflammation without the typical side effects.

### 3. Antimicrobial effects: -

#### a. Antibacterial activity-

The problem regarding the application of conventional antibiotics, including antimicrobial resistance, environmental problems, side effects and high costs have reinforced a tendency to replace synthetic antimicrobials with natural plant based alternative agents (Gortzi *et al.*, 2006).

Myrtle extracts and essential oils have showed antibacterial activities against pathogenic bacteria by affecting the permeability of bacterial cell wall and membrane, promoting the release of cellular contents outside the cell and leading to the disruption of essential membrane function, including nutrient absorption, enzyme activity and electron transfer.

Methanolic crude extract of *M. communis* shows antibacterial activity on six gram-positive bacteria (*Staphylococcus aureus*, *Micrococcus luteus*, *Streptococcus pneumoniae*, *Streptococcus pyogenes*, *Streptococcus agalactiae*, *Listeria monocytogenes*) and four gram-negative bacteria (*E.coli*, *Proteus vulgaris*, *Pseudomonas aeruginosa* and *Campylobacter jejuni*). Due to the presence of large amounts of  $\alpha$ -pinene (37.8%), 1,8-cineol (23.1%), limonene (17.1%) and linalool (10.1%) in *M.communis* essential oil, it also shows antibacterial activities against *E.coli*, *S. aureus* and *Candida albicans*.

Myrtle has also growth-inhibitory effect against *Paenibacillus* larvae in vitro. *P. larvae* is the casual agent of American Foulbrood Disease of honey bees (AFB).

The extract from herbal parts of *M. communis* L. have antibacterial activity, which dramatically increased after the encapsulation in liposomes. According to these findings encapsulated myrtle extracts can be used as potent preservatives in food industry, cosmetics and pharmacology.

**b) Antifungal activity-** In the management of fungal infections there are many problems such as limited number of antifungal drugs, toxicity, resistance to commonly used antifungal drugs, relapse of infections and the high costs. Therefore, there is a necessity of having new antifungal agent to overcome these problems. Essential oils and extracts of myrtle is one of the natural products which can be used as an antifungal agent. *M.communis* shows antifungal activity against many species such as *C. albicans*, *Aspergillus flavus*, *A.niger*, *Penicillium sp.*, and *Trichophyton mentagrophytes*. The antifungal effect of *M. communis* leaf essential oil on oral candidiasis was evaluated in immunosuppressed rats (Najib Zadeh *et al.*, 2011). These data support its traditional claim of antifungal activity.

**c) Antiviral activity-** The antiviral activity of the essential oil is principally due to direct virucidal effects, by denaturing viral structural proteins or glycoproteins (Djilani and Dicko 2012). The best known antiviral compound produced by *M. communis* is  $\alpha$ -caryophyllene. Herpes simplex virus can cause various infections like cold sores, encephalitis, etc or sometimes may results in death of patient. Hydroalcoholic extract of myrtle shows antiviral effect on *herpes simplex virus-1* (HSV-1) in vitro.

#### 4. Analgesic effect: -

Analgesic drugs are used in single or in combination to affect peripheral or central nervous system (CNS) to decrease pain sensation. *M.communis* aerial parts have been functionally used as a traditional analgesic drug. Tests involving thermal stimuli which tend to detect only narcotic analgesics have shown that the aqueous extract of *M. communis* leaves with dose of 150mg/kg has narcotic analgesic properties.

## 5. Repellency and insecticidal effects: -

Insect repellents are used to prevent harmful bites from mosquitoes and some other blood feeding arthropods and may helpful in lowering disease transmission. Repellency effect of this plant was examined and it was demonstrated that essential oil of *Myrtus communis* is effective in repellency, even with 10% concentration. The essential of leaves is active against different life stages of khapra beetle *T. granarium*.

Insecticidal activity of the essential oil extracted from leaves and flowers of *M. communis* against larvae of the mosquito *C. pipiens molestus* (diptera) was reported with LC<sub>50</sub> value of 16mg/L (Traboulsi *et al.*, 2002). Myrtle have also moderate repellence effect against *Anopheles stephensi*, which is one of the vectors of malaria.

## 6. Gastrointestinal effects: -

Gastroesophageal reflux (GER) is the normal; passage of the stomach contents into the esophagus and it can become pathological if it causes ulceration and destroys the normal esophagus squamous epithelium. In the last years, the effects of myrtle on digestive tract have been extensively evaluated. Myrtle is useful in reducing edema and strengthening the stomach and gastrointestinal tract. Myrtle seeds have been shown to protect the gastric mucosa, exerting antiulcer effects (Jabri *et al.*, 2017; Sumbul, Ahmad, Asif, Saud & Akhtar, 2010). Ulcerative colitis is a chronic gastric disease which can be treated with the help of myrtus plant due to the high contents of antioxidant and inflammatory compounds. Myrtle berries are helpful in inhibition of gastric emptying and intestinal mobility, protected against intestinal fluid accumulation, decreased the oxidative stress and improved antioxidant enzyme activities in the intestine (Jabri, Rtibi, Sakly, Marzouki & Sebai, 2016).

## 7. Dermatological effects: -

**a. Effect on burn lesions-** Skin burn lesions cause local injury as well as triggers acute systematic inflammation response where the imbalance between oxidative and antioxidative system occurs. Myrtle oil have possible protective role in treatment against burn-induced lesions. Application of oil once a day on second degree burn wounds enhanced the healing process (Hasanzadeh *et al.*, 2003). A faster healing process, less complications and availability of myrtle are the reasons supporting its traditional use in the treatment of burn wounds. It also helps in reduction of scar tissues after healing.

**b. Treatment of acne lesions-** The ethanolic extract of myrtle was found to be effective in treatment of acne lesions. It has positive effects for convergence, reduction in erythema, removal of sebum and dead skin cells and antibacterial activity on skin. The inhibitory and bactericidal activity of the herb against *Propionibacterium acnes* strains was determined by measuring the MIC and D value. The extract inhibited erythromycin-sensible and resistant *P. acnes* strains growth with MICs of 4.9 ug/mL and 2.4ug/mL respectively.

**c. Effect on hair growth-** In many parts of the world, essential oil of *M. communis* has been used as a hair tonic agent. It was observed that there is effect of application of blend of 100% essential plant oils combined with low electromagnetic pulses on hair growth in treatment of androgenetic alopecia. Using the oils, prevented hair loss and occasionally induced light hair growth by two mechanisms: first, favouring nutritive intake of the hair papilla cells due to the stimulation of the microcirculation and second, regulating the function of sebaceous glands.

**d. Effect on aphthous lesions-** Aphthous lesion is the most common ulcerative condition of the oral mucosa, and presents as a painful punched-out sore on oral mucous membranes. They are also called aphtae, aphtosis, aphthous stomatitis and cancer sores. Myrtle is used as a treatment of mouth ulcers in folk medicines. To evaluate this activity, double-blind, controlled before-after clinical trial, five parameters including size change, pain scale, erythema and exudation level, oral health impact profile and patient overall assessment of their treatment is studied. Significant reduction of ulcer size, pain severity, erythema and exudation level was observed in the group of patients who has applied myrtle leaf oral paste four times a day for 6 days. This mechanism could be because of its antibacterial effect or its radical scavenging activity (Babae *et al.*, 2010).

**Table:- The pharmacological effects of *Myrtus communis L.***

S. No.	EFFECT	PART OF PLANT	PROPOSED POSSIBLE MECHANISM	REFERENCES
1	Anti-inflammatory	Aerial parts	Effect on proliferative phase of inflammation	(Hosseinzadeh <i>et al.</i> , 2011)
2	Analgesic	Aerial parts	Via opioid receptors or promotion of the release of endogenous opiopeptides	(Hosseinzadeh <i>et al.</i> , 2011)
3	Anti-proliferative and antigenotoxic (protective of cells from oxidative stress )	Leaves	Increase in the activity of the antioxidant enzyme family and DNA repair enzymes	(Ines <i>et al.</i> , 2011)
4	Neuro-protective	Berries	Antioxidant; considerable effects in DPPH, DMPD and FRAP assays	(Tumen <i>et al.</i> , 2012)
5	Anti-mutagenic	Aerial parts	Radical scavenging activity	(Mimica-Dukic <i>et al.</i> , 2010)
6	Effect on cancer cell lines	Leaves	Activation of caspase-3,-8 and -9; cleavage of poly PARP; release of nucleosomes into the cytosol; DNA fragmentation	(Tretiakova <i>et al.</i> , 2008)
7	Effect on LDL oxidation	Berries	Inhibition of the reduction of poly unsaturated fatty acids and cholesterol; inhibition of the increase of the oxidative products	(Tuberoso <i>et al.</i> , 2010)
8	Anti-diabetic	Leaves	Inhibition of alpha-glycosidase enzyme	(Gholamhoseinian <i>et al.</i> , 2011)
9	Anti-viral	Leaves	Inhibitory effect on virus before and after entering the	(Moradi <i>et al.</i> , 2011)

			cell	
10	Insecticidal	Leaves	Acting as a neurotoxin	(Tayoub <i>et al.</i> , 2012)
11	Treatment of peptic ulcers	Berries	Reducing the gastric juice volume and total acidity; increasing the gastric pH and gastric wall mucus content	(Zaidi <i>et al.</i> , 2012)
12	Anti-hepatic ischemia	Leaves and fruits	Antioxidant and free radical scavenging activities	(Ferchichi <i>et al.</i> , 2011)
13	Treatment of impotence	Leaves	Inhibition of aromatase activity; inhibition of 5-alpha reductase; cytochrome-P450 inducer activity	(Shariati <i>et al.</i> , 2010)
14	Negative inotropic effect	Leaves	Probable presence of an adenosine like compound	(AI-Jeboory <i>et al.</i> , 1985)
15	Positive effects on burn lesion	Leaves	Increase in revascularization and amount of fibroblasts	(Jorsaraei <i>et al.</i> , 2006)
16	Anti hair loss	Essential oil	Increase in nutritive intake of the hair papilla cells and regulation of the function of sebaceous glands	(Bureau <i>et al.</i> , 2003)
17	Treatment of aphtus lesions	Leaves	Antibacterial effect or free radical scavenging activity	(Babaei <i>et al.</i> , 2010)

\* DPPH: - 2,2-diphenyl-1-picryl-hydrazyl-hydrate

DMPD: - N, N-dimethyl-p-phenylenediamine

FRAP: - Ferric reducing antioxidant power

PARP: - Poly (ADP-ribose) polymerase

LDL: - Low Density Lipoprotein

### **CONCLUSION: -**

From the time immemorial, plants have been used extensively as curative agents for a variety of ailments. Extensive literature survey revealed that *M. communis* has a long history used for wide range of diseases. A number of phytochemicals isolated from various parts of this plant like flavonoids, tannins, terpenoids, glycosides, alkaloids, essential oil, etc. have shown a variety of pharmacological activities like anti-diarrhoeal, antiulcer, antidiabetic, antihypertensive, antioxidant, antimicrobial, antimutagenic, etc. in various clinical and pharmacological trials. In this regard, it is suggested that further studies should be carried out in order to uncover the potential roles of myrtle as an alternative in preventing and treating different diseases.

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## CHAPTER-47

### THOUGHTS AND WORKS OF DR. AMBEDKAR ON AGRICULTURE

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#### **Abstract:**

*Bhimrao Ambedkar was the first Indian economist to examine the problem of sub-division and fragmentation of agricultural land holdings and formulate a very scientific definition of an economic holding. Bharat Ratan Dr. Bhimrao Ambedkar opined that small size of land holding is one the causes of production. Dr. Babasaheb Ambedkar His work in a multifaceted personality, his gratitude in economics, and his thoughts on agriculture are important features in economics. His views on land holding are currently the most useful in terms of compact collective farming and land revenue, criticizing traditional fixed economic land holding and redefining land with economic land. It does not depend on the size of the holding, but on the information on the components of the product. Discussing views on agriculture and therefore considering the relevance of current agricultural low productivity, the task of holding land should be undertaken.*

#### **1.1 introductions-**

Dr. Babasaheb Ambedkar studied Indian agriculture, research articles, seminars and conferences to solve the problems of agriculture and farmers. He also led the peasant movement. His views on agriculture are found in his articles "SM Holdings in Indian and the Remedies" (1771) and "Status and Minorities" (1947)). He pointed out that land grabbing by a small number of people is a serious problem of Indian agriculture, with various disadvantages such as difficulties in cultivation and utilization and resources, low productivity, ineligible income and low standard of living. Dr. Ambedkar According to agricultural productivity is related not only to the size of land holdings but also to capital, labor and other resources. So large sized land can also become unproductive if capital or labor CTC is not available in sufficient quantity and quality. If these resources are available in abundance, small size land will become productive. It was with this in mind that the Land Ceiling Act was passed after independence.

He noted that the enslavement and exploitation of workers under the caste system was detrimental to economic development. Community farming, land holding or equal distribution of land, large scale industrialization, provision of money, water, seeds and fertilizers by the government, allotment of waste land to landless workers, at least other suggestions given by them to solve agricultural problems Salary to laborers, control and regulation of loans to farmers.

#### **1.2 Objective of the paper-**

1. To study the relevance of Bhimrao Ambedkar's agricultural thought.
2. Comparing Bhimrao Ambedkar's thought with the current field of Indian movement

### 1.3. Dr. Bhimrao Ambedkar Thoughts on Land Conservation of Agriculture Sector: -

Bhimrao Ambedkar was the first Indian economist to solve the problem of subdivision and fragmentation of agricultural land holdings” Dr. B.R Ambedkar's Economic and Social Thought and creates a highly scientific definition of a chromic holding. Dr. Bhimrao Ambedkar opined that high land holding is one of the reasons for production. That's why land holding should be consolidated - the traditional definition of "economic holding" is "a rush to produce enough to keep oneself and one's family in reasonable comfort after the necessary experiments."

The language of the economy cannot be said to be big. So short holding is economical. This is a right or wrong ratio on other factors on the production of the subsequent financially or financially presented land unit. A short term can be either financial or financial because the economic depends not on the size of the land but on all factors including land

**Table No.1.1**  
**Area operated operational holding**

Type of holding	1970-71	%	1980-81	%	1990-91	%	1995-96	%	
<b>marginal</b>	14.56	8.98	19.74	12.5	24.89	1504	28.152	17.21	
<b>small</b>	22.26	11.89	23.17	14.14.	28.82	17.42	30.72	18.81	
<b>Semi median</b>	31.00	18.50	34.65	21.15	38.37	23.19	38.95	23.84	
<b>large</b>	51.06	30.88	37.71	23.02	28.65	17.31	24.16	14.79	
<b>%Total</b>	164.14	100	163.80	100	165.48	100	163.35	100	

(Source- agriculture census, in India 2000-01)

It has become clear that the average size of holding has been steadily declining since independence. The main reasons for the decline are population stress on land, faulty inheritance

**Table No.1.2**  
**Average size of holding in India**

years	Average size of holding in India
1970-71	2.30
1976-77	2.00
1980-81	1.84
1995-96	1.57
2000-01	1.14
2012-13	1.32
	1.16

(Source- agriculture census, in India 2000-01)

Laws, loss of cottage industries, etc. 1970- 1971 World. The country with one of the largest Populations in the world are facing many problems related to the catchment area of the economy, such as we are in agriculture.

Facing low productivity rates and high dependency ratios without technical improvements, some of the reasons behind this are supported, one of which is broken land

with low bonding and therefore the need for full corporate and collective farming. Dr. On the basis of Ambedkar, the country wondered who was against this broken holding system. Our table shows that in 1971, we increased our retail share capital by 8.98 per cent. 18.72” Percentage holdings in 2000 and large holdings increased from 30.88 per cent to 13.17 per cent in the same year. Similarly, our table number 2 also shows that the holding size in India was 2.30 in 1970-1901- during1 and now the average size in 2012-1-13 has come down to 1.1 to. From the point of view of analysis, we can say that the retail share of the agricultural sector is growing at an increasing rate, Dr. Ambedkar was against these low stocks and suggested an urgent need to reform the agricultural sector, including corporate farming and formula in corporate societies, for the development of his agricultural sector.

#### **1.4 State socialism and agriculture-**

With high productivity rates: Dr. Bhimrao Ambedkar introduced the concept of state socialism. From this concept comes the idea of collective farming. The state must own the land, including the abolitionists and intermediaries. States should distribute these lands to farms. Farmers should cultivate together. The state should provide the required capital to the agricultural sector and the income earned should be distributed among the farmers, not in the minority.

Our Will fulfill the dream of Ambedkar which will solve the problem of agricultural workers of the British government.

#### **1.5 Land Revenue-**

According to him, the land revenue system was against the interest of the Indian people. Further there was no justice or equality in policy. Land Tea was extremely oppressive, he said. Ambedkar clarified the point that it is unjust to assess the land on ILCMC. The efficiency of assessment did not depend on the ability to pay taxes. The taxable capacity was increased with the increase in income. Since independence, the government has maintained the existing land revenue system in the country.

Some states have adopted agricultural income tax, but so far not all other states in the country are covered. The agricultural sector could be an important tax base for the country. It includes a uniform system of taxation for agricultural and non-agricultural sectors.

#### **1.6 Conclusion-**

Dr. Bhimrao Ambedkar was a staunch supporter of land reforms and played an important role in economic development in the state. He recognized inequality in an insecure capitalist economy. Dr. Bhimrao Ambedkar has been thinking about land holding and surveying system and agricultural sector holding and land revenue system and agricultural sector since ancient times. Co-operative farming and collective farming should be adopted by the government. Bhimrao Ambedkar's thoughts on agriculture are more useful. Dr. B. R. Ambedkar can be credited as one of the great intellectual and social reformers of modern India, who fought for the liberation of Indian women, especially the apathetic class, from lifelong slavery and enslavement in Hindu families in India. His imagines caste and gender inequality as an integral part of social order. Lays the foundation for Indian geological awareness and the gradual transformation of gender justice in land acquisition Bhimrao Ambedkar's Role.

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## CHAPTER-48

### INTRODUCTION TO INDIAN MONETARY AUTHORITY – THE RESERVE BANK OF INDIA

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**Abstract:**

*Being part of a monetized economy it is essential for every member of the economy to have in-depth knowledge of the monetary authority of his or her country. Therefore, this study is conducted to introduce the Indian Monetary System to every Indian. Knowingly or unknowingly every Indian is associated with the functioning of the monetary system, getting affected by the decisions of the monetary authority of the country. Thus it becomes essential for every individual to be familiar with the working of the Central Bank of the country. But it is commonly observed that there is widespread ignorance among the Indian common man regarding the Monetary authority of the country. Therefore, this study is conducted to compile information about the various aspects of central banking.*

*Being the monetary authority of India this study revolves around the Reserve Bank of India. The study is divided into four parts. The study begins with the background of the Reserve Bank of India. The second part deals with the structure of the Reserve Bank of India. The third part of the study focuses on the responsibilities shouldered by the Reserve Bank of India and the concluding part throws light on the legal framework of the Reserve Bank of India.*

**Keywords:** Monetary authority, currency, money supply, monetary policy, central bank.

**Introduction:**

The story of the constitution of the Reserve Bank of India was initiated in the pre-independence period. On 27<sup>th</sup> January 1921 three Presidency Banks namely The Bank of Bengal, Bank of Bombay, and Bank of Madras were amalgamated to form one strong institution capable to take up the responsibility of being the Central Bank of the country. That newly formed institution was named as Imperial Bank of India. In the initial period the Central banking responsibilities were shared between the Imperial bank of India and the Government. Activities related to currency management were retained by the government with itself. The Imperial Bank of India was given dual responsibilities of Commercial Bank as well as Central Bank. But as per the Hilton Young Commission recommendation, the Reserve Bank of India was established as a full-fledged Central bank for India in 1935 and with the establishment of this institution, the Imperial Bank ceased to function as Central Bank and once again became a Commercial Bank. On 1<sup>st</sup> July 1955, the State Bank of India was established as per the provisions of the State Bank of India Act, 1955, and took over the business of the Imperial Bank of India.

Thus since then in India, the responsibility of Central banking is successfully shouldered by the Reserve Bank of India, commonly known as RBI. 1<sup>st</sup> April 1935 is the date of inception of the Reserve Bank of India. Its inception was done as per the provisions of the Reserve Bank of India Act, 1934. It was initially constituted as a private sector institution but in 1949

it was nationalized and became a government-owned institution. Since then being a fully government-owned financial institution, it took up the responsibility as the monetary authority of India. At the time of establishment, the head office of RBI was located in Kolkata. Afterward, in 1937 it was relocated to Mumbai and continued till date. It has twenty-seven regional offices located mainly in state capitals. RBI has four subsidiaries. These subsidiaries are fully owned by RBI. Namely ReBIT, IFTAS, BRBNMPL, and DICGC. Deposit Insurance and Credit Guarantee Corporation of India (DICGC) was formed to deal in deposit and credit guarantee schemes. To improve its effectiveness while dealing with depositors' risks and distressed banks, it was decided to convert it into the Bank Deposits Insurance Corporation (BDIC). Bhartiya Reserve Bank Note Mudran Private Ltd. (BRBNMPL) was formed for increasing the currency notes' production so that a sufficient supply can be maintained to cater to the rising demand for currency notes. National Housing Bank (NHB) is the apex institution in the Indian housing sector, promoting local and regional Housing Finance Institutions by providing financial support. National Bank for Agriculture and Rural Development (NABARD) is a Development Financial Institution to deal with issues related to agriculture credit and rural area development. It is an institution dedicated to fostering rural prosperity. Now it has been handed over to the Government by the RBI.

#### **Structure of the Central Bank:**

The Reserve Bank of India is managed by boards functioning at two-level such as Central Board and Local Board. There is one central board and four local boards functioning at four regions of the land namely, New Delhi, Kolkata, Chennai, and Mumbai. The authority to appoint members of the Central Board is with the Central government. Among these Central Board members, five members function as the full-time official directors and the other fifteen members as unofficial directors. The official directors of the Central board comprise one Governor and four deputy governors. Among the fifteen nonofficial directors, four are the representatives of four Local Boards, one director is a government-nominated official, and the remaining ten are from different fields. The Central government appoints five members each on these four Local Boards. The appointments of all the members of the Central and Local Boards are for a period of four years.

The responsibility of giving direction to the Bank's affairs and general supervision is upon the Central Board while Local boards are expected to advise the Central Board in local matters, indigenous banks matters and perform the responsibilities assigned to them by the Central Board.

The Reserve Bank of India is headed by the Governor. Being the Chief Executive Officer, the governor is ex-officio chair of the Central Board of Directors of the Indian Central Bank. His appointment as RBI governor is for a period of five years. The current governor of the RBI is Mr. Shovikant Das. He is the 25<sup>th</sup> governor of RBI. He was appointed in December 2018 and has completed his term on 9<sup>th</sup> December 2021 and got the extension from 10<sup>th</sup> December 2021 for the next three years. He will hold the office till December 2024. With this, he has got the opportunity to be the longest-serving RBI governor if he could complete the extended term. The first RBI governor was Osborne Smith, then the chair went to James Taylor then C.D. Deshmukh became the governor. He was the first Indian governor of RBI. The next RBI governor was Benegal Rama Rau. He served for a period of 7 years and 197 days which is considered as the longest-serving period for RBI governor to date. Immediately after him

K.G. Ambegaonkar become the RBI governor Then H.V.R. Iyengar become RBI governor and he was replaced by P.C. Bhattacharya. Lakshmi Kant Jha becomes the 8<sup>th</sup> RBI governor and B.N. Adarkar become the 9<sup>th</sup> RBI governor Then the responsibility was given to Sarukkai Jagannathan and from him, it went to N.C. Sen Gupta. The 12<sup>th</sup> RBI governor was K.R. Puri, M. Narasimham was the 13<sup>th</sup> RBI governor and I.G. Patel became the 14<sup>th</sup> RBI governor. Then the responsibility was taken up by Manmohan Singh who later also became Prime Minister. Then Amitav Ghosh took the charge but could serve for the period of 20 days only and become the shortest-serving RBI governor. R.N. Malhotra was the 17<sup>th</sup> RBI governor and S. Venkitaramanan was the 18<sup>th</sup> one. Then C. Rangarajan became the office bearer and then Bimal Jalan took charge. Y. Venugopal Reddy became the 21<sup>st</sup> RBI governor followed by D. Subbarao and then Raghuram Rajan. Then the chair was offered to Urjit Patel, during whose tenure Narendra Modi led government implemented the decision of demonetization in November 2016. After his resignation, the duty was handed over to Shaktikanta Das.

### **The responsibilities shouldered by the Reserve Bank of India**

Being the Central Bank of the country the RBI has been entrusted with a wide variety of responsibilities as follows

#### **Monetary authority**

As a supreme monetary authority of the land, the RBI is responsible for formulation monetary policy, its implementation, and monitoring of its implementation. While designing the monetary policy the RBI needs to keep the objective of price stability with economic growth in mind.

#### **Regulator of the financial system**

Being a regulator of the financial system the RBI is expected to prescribe the broad framework of banking activities in which the Banking and Financial System of the country is expected to function.

#### **Supervisor of Financial System**

As the regulator of the financial system, the RBI is also expected to supervise the financial system. To perform this role, the RBI is expected to maintain public confidence in the system by protecting the depositors' interests as well as ensuring the availability of banking services at a low cost.

#### **Custodian of foreign currency**

Being the custodian of foreign currency, the RBI is expected to promote the international trade for which it has to ensure sufficient and stable flow of foreign currency and orderly expansion of the forex market.

#### **Issue of currency**

Being Central Bank, the RBI is entrusted with the responsibility to issue and exchange currency in the economy, and on another hand, it also needs to withdraw the currency not fit for circulation.

#### **Regulator and Supervisor of Payment and Settlement Systems**

Provision of safe and efficient modes of payment system for the people is the responsibility of RBI for which it has to regulate and supervise the Payment and Settlement System. It is essential for maintaining public trust in the system.



**Banker to the Government**

The RBI is expected to provide regular banking services to the Central government as well as state government. It is also needed to offer the services of merchant bankers to the governments.

**Banker to Bank**

While performing the role of Banker for all scheduled banks, the RBI has to maintain bank accounts of all scheduled banks.

**Legal Framework Governing the Reserve Bank of India**

The RBI was established with objectives of securing a stable monetary system in the economy and having a proper money supply system as per the needs of the economy so that the objective of stability with growth can be achieved. While working for achieving these objectives RBI need to function as per the provisions of certain acts as follows

- The Reserve Bank of India Act, 1934  
The RBI was established as per the provisions of this act. This act throws light on the regulation of the issue of Banknotes and the keeping of reserves with an objective to secure economic stability in the country and the ways to operate the currency and credit system favorable to the country. It provides a contemporary monetary policy structure to see the trials of a progressively multifaceted economy. It guides to maintaining price stability along with achieving growth.
- The Government Securities Act, 2006  
This Act is about the consolidation and amendments of norms regarding Securities issued by the Central Government or a state government and its management by RBI. It throws light on forms and transfers of government securities and recognition of title to the security of the deceased. It also guides about the norms related to nomination, issue of duplicate or new government securities. It informs about the grant of information, inspection of documents, pledge, hypothecation or lien of Government Security, payment of Interest, and maturity proceeds of government securities and fees to be charged.
- The Banking Regulation Act, 1949  
This Act is for consolidation and amendments of the law governing banking. It talks about the business of banking companies, control over the management of banking companies, supersession of Board of Directors of Banking company, prevention of certain activities concerning banking companies, getting hold of the actions of banking companies, deferment of business and winding up of banking companies, provisions for quick disbursement of proceedings after closure, and applicability of the act to the co-operative banks.
- The Payment and Settlement Systems Act, 2007  
This Act provides for the regulation and supervision of payment systems in India and to designate the RBI as the authority for that purpose and various matters like authorization of payment system, regulation, and supervision by the RBI, rights, and duties of a system provider, settlement of disputes and offenses and penalties.
- The Indian Coinage Act, 2011  
This Act provides information regarding the consolidation of laws concerning coinage and the mints, their protection, and provisions regarding the prohibition of melting or destruction of coins and prohibits the making of the possession of coins. This Act deals

with power to establish and abolish mints, denomination, dimensions, designs composition and standard weight of coin when it is to be used as a legal tender, decimal system of coinage, powers related to cut diminished or defaced coins, counterfeit coins, power of mint to delegate its functions, prohibition of making or melting or destruction of coins, the penalty for contravention of the Act, prohibition and penalty for unlawful making, issue or possession of pieces of metal to be used as money, prohibition and penalty for bringing metal piece for use as coin, forfeiture of coins and norms for the continuance of existing coins.

- The Foreign Exchange Management Act, 1999

This Act guides regarding amendments concerning the establishment of a branch office or a liaison office or a project office or any other place of business in India, transfer or issue of security by an individual residing abroad, export and import of currency, foreign currency accounts of an Indian, deposit or debt instrument, mode of payment and reporting of non-debt instruments, export of goods and services and methods of receipts and payments, international financial services centres, foreign exchange derivative contracts, and margin for derivative contracts.

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## CHAPTER-49

### READING SKILL AND LANGUAGE ACQUISITION

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**Abstract:**

*In learning a target language, skills are extremely crucial. Although reading is a receptive skill, the researcher wants to emphasize that reading requires active participation on the reader's behalf. Students are more capable of dealing with a higher level of reading ability than they are of dealing with language creation. It is impossible to overestimate the value of reading. If we observe how we read in English (or our original language), we will see that we do not read every letter, but rather skim through each sentence, taking in large chunks of letters at a time and effortlessly connecting them to words and expressions. In learning a target language, skills are extremely crucial. Reading is a receptive talent, but it is also a communicative one. Reading in the target language should be an important component of our language learning journey – and one that we should continue as long as we are language learners. The current research focuses on the role of reading ability on language development. It implies that reading should be viewed as a communicative rather than a passive activity by students. It also discusses the techniques that should be implemented in order to improve the skill as well as their potential and resourcefulness. It also emphasizes language acquisition via reading ability.*

**Keywords:** language acquisition, receptive skill, target language, potential and resourcefulness

**Basic Principles:**

Despite the fact that reading is accomplished with various mediums (written and spoken text), there are underlying features and skills that apply to reading when practiced by native speakers. We'll examine content, purpose, and expectations, as well as receptive ability. We read a significant deal of language in our daily lives, and this language can be divided into two categories: fascination and utility. We frequently read to something that interests us - or that we believe would interest us. A book is typically chosen by a buyer in a bookstore because he believes it will interest him. Reading for pleasure, intellectual stimulation, and other activities fall under the interest category. However, sometimes it is not the fact that a text is intriguing that causes the reader to pay attention to it; rather, it is the text's utility that compels the reader to pay attention to it. If you're using a hot-drinks machine for the first time, read the directions carefully to ensure that you get the type of coffee you want rather than tea or hot chocolate. No one would argue that the instructions you read are particularly engaging, and the same could be said of telephone directory instructions, rules and regulations, and maintenance manuals, to name a few examples.

These two categories, on the other hand, are not always mutually exclusive. The student may read material that he requires for his studies (and hence would be classified as 'useful') while

also finding it intriguing. Nonetheless, when deciding what kind of texts pupils should be exposed to, the two general traits of utility and interest are critical.

**Strategies for Reading Skills:**

Students do not instantly transfer the skills they use when reading in their home language, which frustrates language instructors. Instead, they appear to believe that reading entails starting at the beginning and working through the text word by word, pausing to look up any unfamiliar vocabulary words along the way, until they reach the finish. Students rely only on their linguistic understanding when they do this, which is a bottom-up method. As a result, one of the most essential roles of the language instructor is to assist pupils in moving past this notion and employing top-down tactics in the same way they do in their mother tongue. Effective language educators show students how to adapt their reading behaviour to a variety of settings, input kinds, and reading goals. They assist pupils in developing a set of reading techniques and matching them to specific reading situations.

The following are some strategies that can help pupils read more quickly and effectively:

- Predicting: using knowledge of the subject matter to make predictions about content and vocabulary and check comprehension; using knowledge of the text type and purpose to make predictions about discourse structure; using knowledge of the author to make predictions about writing style, vocabulary, and content
- Skimming and scanning: scanning titles, section headings, and photo captions to get a sense of the structure and content of a reading selection.
- They assist students in the development of a set of reading strategies as well as the matching of relevant methods to specific reading situations.
- Students can benefit from the following strategies to improve their reading speed and comprehension:
  - Predicting: using knowledge of the subject matter to make predictions about content and vocabulary and check comprehension; using knowledge of the text type and purpose to make predictions about discourse structure; using knowledge of the author to make predictions about writing style, vocabulary, and content
  - Skimming and scanning: using knowledge of the subject matter to make predictions about content and vocabulary and check comprehension; using knowledge of the author to make predictions about writing style, vocabulary, and content.
- Allowing time in class for group and individual previewing and predicting exercises in advance of in-class or out-of-class reading. These activities' importance and worth are demonstrated by allocating class time to them.
- By reviewing vocabulary topics with cloze (fill in the blank) exercises. This teaches pupils to deduce meaning from context.
- Encouraging students to discuss what methods they believe would aid them in approaching a reading task, and then discussing what tactics they actually employed after reading. This encourages pupils to be adaptable in their strategy selection.

When language learners employ reading methods, they develop control over their reading experience and confidence in their ability to read the language.

**Reading to Learn the Language:**

Reading is an important aspect of language training at all levels because it helps students learn in a variety of ways. Reading is a great way to learn a language. Reading is a form of

linguistic intake. Instructors provide various opportunities for students to acquire vocabulary, grammar, sentence structure, and discourse structure as they occur in authentic circumstances by providing a variety of materials to read.

As a result, students get a better understanding of how the elements of language interact to convey meaning. Reading for content information: In their home language, students frequently read to learn more about a subject they are studying, and this goal can be valuable in the language learning classroom as well. In the language classroom, reading for content information provides students with both authentic reading material and an authentic reading purpose.

Reading for cultural awareness and knowledge: Reading commonplace materials written for native speakers can provide students with insight into the lifestyles and worldviews of the people whose language they are learning. Students who have access to newspapers, periodicals, and Web sites are exposed to a wide range of cultures, and monolithic cultural preconceptions begin to crumble.

**Four basic steps:**

1. Determine why you are reading. To forecast or anticipate information and discover acceptable reading tactics, use your background knowledge of the topic.
2. Pay attention to the sections of the text that are important to the stated goal and disregard the rest. This selectivity allows pupils to concentrate on certain elements in the input, reducing the amount of data they must maintain in short-term memory.
3. Choose reading strategies that are suited for the job and utilise them in a flexible and participatory manner. When students employ both top-down and bottom-up skills to generate meaning, their comprehension improves and their confidence rises.
4. Check your comprehension while reading and after you've finished the reading activity. Students can use monitoring comprehension to uncover inconsistencies and understanding errors, as well as learn to use alternative tactics.

**Pre-reading exercises include:**

- Pre-reading activities can be used as preparation in a variety of ways.
- Examine students' prior understanding of the topic and the text's linguistic substance.
- Provide pupils with the background knowledge they'll need to understand the material, or make use of what they already know.
- Clarify any cultural information that is required to understand the piece.
- Inform students about the type of text they will be reading and the purpose(s) for which they will be reading it.
- Allow for group or collaborative work as well as class discussion activities.

**Sample activities:**

- Looking at photos, maps, diagrams, or graphs and their captions to predict content and organization or sequence of information • Using the title, subtitles, and divisions within the text to predict content and organization or sequence of information
- Discussing the author's background, writing style, and common subjects
- Doing guided practice with guessing meaning from context or checking comprehension while reading the type of text they will be reading • Reviewing vocabulary or grammatical structures

- Reading over the comprehension questions to focus attention on finding that information while reading • Constructing semantic webs (a graphic arrangement of concepts or words showing how they are related)
- Allow for group or collaborative work as well as class discussion activities.

**Pre-reading exercises:**

Pre-reading exercises are especially helpful at the beginning of reading training and at lower levels of language competency. You will be able to minimize the amount of guided pre-reading and enable students to undertake these activities on their own as they grow more skilled at employing reading strategies.

The process, through which humans learn to perceive and comprehend language, as well as to make and employ words and sentences to communicate, is known as language acquisition. Because non-humans do not communicate via language, language learning is one of the defining human characteristics. The term "language acquisition" usually refers to the study of newborns' acquisition of their native language. This is distinct from second-language acquisition, which is concerned with the acquisition of new languages by both children and adults.

**Conclusion:**

Skinner presented one of the early scientific explanations of language development (1957). He accounted for language development through environmental influence as one of the pioneers of behaviorism. Skinner claimed that children learn language by linking words with meanings using behaviorist reinforcement principles. When a youngster understands the communicative significance of words and phrases, correct utterances are positively rewarded. When a youngster says 'milk,' for example, and the mother smiles and gives her some, the child will find this outcome pleasurable, which will help the child's language development (Ambridge & Lieven, 2011).

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## CHAPTER-50

## कोविड-१९ चा समाजजीवनावर झालेला परिणाम

प्रा.आव्हाड एस.एन

समाजशास्त्र विभाग प्रमुख

यशवंतराव चव्हाण महाविद्यालय पाचवड

ता.वाई जि. सातारा

**गोषवारा:**

कोरोना व्हायरस हा अतिसूक्ष्म घातक विषाणू आहे. या व्हायरसला कोविड-१९ म्हटले जाते. हा व्हायरस सर्वप्रथम डिसेंबर २०१९ मध्ये चीनमधील वूहान या शहरात आढळून आला होता. ११ मार्च रोजी जागतिक आरोग्य संघटनेने या व्हायरसला महामारी म्हणून घोषित केले आहे. हा संसर्गजन्य रोग असल्याने याचा प्रसार जगभरातील २१३ पेक्षा अधिक देशांमध्ये वेगाने झाला आहे. आजअखेर जगभरात या विषाणूच्या संसर्गामुळे लाखोच्या संख्येने लोक मृत्युमुखी पावले आहेत. कोरोना विषाणूने संपूर्ण जगाला विळखा घातला आहे. याची उत्पत्ती, प्रभाव, फैलाव, लक्षणे आणि उपायांच्या पद्धती यावरून सर्वत्र चर्चा सुरु असून या आरोग्याला घातक असलेल्या विषाणू विरुद्ध प्रत्येकजण उभा राहताना दिसतोय. तरीपण यामुळे सामान्य जनता मात्र हवालदिल झालेली दिसते. वास्तविक कोरोना व्हायरस नवा नाही. काही वर्षांपूर्वी आलेला सार्स रोगही कोरोनाचाच एक प्रकार होता. मात्र कोविड-१९ नावाच्या नव्या विषाणूने सर्वांवर मात करत सर्वत्र धुमाकूळ घातला आहे. जगाचा विचार केला तर १५.११ कोटी व्यक्तींना कोरोना झाला आहे आणि ३१.७९ लाखापेक्षा जास्त व्यक्तींचा बळी घेतला आहे. भारतातही २,४२,३६२ पेक्षा जास्त व्यक्तींचा मृत्यू झाला असून महाराष्ट्रात ७५,२७७ व्यक्तींचा मृत्यू झालेला आहे आणि लागण झालेल्या रुग्णांची संख्या सातत्याने वाढत आहे. याचा परिणाम समाजातील सर्वांवर झालेला दिसतो.

**महत्वाचे शब्द-** कोविड-१९, व्यक्तीच्या सामाजिक, आर्थिक, मानसिक जीवनावर परिणाम

**परिचय:**

चीनमधील वूहान या शहरामधून उदयास आलेल्या कोविड-१९चा जवळजवळ प्रत्येक समाजात गंभीर परिणाम झाला आहे. आरोग्यावर होत असलेल्या विपरीत परिणामामुळे कोविड-१९ ला जागतिक आरोग्य संघटनेने जागतिक महामारी म्हणून घोषित केले आहे. मोठ्या प्रमाणात पसरलेल्या कोविड-१९ने जगाचा प्रवास थांबविण्यास भाग पाडले आहे. व्यक्तीनेही स्वतःला काही बंधने घातली आहेत. तसेच, लॉकडाऊनला जगभर पसरलेला रोग नियंत्रित करण्यासाठी एकमेव उपाय म्हणून ओळखले गेले आहे. भारतीय समाजातील लॉकडाऊन सामाजिक, शैक्षणिक, आर्थिक, राजकीय, कृषी, मानसिक स्तर आणि इतर बऱ्याच गोष्टींशी निगडित आहे ज्यामुळे लोकांच्या जीवनावर विनाशकारी परिणाम झाला आहे. भारतीय समाजात पूर्वी जसे उच्च

जातीतील लोक अस्पृश्यांशी सामाजिक-अंतर राखत असत तसेच अंतर कोविड-१९ च्या कारणास्तव समकालीन समाजात व्यक्ती-व्यक्ती अंतर ठेवत असल्याचे दिसून येत आहे. अर्थव्यवस्थेच्या दृष्टीकोनातून ग्रामीण आणि शहरी दोन्ही ठिकाणी विपरित परिणाम झाला आहे. ग्रामीण भागातून शहरामध्ये रोजगारासाठी स्थलांतरित झालेला मोठा वर्ग आहे. लॉकडाऊनच्या निर्णयाचा या वर्गावरदेखील अपरिमित परिणाम झाला. सध्या जगभरात कोरोना विषाणूच्या साथीने थैमान घातले आहे. या साथीपुढे जगातील विकसित देश देखील हतबल झालेले दिसत आहेत. या विषाणूने समाजातील बहुसंख्य व्यक्तींची परिस्थिती चिंताजनक केली आहे. या रोगाच्या होत असलेल्या प्रसारामुळे 'जिवंत राहणे' हीच प्राथमिकता आहे हे अधोरेखित करायला भाग पाडले आहे. या शोधनिबंधात कोविड- १९चे समाजावर झालेले परिणाम यावर लक्ष वेधले आहे.

### सामाजिक परिणाम:

भारतात मोठा प्रमाणावर कोरोनाची साथ पसरली आहे. गेल्या २४ मार्च २०२० रोजी देशाला संबोधित करताना २१ दिवसांच्या संचारबंदीची घोषणा पंतप्रधानांनी केली. त्या आधीदेखील २२ मार्च रोजी एक दिवसाचा 'जनता कर्फ्यु' पाळण्याचे आवाहन नागरिकांना केले होते. कोरोनाचा प्रादुर्भाव रोखण्यासाठी बरेच कर्तव्यदक्ष लोक अहोरात्र आपल्या जीवाची परवा न करता सेवा करत आहेत. तर याउलट काही लोक कर्फ्यूचे गांभीर्याने पालन करताना दिसत नाहीत. जेव्हा लोकांचे मनोधैर्य वाढवण्यासाठी पंतप्रधानांनी थाळी वाजवण्याचे आवाहन केले तेव्हा काही जण ढोल-ताशा, फटाके घेऊन रस्त्यावर पोहोचले. अशा अवघड परिस्थितीमध्ये सर्वांनी एकत्र येऊन कोरोनाच्या विरुद्ध लढायला पाहिजे. आता सुमारे वर्षभरानंतर देखील कोरोनाच्या स्थितीत बदल झालेला दिसत नाही. परिणामी देशभरात विविध ठिकाणी पूर्णतः किंवा अंशतः लॉकडाऊन लवण्यात आलेले आहे. या काळात प्रत्येकाने घरी बसून शासकीय यंत्रणांना सहकार्य केले पाहिजे. कोरोना रुग्णांना मिळणाऱ्या सोयींपासून ते किराणामाल आणि जीवनावश्यक गोष्टींसाठी आता विविध पातळीवर सुविधा करण्यात आल्या आहेत. परंतु आपल्या देशातील लोकसंख्या पाहता केलेल्या सुविधा फारच त्रोटक आहेत. त्यामुळे प्रत्येकाने जबाबदारीने वागणे हाच प्राधान्यक्रम आहे. या महामारीच्या सुरुवातीच्या काळात विशिष्ट धर्माच्या लोकांना कारणीभूत ठरवणे, दिलेल्या निर्देशांचे पालन न करणे, शहरातून येणाऱ्या लोकांना गावात प्रवेश न देणे, प्रवेश रोखण्यासाठी गावाच्या वेशीवर अडथळे निर्माण करणे, एखाद्या व्यक्तीला संशयावरून गावाबाहेर काढणे अशा गोष्टी निदर्शनास आल्या. सद्यस्थितीत कोरोनाविषयी मोठ्या प्रमाणात सामाजिक सजगता आली आहे परंतु त्याचबरोबर जबाबदारीचे भान येणे हेदेखील तेवढेच क्रमप्राप्त आहे. कारण सध्या भारतामध्ये एकूण उपलब्ध असणाऱ्या डॉक्टरांची संख्या, बेडची संख्या तसेच व्हेंटिलेटर, मास्क आणि इतर अत्याधुनिक उपकरणे ही भारताच्या एकूण लोकसंख्येपेक्षा खूपच कमी आहेत. तसेच रुग्ण तपासाच्या वेळी लागणाऱ्या साधन सामुग्रीचा तुटवडा असल्याने डॉक्टर्स, नर्स, पोलीस आणि इतर जे लोक जबाबदारीने काम करत आहेत त्यांना थेटपणे संसर्ग होण्याचा धोका आहे. समाजातील इतर घटक लक्षात



घेता जे मोठे शेतकरी नाहीत त्यांच्याकडे धान्याचा साठा नाही. जे लोकं स्थलांतर करून गेलेले असतात ते आर्थिकदृष्ट्या शक्य असेल तेवढे धान्य घेऊन ठेवतात परंतु तो साठा पर्याप्त नसतो. शहराकडे गेलेले कित्येक स्थलांतरित मजूर आपल्या गावी परतले. ते जिथे कामासाठी गेले होते तिथे त्यांना दिवसाला काहीतरी काम मिळून त्याचा मोबदला मिळायचा आणि त्यावर त्यांचा उदरनिर्वाह व्हायचा. परंतु ते गावी आल्यानंतर त्यांचा रोजगार बंद झाला आहे. हातावरचे पोट असल्यामुळे बहुसंख्य व्यक्तींची बँक बचत नाही. ज्याच्या शेतीला पाण्याची व्यवस्था आहे त्यांच्या घरी अन्नधान्य आहे. पण जे आदिवासी शेतकरी शेतीसाठी पावसाच्या पाण्यावर अवलंबून आहेत त्यांच्याकडे साठा असणे अवघड आहे. एकंदरीत सामाजिक दुराव्यासोबतच माणसाच्या उदरनिर्वाहाच्या प्रश्न कोरोनाने उभा केला आहे.

### अर्थव्यवस्थेवर परिणाम:

कोविड-१९ या साथीच्या आजाराचा आणि लॉकडाऊनचा फटका भारतीय अर्थव्यवस्थेवर झालेला आहे. लघुउद्योग, शेतकरी, मजूरवर्ग, लघुव्यावसायिक यांच्यासाठी हा काळ आव्हानाचा आहे यात शंका नाही आणि गेल्या वर्षभरात आपण त्याचा परिणाम देशाच्या जीडीपीवर झालेला पाहिला. परंतु सद्यस्थितीत बरेच व्यवसाय चालवण्यास सरकारने अनुमती दिलेली आहे, त्यामुळे व्यापारी वर्गाला थोडी सवलत मिळाल्याचे दिसते. दुसरीकडे ग्रामीण भागातील अर्थव्यवस्था बेरोजगारीमुळे जास्तच प्रभावित होत आहे. आरोग्याच्या दृष्टीने कोरोनाकडे पाहणे महत्वाचे आहेच पण या कोविड-१९ व्हायरसचे अर्थकारणावर होणारे परिणामही अतिशय तीव्र आहेत. या आजारामुळे जागतिक अर्थव्यवस्थेवर होणारा परिणाम आता स्थानिक पातळीवर ठळकपणे दिसू लागलाय. जागतिक व्यापाराची पुरवठा साखळीच विस्कळीत करून या विषाणूने जागतिक अर्थव्यवस्थेला जेरीस आणले असेच म्हणावे लागेल. काही अब्ज डॉलर्सचा फटका केवळ कोरोनामुळे जागतिक अर्थव्यवस्थेला बसलाय आणि अजूनही तो वाढतच जात आहे. तेल उत्पादक देश, रशिया व अमेरिका यांच्यात सुरू झालेल्या तेलयुद्धाचा अन्य देशांना आणि तो ग्राहकांनाही काही फायदा मिळालेला दिसून येत नाही. इंटरनेट व तंत्रज्ञानामुळे व्यावसायिकदृष्ट्या जग हे खूप छोटे झाले आहे. विकसित देशांना सेवा पुरवणाऱ्या आयटी कंपन्यांची जागतिक पातळीवरची देवघेव इतकी वाढली आहे की एका देशातील उद्योग बंद पडताच दुसऱ्या देशाला त्याचा लगेच फटका बसतो. देशातील वाहन उद्योगही अडचणीत आहे. चीनमधून भारतात येणाऱ्या गाड्यांचे सुटे भाग व औषधांसाठी लागणारा कच्चा माल उपलब्ध होत नसल्याने त्याचा औषध व वाहन उद्योगांवर विपरीत परिणाम झाला आहे. अलीकडेच अमेरिकेने औषधासाठी लागणाऱ्या कच्च्या मालाच्या निर्यातीवरील बंदी उठवल्याने थोडा दिलासा मिळाले म्हणण्यास हरकत नाही. आपल्याकडील पर्यटन व वाहतूक क्षेत्र मंदीच्या सावटाखाली आहे. तीर्थक्षेत्रे, खाण्याच्या जागा, शॉपिंग मॉल तसेच गर्दीच्या जागा ओस पडलेल्या दिसतात. कृषी क्षेत्रालाही मोठा फटका या कोरोनामुळे बसला आहे. कांद्याला मिळणारा भाव कमी होत असताना पालेभाज्या आणि फळांची मागणीही घटलीय. देशातून मासे आणि कोळंबीचीही मोठ्या प्रमाणात निर्यात होते परंतु सध्या कृषि सोबतच मत्स्य व्यवसाय देखील

मंदावलेला दिसून येत आहे. कोरोना संदर्भात पसरलेल्या अफवांचा सर्वात मोठा फटका पोल्ट्री व्यवसायाला बसला. या व्यवसायाला दरमहा हजारो कोटी रुपयांचा फटका सहन करावा लागला. खाद्य निर्मिती करणाऱ्या कंपन्यांनी खरेदी थांबवल्यामुळे मका व सोयाबीन सारखी पिके घेणारे शेतकरीही अडचणीत आले आहेत. केवळ महाराष्ट्रात प्रत्यक्ष-अप्रत्यक्षरीत्या पोल्ट्री व्यवसायावर अवलंबून असलेल्या लाखो लोकांना याची झळ सोसावी लागत आहे. कोरोनाचा पहिला फटका बसला तो निर्यातीला. अनेक देशांची निर्यात ठप्प झाली आहे. आपल्याकडील आंबा, द्राक्ष निर्यातदार शेतकऱ्यांपासून तर व्यापाऱ्यांपर्यंत आणि कामगारांपासून तर उद्योजकांपर्यंत सगळेच हवालदिल झाले आहेत. ग्लोबल इकॉनॉमीमध्ये प्रत्येक देश सध्या दुसऱ्या देशावर अवलंबून आहे. त्यामुळे या प्रश्नाची दाहकता अधिक वाढते. अनेक उद्योग बंद पडण्याच्या स्थितीत आहेत. औषध कंपन्यांचीही तीच गत आहे. कापड, यंत्रमाग, छोट्या-मोठ्या इंजिनिअरिंग इंडस्ट्रीज, आयटी सर्व्हिसेस या सर्वच उद्योगांना त्याची जबर किंमत मोजावी लागू शकते. आपल्याकडे ९० टक्के नोकऱ्या या असंघटित क्षेत्रांत आहेत. अगदी रिक्षावाला, हातगाडीवाला, टॅक्सीवाले, रस्त्यावरचे खेळणी विक्रेते यापासून तर वेटर, गॅरेजवाले, मॉल मधील तरुण-तरुणी, बांधकाम क्षेत्रात काम करणारे मजूर, अर्धकुशल, अकुशल कामगार अशा हातावर पोट असलेल्या लोकांच्या रोजगारावर कोरोनामुळे संक्रांत आली आहे. नोटबंदीच्या तडाख्याने घायाळ झालेल्या अर्थव्यवस्थेतील हे घटक आता कुठेतरी कसंबसं सावरत असताना अचानक कोरोनाचे संकट कोसळले. साधे चहाचे उदाहरण घेता येईल. राज्याची लोकसंख्या बारा कोटीच्या घरात आहे. यापैकी अवघ्या एक कोटी लोकांनी जरी एका वेळेस हॉटेलमध्ये चहा घेणे सोडले आणि पाच रुपयाला एक चहा याप्रमाणे हिशेब केला तर महिन्याला काही कोटी रुपयांचा फटका केवळ चहावाल्यांना बसणार आहे. त्यातही मुळातच हातावर पोट असलेल्या या वर्गाकडून बचत केली जात नाही. शिल्लक काही उरतच नसल्यामुळे बचत करणार तरी कशी? अशातच कोरोनाची स्थिती आणखी एक-दोन महिने कायम राहिली तर या वर्गाचं जगणं कठीण होणार आहे. अशा परिस्थितीत पोटाची खळगी भरण्यासाठी अनेक कुटुंबं सावकारांकडून अवघ्या सव्वा व्याज दराने पैसे घेऊन ते कर्जाच्या दुष्टचक्रात अडकण्याचीही शक्यता आहे. नाट्यक्षेत्रातील कलाकार आणि पडद्यामागे काम करणारे कामगार यांच्या उत्पन्नावरही गदा आली आहे. या सर्व बाबींकडेही लक्ष देण्याची गरज आहे. सध्या राज्यात आणि एकूणच देशभरात बेकारीने कळस गाठला आहे. त्यातच कोरोनामुळे आणखी वाढ होण्याची भीती आहे. त्यामुळे याचाही लगेचच अभ्यास करून कोणत्या उद्योगावर काय परिणाम होईल आणि त्यासाठी काय उपाययोजना कराव्या लागतील याचाही विचार करावा लागणार आहे. त्याची सुरुवात संवादापासून होऊ शकते. त्यासाठी छोटे, मध्यम व मोठ्या व्यवसायिकांशी आणि त्यांच्या संघटनांशी लगेचच चर्चा सुरू केली तर त्यावर लवकर मार्ग शोधून काढणे शक्य होईल. भारतासारख्या विकसनशील अर्थव्यवस्थेसाठी प्रगतीची दारे उघडणारा काळ म्हणूनही या रोगाकडे पाहिलं जातंय. कधी कधी वाईटातूनही चांगले घडत असते. त्याप्रमाणेच कोरोनाच्या संकटातून संधीही निर्माण होऊ शकतात. फक्त त्या शोधण्याची आणि त्याला मूर्त

रूप देण्याची तत्परता राज्यकर्त्याकडे असावी लागते. आपल्याकडील राज्यकर्ते तशी तत्परता दाखवतील, अशी आशा करायला हरकत नाही. चीनपासून धास्तावलेल्या व पर्यायी उत्पन्नाच्या शोधात असणाऱ्या उद्योगांना भारत व विशेषतः महाराष्ट्र हा एक सुरक्षित पर्याय होऊ शकतो. यामुळे गलितगात्र झालेल्या आपल्या अर्थव्यवस्थेलाही नवसंजीवनी मिळू शकेल. पण त्यासाठी केंद्र व राज्य सरकारने पुढाकार घेऊन करसवलती व अन्य शक्य त्या उपाययोजना त्वरेने करणे आवश्यक आहे. तसेच अर्थतज्ञांची समिती नेमून येत्या काही वर्षात कोरोना विषाणूच्या प्रादुर्भावामुळे उद्योगांवर होणाऱ्या अल्प व दीर्घकालीन परिणामांचा अभ्यास करून वेळीच योग्य ती पावलेही उचलली पाहिजेत. एकमेकांशी येणाऱ्या जवळच्या संबंधांमुळे कोरोनाचा वेगाने प्रसार होतो. म्हणून राज्य सरकारने शाळा-महाविद्यालये, मॉल, थिएटर बंद केले आहेत. काही कंपन्यांनीही कार्यालयात न येता घरून काम करण्याची मुभा दिली आहे. यातून एक नवी कार्यप्रणालीही उदयास येऊ शकते. याचा भविष्यात काय परिणाम होईल हे आताच सांगणे कठीण असले तरी अर्थव्यवस्थेवर याचा थेट परिणाम आताच दिसून येत आहे.

**कोविड-१९: मानसिक आरोग्याच्या समस्यांत वाढ:-**

आत्महत्येचा विचार करणाऱ्यांच्या किंवा स्वतःला ईजा करून घेणाऱ्यांच्या संख्येत अलीकडील काळात वाढ झाली आहे. गुगलवर “सुइसाइड” हा सर्च देणाऱ्या लोकांच्या संख्येत प्रचंड वाढ दिसून येत आहे. कोरोनाशी संबंधित आत्महत्यांच्या बातम्या आल्यामुळे तसेच आत्महत्येची कल्पना व भावनिक ताणासंदर्भातील फोनकॉल्स व ईमेलसमध्ये तिपटीने वाढ झाली आहे. कोरोनाच्या साथीमुळे देशभरातील लोकांना वेगळ्या जीवनपद्धतीशी जुळवून घेणे भाग पडत आहे आणि त्यामुळे त्यांच्या मानसिक आरोग्यावर मोठा ताण येत आहे. एरवीही जगात सर्वाधिक आत्महत्या होणाऱ्या देशात लॉकडाऊनचा लोकांच्या मानसिक आरोग्यावर प्रतिकूल परिणाम झाला आहे. “समाजाच्या वंचित घटकांमध्ये आत्महत्येचा विचार नक्कीच वाढीस लागलेला आहे.” “मानसिक आजार, आर्थिक असुरक्षितता आणि कामाचा ताण या पूर्वीपासून प्रचलित धोक्यांमध्ये लॉकडाऊनमुळे आणखी वाढ झाली आहे. या समस्या लोकसंख्येच्या सर्व स्तरांमध्ये, सर्व आर्थिक व सामाजिक गटांमध्ये जाणवत आहेत, असे त्यांनी स्पष्ट केले. यातील अनेक रुग्णांना औषधे किंवा उपचार मिळवणे कठीण झाले असल्याने त्यांचे आजार पुन्हा डोके वर काढत आहेत. हे प्रमाण ग्रामीण भागात अधिक आहे. चिंता, नोकरी जाणे, ताण, एकाकीपणा आणि आर्थिक असुरक्षितता ही मानसिक आजारांसाठी उपचार घेऊ इच्छिणाऱ्या रुग्णांनी दिलेली प्रमुख कारणे आहेत. बहुतेक प्रकरणांमध्ये चिंतेचा स्तर खूप अधिक आहे. हा बहुतेकदा कोरोनाशी थेट संबंधित नाही पण पूर्वीच्या समस्यांची तीव्रता या कालखंडात नक्कीच वाढली आहे. यामुळे दडपल्यासारखी भावना निर्माण होत आहे आणि त्यातून आत्महत्येचा विचार वाढीस लागत आहे,” एकंदर देशातील मानसिक आरोग्याची स्थिती गंभीर आहे असे निरीक्षणातून दिसून येत आहे. मानसिक आरोग्यासाठी मदत मागणाऱ्यांमध्ये तरुण व्यावसायिक, विद्यार्थी आणि स्त्रियांचे प्रमाण अधिक आहे. मानसिक आजारांचे प्रमाण मात्र लोकसंख्येच्या सर्व वर्गांमध्ये, सर्व स्तरांवर खूप आहे. सरकारनेही सामाजिक-आर्थिक सुरक्षितता

जाळी वाढवणे तसेच मानसिक आजारांचा सामना करणाऱ्यांना आधार देण्यासाठी आणखी काही मार्गांचा विचार करणे अत्यंत आवश्यक आहे.

#### निष्कर्ष :

सामाजिक परिणामाचा विचार केला तर व्यक्ती-व्यक्ती जाणीवपूर्वक अंतर ठेवत आहेत कारण कोविड-१९ मुळे आतापर्यंत भारतात २,२६,०२,५९६ अधिक लोक बाधित झाले आहेत, तर २,४५,२७० अधिक मृत्युमुखी पडले आहेत. महाराष्ट्रात सुमारे ६,५७,०१९ बाधित असून ७४,४१३ व्यक्ती मृत्युमुखी पडले आहेत आणि अजूनही ही हानी दिवसेंदिवस वाढतच जाणार आहे, कारण अजून साथ आटोक्यात आलेली नसून ती वाढतच आहे. त्यामुळे जगातील बहुतांश देशांना जागतिक आर्थिक मंदीची झळ बसल्याचे दिसून येते. आपल्या देशात कोविड-१९ पूर्वीच आर्थिक मंदी ठाण मांडून बसली होती. त्यामुळे आणखी गंभीर आर्थिक मंदीला आपल्याला तोंड द्यावे लागत आहे. सर्वांनी सर्व व्यवहार बंद करून आहे तिथे थांबणे आणि संसर्ग टाळणे, हाच मार्ग सर्व देशांनी निवडला आहे. त्यामुळे 'न भूतो न भविष्यती' अशी परिस्थिती निर्माण झाली. बहुतांश उद्योगधंदे-व्यवसाय बंद झाले आहेत. आर्थिक व्यवहार रोडावले आहेत. यातून फक्त जीवनावश्यक गोष्टींना सूट दिली गेली-जसे की भाजी, औषधे, किराणा इत्यादी. एरवी गर्दीने ओसंडून वाहणारे रस्ते सुनसान झाले आहे. एक दिवस नाही तर अनेक दिवस, काही महिने. एवढी गंभीर वेळ येईल अशी कुणी कल्पना केलेली नव्हती. उलाढालीत घट व त्यामुळे नफ्यावर विपरीत परिणाम. विमान वाहतूक, बँकिंग, हॉटेल, बांधकाम व पर्यटन क्षेत्राचे प्रचंड नुकसान. जीडीपीमध्ये घट. क्रयशक्तीत मोठी घट व त्यामुळे अर्थव्यवस्था आकुंचन पावण्याचा धोका, लोकांमधील वाढलेले नैराश्य असे अगणित परिणाम या महामारीमुळे समाजाच्या सामाजिक, आर्थिक तसेच मानसिक स्थितीवर झालेले दिसून येतात.

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## CHAPTER-51

## दया पवार यांच्या साहित्यातील वेदना व विद्रोह

डॉ. दिनेश पांडुरंग वाघुंबरे

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## प्रस्तावना:

साठोत्तरी मराठी साहित्यात जे विविध वाङ्मयीन प्रवाह निर्माण झाले; त्यातील महत्वाचा प्रवाह म्हणजे दलित साहित्य होय. समूहनिष्ठ साहित्याचा महत्वाचा प्रवाह म्हणजे दलित साहित्य होय. साहित्य, समाज आणि चळवळ यांचा सहसंबंध दर्शविण्यासाठी अशा प्रकारच्या साहित्यप्रवाहांचा नितांत उपयोग होतो. डॉ. बाबासाहेब आंबेडकर यांचे जीवनचरित्र, महात्मा गौतम बुद्ध यांचा बौद्ध धम्म आणि महात्मा फुले यांचे लेखनसाहित्य ही या लेखनप्रवाहाची प्रेरणा म्हणता येईल. अशा या साहित्यप्रवाहामध्ये ज्या ज्या लेखकांनी आपली लेखणी लिहिती केली. त्यांमध्ये अण्णा भाऊ साठे, शंकरराव खरात, ना. रा. शेंडे, नारायण सुर्वे, योगीराज वाघमारे, नामदेव ढसाळ, अर्जुन डांगळे, केशव मेश्राम, वामन होवाळ यांच्यासह दया पवार यांच्या नावाचा समावेश होतो.

दलित साहित्याचे विशेष नोंदवताना विविध अभ्यासकांनी आपापल्या परीने व्याख्या करण्याचा प्रयत्न केलेला आहे. त्यात डॉ. म. ना. वानखेडे यांच्या मते, दलित साहित्य म्हणजे धर्माने आणि सामाजिक रूढीने ज्यांना आजवर बहिष्कृत मानले त्या लेखकांचे साहित्य म्हणजे दलित साहित्य होय, असे सांगितले आहे. तर वि. स. जोग यांच्या मते, हिंदू धर्मातील रूढींनी ज्यांना जन्मजात अस्पृश्यता दिली आहे, अशा अस्पृश्यांनी आपल्यावरील, या जन्मनिष्ठ कनिष्ठावरील अन्यायाविरुद्ध आवाज ज्या साहित्यात उठवला आहे, ते म्हणजे दलित साहित्य. या दोन्हीही व्याख्यांचा आशय पाहिल्यानंतर या साहित्यप्रवाहांचे वेगळेपण, प्रस्थापित व्यवस्थेविरुद्धाचा हुंकार, आणि अभिव्यक्तीहेतू निश्चित होतांना दिसून येतो. (तांबोळी, 2016, 20)

या पार्श्वभूमीवर दया पवार यांच्या साहित्यातील वेदना व विद्रोह लक्षात घेणे, हा या लेखामागचा मुख्य हेतू आहे.

## ‘कोंडवाड्या’तील विद्रोही जाणिवा:

दया पवार यांच्या कोंडवाडा कवितासंग्रहाविषयी स्वतः पवार असे म्हणतात की, ‘कोंडवाडा’ लिहून झाला नसता, तर ‘बलुतं’ही लिहून झालं नसतं. याचाच अर्थ बलुतं च्या लिहिण्यामागणी पार्श्वभूमी ही ‘कोंडवाडा’ या कवितासंग्रहाने अगोदरच तयार करून ठेवलेली होती. या कवितासंग्रहात दया पवार यांचा विषांदाचा सूर दिसून येतो. त्यांनी पुनः पुन्हा प्रस्थापित व्यवस्थेला प्रश्न विचारलेले दिसून येतात. किंबहुना इतिहास-पुराणांतील पराभूत नायक-नायिकांना आपल्या कवितांमध्ये स्थान दिलेले दिसते. त्यामुळे अनेकदा नवीन मिथ निर्माण

झाल्या आहेत की काय असे सहज वाटून जाते. “खांडववन जाळणारे तुमचे पिढीजात हात/आज तुम्ही पारंगत वडवानल पेटविण्यात” या संस्कृतीने अगदी अनादी काळापासून दलितांचे शोषण केले आहे. किंबहुना शोषणाची व्यवस्थाच निर्माण केलेली दिसून येते. ही व्यवस्था सनातन आणि शाश्वत स्वरूपाची आहे. याला तथागत भगवान बुद्ध, महात्मा जोतीबा फुले आणि डॉ. बाबासाहेब आंबेडकर यांनी विरोध केला. नवीन समाजाची निर्मिती ही नेहमीच महापुरुषांचे ध्येय राहिलेले आहे. परंतु ग्रंथप्रामाण्यवादाने या सर्वांवर पाणी फिरवले. ही अत्यंत खेदाची बाब आहे. या देशातील मूळ निवासी लोकांना हद्दपार करून प्रस्थापितांनी आपली संस्कृती लिलया रुजवण्याचा प्रयत्न केला. आणि त्यात ते यशस्वी झाले. त्यामुळे पराभूत नायक हे आमच्या इतिहासाचे नायक आहेत. असे त्यांना वाटते. दलित कवितेने हिंदू मिथकांचे खंडण केलेले आहे. त्याची प्रचीती कोंडवाड्यातून येते. खांडववनाची मिथ पवारांच्या कवितेत येऊन जाते. प्रा. रा. ग. जाधव यांच्या मते दलित पुराण-निर्मिती ही दलित साहित्याची कालोचित गरज आहे. ही बाब नोंद घेण्यासारखी आहे. इतिहासाचे पुनर्वाचन आणि पुनर्मूल्यांकन काव्यात्म पातळीवर पवार करतांना दिसतात. निरापराध लोकांची हत्या हे आर्य संस्कृतीचे वसाहतीकरण रुंदावण्यामागचा हेतू आहे. आणि इतिहासात अशा प्रकारच्या निरापराध हत्यांचे अनेक दाखले नोंदविण्यात आले आहे. याची आठवण यानिमित्ताने होते.

प्रा. वानखेडे म्हणतात त्याप्रमाणे, “मिथ या कोणत्याही समाजाला आवश्यक असतात. पवारांनीसुद्धा सिद्धार्थ, अंगुलीमाल, दस्यूचा अबलख घोडा, एकलव्य, नागभूमी, शंबूक इत्यादी मिथ वापरल्या आहेत. कधी कधी मात्र एखादी ‘मिथ’ केंद्रस्थानी मानून पवार त्या विषयी विचार करून आपली कविता लिहीत असावेत, असे वाटते.

दया पवार यांच्या कवितांवर मार्क्सवादाचाही प्रभाव असल्याचे दिसून येते. अनेकदा ते क्रांतीची आणि परिवर्तनाची भाषा वापरतात. शोषितवर्गाला ते आवाहन करू इच्छितात. ते म्हणतात, “तुम्हीच प्रकाशाचे पुंजके व्हा/अन् क्रांतीचा जयजयकार करा.” दया पवारांची कविता ही वैयक्तिक अनुभवातून सामाजिक आणि प्रातिनिधिक होताना जाणवते.

डॉ. भालचंद्र फडके पवारांच्या ‘कोंडवाडा’ बद्दल म्हणतात, “त्यांचे भाग्य असे थोर की, त्यांना रोखठोक भाषेत अन्याय, दुःख वेशीवर टांगणारे सुर्वे भेटले. प्रक्षोभ, विद्रोह व्यक्त करणारे बागूल मित्र म्हणून लाभले. सांस्कृतिक संघर्षाची जाणीव असलेले अभ्यासक डॉ. वानखेडे भेटले आणि पानतावणे यांच्या ‘अस्मिदर्श’ मध्ये अनुभव मांडायला जागा मिळाली. अकाली मरण पावलेल्या सुकांत भट्टाचार्यांच्या कवितेमुळे ते अस्वस्थ झाले. डॉ. आंबेडकरांच्या विचारांचे चिंतन करीत करीत त्यांना नवा मार्ग सापडला.” (फडके, 1977,145) डॉ. फडके यांचे हे मत लक्षात ठेवण्याजोगे आहे.

समर्पणशीलता हा दया पवार यांच्या कवितेचा स्थायीभाव आहे. “धारदार सुल्यांच्या दरवाज्याला/हत्ती जसे चिपा होतात/तसे आपण हसत हसत मरावे” यातून त्यांची सामाजिक जाणीव वैश्विक होताना जाणवते. त्यांची कविता भविष्याची स्वप्न पाहते. भविष्यकाळ

घडवायचा असेल तर वर्तमान मातीमोल झाला तरी चालेल, असे त्यांना वाटते. त्यांची एकूणच कविता काव्यात्म पातळीवर विद्रोह करताना जाणवते.

### दगडूचं शोषित आयुष्य कथन करणारं 'बलुतं':

दया पवार यांचा महत्वाचा ग्रंथ म्हणजे 'बलुतं' हे आत्मकथन होय. दलित आत्मकथनांचा विचार केला तर असे दिसून येते की दलित साहित्याच्या निर्मितीपूर्वी असणारे आत्मचरित्राचे रूढ आकृतिबंध हे दलित साहित्याने झुगारून दिलेले दिसून येतात. जीवनाच्या पूर्वार्धातच त्यांनी आपल्या जीवनाची कुत्तरओढ चित्रित केलेली पाहावयास मिळते. त्यात उपरा, आठवणींचे पक्षी, मुक्काम पोष्ट देवाचे गोठणे इत्यादी अनेक आत्मकथनांचा समोवशा होतो; त्यात बलुतंचे नाव अग्रक्रमाने घ्यावे लागते. बलुतं या आत्मकथनाची प्रथम आवृत्ती ही 24 डिसेंबर 1978 रोजी आली. आज बलुतं प्रकाशित होऊन चाळीस वर्षांपेक्षा जास्त काळ लोटलेला आहे. तरीसुद्धा आजही हे आत्मकथन वाचकमनाला भुरळ पाडताना दिसते. स्वतः दया पवार म्हणतात, "कोंडवाडा हा कवितासंग्रह लिहून झाला नसता तर 'बलुतं' लिहिता आले असते की नाही याची शंका वाटते." या आत्मकथनातील घटना-प्रसंग हे योगायोग नसून प्रत्यक्षात अनुभवलेल्या घटना आहेत. त्यामुळे काल्पनिकतेचा लवलेशही या पुस्तकात आलेला दिसून येत नाही. या पुस्तकाची अर्पणपत्रिका ही "आई तुझ्यामुळंच दलितांच्या विराट दुःखाचं दर्शन झालं." ही आहे. पवारांनी हे आत्मकथन आपल्या आईस अर्पण केलेले आहे. वयाच्या पूर्वार्धात लिहिलेले हे कथन आहे. त्यामुळे हे आत्मकथन एकीकडे आत्मनिष्ठ होत असले तरी दुसरीकडे ते समूहनिष्ठ होतांनाही जाणवते.

बलुतं ही स्वतःचीच आत्मकहाणी दया पवारांनी जरा वेगळ्या भूमिकेतून वाचकांसमोर मांडलेली आहे. स्वतःच्या व्यक्तिमत्त्वाची जडणघडण उलगडून दाखविण्यासाठी लिहिलेली आहे. दगडू मारुती पवार हा दया पवार यांनी स्वतःची आत्मकहाणी सांगतो आहे, अशी भूमिका या आत्मकथेत घेतलेली आहे. रूढ अर्थाने बलुत्याचा नायक कुणीही नाही. यातील दगडू हा व्यवस्थेला प्रश्न विचारणारा प्रतिनायक आहे. त्यामुळे सर्रासपणे प्रतिनायकाला जो व्यवस्थेविरुद्ध संघर्ष करावा लागतो; तो दगडूलाही करावा लागतो. हा दगडू बलुतंमध्ये वेळोवेळी पराभूत होताना दिसून येतो. त्याचं दुभंगलेपण, परवड वेळोवेळी चित्रित झालेली दिसते. आत्मकथनाच्या पातळीवर दलित समाजाच्या जीवनाचं प्रारंभिक आणि प्रातिनिधिक प्रतिबिंब चित्रित करणारं ही पहिलं व्हिलं आत्मकथन म्हणता येईल. आपल्या सामाजिक भूतकाळाचे प्रतिबिंब या आत्मकथनातून आलेले आहे.

बलुत्यात प्रामुख्याने आई आणि दादा यांची व्यक्तिचित्रे उठावदार आहेत, परंतु त्यातही इतर अनेक व्यक्तीचे चित्रण येतेच, त्यातही जावजीबुवा, उमा आजा, सदाशिव, तात्या, काकू, दादासाहेब, सलमा, सई, गऊ, शिवातात्या, आजी, कुलकर्णी सर, चंदर यांची व्यक्तिचित्रे उठावदार आहेत. या सर्वच मंडळीच्या जीवनाचे सूत्र अलग अलग आहे. बलुत्यातील समाज-जीवनाचा पट, धामणगावचा महारवाडा आणि मुंबईचा कावाखाना यांमध्येच जरी विणला गेलेला असला, तरी इतरही व्यक्तीच्या अनुषंगाने विविध समाजाच्या जीवनाचे दर्शन त्यातून घडते. दलित

साहित्याच्या आत्मकथनाच्या इतिहासात बलुंतला अग्रक्रमाने स्थान द्यावे लागते. (खांडगे,1989,62)

बलुंतचे निवेदन करताना दगडू मात्र तो ज्या दलित समाजातून आला, त्या समाजाच्या सुखदुःखापासून, समाजाच्या जाणिवांपासून बराचसा दूर दूर चाललाय, असे लक्षात येते. याचे कारणही दगडूच्या व्यक्तिमत्वात नसून, तो ज्या सामाजिक परिवर्तनाचा एक अपरिहार्य भाग झाला, त्या परिवर्तनाला द्यावे लागेल. दगडू बदलतोय आणि त्याचे हे बदलणे त्याला दलित समाजापासून दूर नेत आहे. सामाजिक चळवळीच्या रेट्यामुळेही तो बदलत होता. काही जुन्या संकल्पना मातीआड लोटल्या जात होत्या.

एकूणच दलित समाज, दलित चळवळ, स्त्री-पुरुष संबंधातील ताणे-बाणे, ग्रामीण आणि मुंबईसारख्या शहरी भागातील दलितांचे जीवन, त्यांचे होणारे षोशण, मुक्त संबंध, मुस्लिम आणि दलित यांचे परस्परांविषयीचे ग्रह, धर्मांतरावरून निर्माण झालेले प्रश्न असे विविध आयाम या आत्मकथनाला लाभलेले आहे.

#### दया पवारांचे 'चावडी' आणि 'विटाळ':

दलित चळवळींविषयीचे अतिशय चिकित्सक लेखन ज्यातून येते, त्याचे नाव 'चावडी' असे म्हणता येईल. त्यामुळे दलित साहित्यात 'चावडी'चे स्थान आगळेवेगळे आहे. या लेखनातून त्याची सामाजिक बांधिलकी दिसून येते. हा ग्रंथ स्तंभलेखनाचे संकलन आहे. दिनांक साप्ताहिकातून 1979 ते 1980 या कालावधीत जे लेखन केले होते. ते यातून प्रकाशित करण्यात आलेले आहे. या एकूच स्तंभलेखनामध्ये तत्कालीन विषय हाताळलेले आहेत. प्रवासात त्यांनी विविध देशातील संस्कृती अतिशय जवळून पाहिली. तेथील प्रश्न त्यांना तीव्रतेने जाणवले. ते प्रश्न चिंतनशिल स्वरूपाचे होते. ते त्यांनी 'जागल्या' या नावाने सदर चालवून लिहिले. यातून समाजातील विविध प्रवृत्तींविषयी तक्रार निवेदन केलेली आहे. 'चावडी' आणि 'जागल्या' असे या पुस्तकांचे सरळ दोन भाग केलेले आहेत. समाजातील समांतर साहित्याच्या निमित्ताने फिरत असतांना आलेले अनुभव 'चावडी'तून कथन केलेले आहेत. चावडीत एकंदर वीस लेख आहेत. त्यांपैकी काही व्यक्तिचित्रणात्मक तर काही सामाजिक व्यंग्यावर बोट ठेवणारे आहेत. आपल्याला आलेल्या अनुभवांवरचे ते भाष्य आहे. त्यात त्यांनी दिल्लीमधील सनातन मूल्ये जपणारी कुल्हड संस्कृती चित्रित केलेली आहे. घेट्टोमधील रिक्षा खेचणारांचे जग, गावकुसाबाहेरील लोकांची आजची स्थिती, मीरा दातार या दग्याविषयीच्या आहारी गेलेले अंधश्रद्धाळू कलावंत, तेथे अंगात येऊन घुमणार्या स्त्रिया चित्रित केल्या आहेत. पाशी नावाच्या उपेक्षित जमातीचे चित्रण केले आहे. 'अलवरा डाकू' आणि 'गरिबी हटाव' मधून विषन्न करणारी सामाजिक परिस्थिती चित्रित केलेली आहे. सतीश जमाली, अभिमन्यू अनंत, ओम गोस्वामी, आलमशहा खान यांसारख्या हिंदी लेखकांच्या जीवनाभिमुख लेखकांचाही परिचय करून दिलेला आहे. हे लेखन ललित लेखन नाही. त्यामुळे यात कोणत्याही प्रकारची कलात्मकता दिसून येत नाही. अशा प्रकारच्या त्यांच्या एकूणच लेखनात सामाजिक बांधिलकीचा प्रत्यय दिसून येतो.



‘चावडी’तील दुसरा भाग म्हणजे ‘जागल्या’ होय. हे लेखनही सामाजिक जाणिवेतून केलेले असले तरी यातील लेखन हे चावडीपेक्षा वेगल्या स्वरूपाचे आहे. या लेखातून त्यांनी दलित साहित्याच्या संदर्भात जागल्याची भूमिका घेतलेली आहे. समाजातील ढोंगीपणावर त्यांनी हल्ला चढविलेला आहे. दलित चळवळीच्या विकृतीवर बोट ठेवले आहे. ‘लगीन’सारख्या लेखातून त्यांनी अरुण कांबळेच्या लग्नाची कथा सांगितली आहे. यात त्यांनी अरुण कांबळेची फिरकी घेतलेली आहे. ‘दलितस्थान’ सारख्या लेखातून काँग्रेसला बळी पडलेल्या दलित नेत्यांनी हकिगत चित्रित केली आहे. ‘काठी’ या लेखातून महात्मा गांधींच्या तत्वांना आणि विचारांना आपण कसे दुरावलो आहोत, याचे उपहासगर्भ चित्रण आलेले आहे. या लेखांसाठी दया पवार यांनी ग्रामीण भाषेचा बाज वापरलेला आहे. त्यातील शब्द अस्सल ग्रामीण स्वरूपाचे आहेत. अनेकदा उदाहरणांचा उपयोग केलेला आहे. अत्यंत परखड स्वरूपाचे हे लेखन आहे.

दया पवार यांच्या ‘विटाळ’ कथासंग्रहातील कथा ह्या दलितांचे विविध स्वरूपातील जीवनचित्रण रेखाटणाऱ्या कथा आहेत. त्यांच्या सुरुवातीच्या कथा या रोमँटिक स्वरूपाच्या होत्या. कालांतराने जेव्हा ‘पंख’ सारखी कथा लिहून झाली. तेव्हा त्यांना कथाआशयाचा खरा सूर गवसला. ‘विटाळ’ सारख्या शीर्षकावरूनच त्याचे वेगळेपण लक्षात येते. या कथासंग्रहात एकूण दहा कथांचा समावेश आहे. पैकी एका भागात दलितांचे जीवनानुभव तर दुसऱ्या भागात दलितेतरांचे जीवनानुभव चित्रित केलेले आहेत. भूक, ससाणा, आमदार यांसारख्या कथांतून दलितेतर जीवनाचे अनुभव व्यक्त केलेले आहेत. ‘विटाळ’ सारख्या कथेतून सामाजिक विषमतेवर बोट ठेवले आहे. समाज आणि कायदा हा नेहमी सत्ताधारीवर्गाच्या बाजूने असतो. यात व्यक्ती ही नेहमी हतबल ठरत असते. शेवटी तिला तडजोडी कराव्या लागतात. हे यातून सूचित होते. समाजरचनेचे विविध कंगोरे शोधण्याचा प्रयत्न या कथेतून केला गेला आहे. लेखक वाचकांना एका भयाण वास्तवाला सामोरे घेऊन जातो. नैसर्गिक विटाळापासून ते सामाजिक विटाळापर्यंत स्त्रियांना आणि दलितांना कसे नाकारले गेले आहे, हे विदारक सत्य यातून प्रतिबिंबित होते. या कथासंग्रहात ‘फिडेल’ आणि ‘आमदार’ या व्यक्तिचित्रणात्मक कथा येतात. यातून दलित समाजातील विघातक प्रवृत्तीवर बोट ठेवलेले आहे. यामुळे समाजाचा विकास खुंटतो, असे भाष्यही करतात. ‘घुसमट’ सारख्या कथेतून दलितेतर जीवनाचे भयाण दर्शन घडवलेले आहे. आर्थिक समस्यांतून उद्धवलेली दारिद्र्यता आणि त्यातून गलितगात्र झालेले कुटुंब, हालअपेष्टा, जगण्याचा रेटा याचे भयाण चित्रण यातून आलेले आहे. ही कथा म्हणजे अनुभवाची प्रामाणिक अभिव्यक्ती म्हणता येईल. मानवी जीवनाची गुंतागुंत यातून प्रकट होते. पवारांच्या अनेक कथा दारिद्र्याची पार्श्वभूमी घेऊन उभ्या राहतात. ‘सयबाय’ सारखी कथा ही मानवी वृत्ती-प्रवृत्तीचा वेध घेते. ‘ससाणा’ सारखी कथा ही गावगुंडांचा प्रश्न हाताळताना दिसते. ‘वधस्तंभ’ सारख्या कथेतून संघर्ष करणारा माणूस उभा राहतो. एकूणच विटाळमधील कथा पाहिल्यातर या सर्व कथा या पांढरपेशी आणि मध्यमवर्गापासून दूर जाऊन दलित लेखकाने दलित समाजाच्या लिहिलेल्या व्यथा म्हणता येतील. वर्णव्यवस्थेचा समाजव्यवस्थेवरील पगडा यातून प्रतिबिंबित होतो. तरीदेखील काही ठिकाणी मन हेलावून टाकणाऱ्या घटनांचे चित्रण लेखकाने केलेले आहे. दया

पवार यांचे लेखन हे सामाजिक बांधिलकीतून झालेले दिसून येते. कथेतून येणारी पात्रे ही शोषित समाजाची आहेत. त्यांनी कथांतून सामाजिक मूल्यांचा होणारा रूढास चित्रित केलेला आहे. व्यवस्थेची पडझड चित्रित केलेली आहे. त्यामुळे त्यांची कथा चिंतनाच्या पातळीवर जाताना दिसते.

#### **समारोप :**

दया पवार यांच्या एकूण साहित्याचा विचार केला तर असे लक्षात येते की, 1960 नंतर मराठी साहित्यात जे वाङ्मयीन प्रवाह निर्माण झाले. त्यातील दलित साहित्याचा प्रवाह प्रगल्भ करण्यामध्ये त्यांच्या एकूण साहित्याचा वाटा मोलाचा आहे. आत्मकथन, कथा, कविता आणि स्तंभलेखन इत्यादी वाङ्मयप्रकारांचा उपयोग करून त्यांनी आपली साहित्यनिर्मिती केलेली पाहावयास मिळते. त्यातही 1960 नंतर दलित समाजात झालेले स्थित्यंतर, शिक्षणाचा परिणाम, दलितांचा राजकारणातील प्रवेश, जिल्हा आणि तालुक्याच्या स्तरावरील राजकारण, निर्माण झालेली दलित नेतृत्व, शोषितांवर होणारा अन्याय, दलित, मुस्लिम यांच्यातील ताणतणाव त्यामागची राजकीय पार्श्वभूमी ही अत्यंत खूबीने त्यांनी आपल्या साहित्यातून चित्रित केलेली आहे. कोंडवाडा हा कवितासंग्रह आणि बलुतं हे आत्मकथन हे एकाच नाण्याच्या दोन बाजू म्हणता येतील. त्यांच्या एकूणच साहित्यात विषाद आणि विद्रोह एकत्रित आलेला जाणवतो. ते आपल्या साहित्यातून विषमतेवर प्रहार करतात आणि मानवतेचे गीत गातात. एकूणच दलित साहित्याच्या प्रारंभीच्या काळातील लेखकांमध्ये दया पवार यांचे नाव घ्यावे लागेल.

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## CHAPTER-52

## भारतातील बालकामगार समस्या: कारणे, परिणाम व हक्क किंवा अधिकार

प्रा. डॉ. सुभाष तातेराव पंडित

अर्थशास्त्र विभाग

स्वामी विवेकानंद रात्र कला व वाणिज्य महाविद्यालय,  
दत्त नगर, आयरे रोड, डोंबिवली (पूर्व) ४२१२०१ जिल्हा ठाणे

## गोष्टवारा (Abstract):

देशाच्या विकासाचे आणि सुरक्षतेचे भवितव्य हे बालकांच्या हाती असते. जगातील अनेक देशांच्या आर्थिक व सामाजिक घटकांचा अभ्यास करताना दिसून येते की, अर्थव्यवस्थेचा विकास करत असताना अनेक देशाने जवळ – जवळ सर्वच क्षेत्रात मोठ्या प्रमाणात प्रगती केली असली तरी विविध प्रकारच्या आर्थिक व सामाजिक समस्या त्या देशांच्या वाढत्या प्रगतीचा आलेखाबरोबरच वाढलेल्या असून यातील अत्यंत परिणामकारक समस्या म्हणून बालकामगार समस्येला ओळखले जाते. आर्थिकदृष्ट्या मागास, गरीब, असलेल्या विकसनशील व अविकसित राष्ट्रात बालकामगार समस्या तीव्र स्वरूपाची असलेली आपणास दिसून येते. सदर अभ्यासात भारतीय अर्थव्यवस्थेतील बालकामगार समस्या निर्माण होण्याची कारणे, परिणाम त्याच बरोबरच बालकांचे समजातील हक्क याबाबत विक्षेपण केले आहे.

## प्रस्तावना (Introduction):

बालमजुरी म्हणजे मुलांचे बालपण हिरावून घेणारे, नियमित शाळेत जाण्याच्या त्यांच्या क्षमतेत व्यत्यय आणणारे आणि ते मानसिक, शारीरिक, सामाजिक किंवा नैतिकदृष्ट्या धोकादायक आणि हानीकारक अशा कोणत्याही कामात मुलांचा रोजगार होय. गुरुपादस्वामी समितीच्या शिफारशीवर आधारित, बालकामगार (प्रतिबंध आणि नियमन) कायदा 1986 मध्ये लागू करण्यात आला. कायदानुसार, विशिष्ट धोकादायक व्यवसाय आणि उत्पादन प्रक्रियांमध्ये मुलांना कामावर ठेवण्यास मनाई करण्यात आली असून इतर घटकांमध्ये कामाच्या परिस्थितीचे नियमन केले होते. दिनांक 20 नोव्हेंबर 2018 मध्ये बालमजुरीचे नियमन हे औद्योगिक क्रांतीच्या सुरुवातीच्या दिवसांपासून सुरू झाले. ब्रिटनमध्ये बालमजुरीचे नियमन करणारा पहिला कायदा 1803 मध्ये मंजूर करण्यात आला. 1802 आणि 1819 च्या सुरुवातीला कारखाने आणि सूत गिरण्यांमधील कामगारांच्या मुलांचे कामाचे तास 12 तासांवर नियमित करण्यासाठी फॅक्टरी कायदे पारित करण्यात आले असले तरी बालमजुरी कमी झालेली आपणास दिसून येते नाही. जागतिक लोकसंख्येपैकी बालकामगारांचे प्रमाण 38.7 टक्के मुले धोकादायक कामात गुंतलेली असून विविध क्षेत्रांमध्ये, बालकामगारांची सर्वाधिक संख्या, 122 दशलक्ष म्हणजे 64% आहे. ज्यामध्ये भारतातील बालकामगारांची संख्या मोठ्या प्रमाणात असलेली आपणास लक्षात येते. 2011 च्या जनगणनेनुसार, भारतातील (5-14) वयोगटातील

एकूण बालकांची संख्या 259.6 दशलक्ष आहे. यापैकी 10.1 दशलक्ष (एकूण बालकांच्या लोकसंख्येच्या 3.9%) एकतर 'मुख्य कामगार' किंवा 'किमान कामगार' म्हणून काम करत आहेत. देशातील एकूण राज्याचा विचार केला तर उत्तर प्रदेशमध्ये बालकामगारांची सर्वाधिक संख्या असून त्याचे प्रमाण देशाच्या तुलनेत 20% पेक्षा जास्त आहे. (सेव्ह द चिल्ड्रेन, 2016) यातील बहुतेक बालमजूर हे उत्तर प्रदेशात प्रचलित असलेल्या रेशीम उद्योगात काम करतात. भारतात सामाजिकदृष्ट्या मागासलेल्या कुटुंबातील मुलांचे पालक किंवा नातेवाईक त्यांना बालमजुरीकडे ढकलताना आपणास दिसून येते. अनेक प्रकरणांमध्ये, मुलांना कमावण्यासाठी किंवा उत्तपन निर्माण करून कुटुंबाचा उदरनिर्वाह करता यावा याकरिता शाळा सोडून काम करायला भाग पाडले जाते.

#### **अभ्यासाची उद्दिष्ट्ये (Objectives of Study):**

१. बालकामगारांची समस्येच्या कारणे, परिणामाचा अभ्यास करणे.
२. बालकामगारांची समस्येवरील उपाय सुचविणे.
३. देशातील बालकांच्या हक्क किंवा अधिकाराचा अभ्यास करणे.

#### **अभ्यासाच्या मर्यादा (Limitations of Study):**

प्रस्तुत अभ्यास केवळ देशातील बालकामगार समस्या निर्माण होण्यास कारणीभूत असलेल्या घटकांचा तसेच त्यांच्या परिणामाचा करण्यात आला असून समाजातील बालकांच्या हक्कांचे किंवा अधिकारांचे विश्लेषण करण्यात आले आहे.

#### **अभ्यास संशोधन पद्धती (Research Methodology of Study):**

देशाच्या अर्थव्यवस्थेतील बालकामगारांच्या समस्येची कारणे, परिणाम व त्यांची हक्क याचा अभ्यास करण्यासाठी आवश्यक असलेली माहिती ही संशोधनाच्या द्वितीय साधन सामुग्रीच्या आधारे प्राप्त करून वर्णनात्मक आणि विश्लेषणात्मक पद्धतीचा उपयोग अभ्यासात करण्यात आला आहे.

"बालमजुरी" या शब्दाची व्याख्या साधारणतः असे काम म्हणून केली जाते जे मुलांचे बालपण, त्यांची क्षमता आणि त्यांचा सन्मान हिरावून घेते आणि शारीरिक आणि मानसिक विकासासाठी हानिकारक आहे. बालमजुरी अशा कामांचा संदर्भ देते जे: मानसिक, शारीरिक, सामाजिक किंवा नैतिकदृष्ट्या धोकादायक आणि मुलांसाठी हानिकारक आहे; भारताची जनगणना 2001 नुसार कार्यालय, 17 वर्षांहून कमी वयाच्या मुलाने भरपाई, मजुरी किंवा नफा यासह किंवा त्याशिवाय आर्थिकदृष्ट्या उत्पादक क्रियाकलापांमध्ये सहभाग म्हणून बालमजुरीची व्याख्या केली आहे. असा सहभाग शारीरिक किंवा मानसिक किंवा दोन्ही असू शकतो. बालमजुरीची व्याख्या उद्योग किंवा व्यवसायात मुलांचा वापर अशी केली जाते. विशेषतः जेव्हा बालमजुरी बेकायदेशीर किंवा अमानवीय मानली जाते.

#### **बालकामगार समस्येची कारणे (Causes of Child Labour):**

अर्थव्यवस्थेतील बालमजुरी आणि शोषण हे अनेक घटकांचे परिणाम आहेत, ज्यात गरिबी, सामाजिक नियम, प्रौढ आणि किशोरवयीन मुलांसाठी योग्य कामाच्या संधींचा अभाव,

स्थलांतर आणि आपत्कालीन परिस्थिती यांचा समावेश होतो. हे घटक केवळ बालमजुरीचे कारणच नाहीत तर भेदभावामुळे प्रबळ झालेल्या सामाजिक असमानतेचा परिणाम देखील आहेत. देशातील बालकामगार समस्येची काही कारणे पुढील प्रमाणे आहेत.

- गरिबी व दारिद्र्य
- संयुक्त कुटुंब पद्धती
- शेती व शेतीसंबंधित व्यवसाय
- असुक्षित पालक वर्ग
- दर्जेदार शिक्षणाचा अभाव
- सभ्य कामासाठी कमी प्रवेश
- बालमजुरीबद्दल मर्यादित समज
- नैसर्गिक आपत्ती आणि हवामान बदल
- संघर्ष आणि मोठ्या प्रमाणावर स्थलांतर
- बालमजुरीशी लढा

#### **बालकामगार समस्येची परिणाम (Impact Of Child Labours Problem):**

बालमजुरीचे परिणाम थक्क करणारे असून बालमजुरीमुळे बालकांची अत्यंत शारीरिक आणि मानसिक हानी होऊ शकते आणि मृत्यू देखील होऊ शकतो. त्यातून गुलामगिरी आणि लैंगिक किंवा आर्थिक शोषण होऊ शकते. आणि जवळजवळ प्रत्येक बाबतीत, ते मुलांना शालेय शिक्षण आणि आरोग्य सेवेपासून दूर करते, त्यांचे मूलभूत अधिकार मर्यादित करते आणि त्यांचे भविष्य धोक्यात आणते. बालकामगार मुलांना त्यांच्या शाळेत जाण्याचा हक्क हिरावून घेतात आणि गरिबीचे आंतरपिढी चक्र मजबूत करते. 2011 च्या जनगणनेच्या आकडेवारीनुसार, भारतात बालकामगारांची संख्या 10.1 दशलक्ष आहे. ज्यात 5.6 दशलक्ष मुले आणि 4.5 दशलक्ष मुली आहेत.

समाजातील बालमजुरीमुळे अर्थव्यवस्थेतील प्रौढ बेरोजगारी वाढते परिणामी राष्ट्रीय वेतन कमी होते. बालमजुरीचा वापर करणे म्हणजे कामगारांमध्ये गुंतवणूक केली जात नाही किंवा त्यांना योग्य मोबदला दिला जात नाही, अशा प्रौढांचा समज तयार होतो. यावरून असे सूचित होते की, बालमजुरी हा समाजातील गरिबीचा एक पैलू असला तरी, आर्थिक विकासाच्या पातळीच्या पलीकडे असलेले घटक बाल रोजगारावर प्रभाव टाकतात. एकदा बालमजुरीमध्ये गुंतल्यानंतर, मुले अनेकदा शाळेत परत येऊ शकत नाहीत किंवा त्यांचे शिक्षण चालू ठेवू शकत नाहीत. बऱ्याच प्रकरणांमध्ये, पालक मुलांना शाळेत जाण्यास सक्रीयपणे प्रतिबंधित करतात, तर मागणी केलेल्या दीर्घ तासांमुळे शालेय शिक्षण व्यावहारिकदृष्ट्या अशक्य होते.

## बालकामगार समस्येवरील उपाय आणि हक्क किंवा अधिकार (Rights and Measures of Child Labour Problem) :

### बालकामगार समस्येवरील उपाय (Measures of Child Labour Problem):

भारतात बालमजुरीची प्रथा अजूनही कायम आहे, 80 लाखांहून अधिक मुले (5-14 वर्षे) शेतात, कारखाने, दुकाने आणि इतरत्र काम करतात. कृतज्ञतापूर्वक, सेव्ह द चिल्ड्रेन सारख्या संस्थांद्वारे लागोपाठ सरकारी धोरणे आणि कठोर नागरी समाजाच्या पुढाकारांच्या संयोजनाने बाल हक्कांसाठी लढण्यासाठी एक ठोस दिशा दाखवली आहे. सामाजिकदृष्ट्या जागरूक कॉर्पोरेशन आणि धर्मादाय देणगी देणाऱ्या नागरिकांच्या वाढत्या संख्येसह एकत्रितपणे, बाल हक्क आज प्रत्येकासाठी एक कारण बनले असून भारतातील बालमजुरी संपुष्टात आणण्याचा प्रयत्न करत आहे. देशातील बालकामगार समस्येची काही उपाय पुढील प्रमाणे आहेत.

- समाजात जागरूकता निर्माण करणे.
- देशात अधिक कठोर बालमजुरी विरोधक कायदे आणि प्रभावी अंमलबजावणी करणे
- अधिक मुलांना शाळेत पाठवण्याची आवश्यकता आहे.
- सेव्ह द चिल्ड्रेन चाइल्ड एज्युकेशन उपलब्धीमध्ये खालील गोष्टींचा समावेश आहे:  
झोपडपट्ट्या आणि गावांसारख्या वैविध्यपूर्ण सेटिंग्जमध्ये 'समावेशक विद्यार्थी अनुकूल वातावरण' तयार करणे
- मुलांना शाळेत पाठवण्यासाठी, प्रवेशासाठी मदत देण्यासाठी मुले आणि कुटुंबांशी संवाद करणे गरजेचे आहे.
- मुलांसाठी अनुकूल आणि परस्परसंवादी शिक्षण पद्धतींसह शाळेत मजेदार, अर्थपूर्ण अनुभव तयार करणे आवश्यक आहे.
- संगणक, क्रीडा उपकरणे आणि मोबाईल लर्निंग सेंटर यासारख्या ग्रंथालये आणि पायाभूत सुविधांसाठी निधी निर्माण करणे.
- शाळाबाह्य मुले (गळती आणि कधीही शाळेत न गेलेली मुले), रस्त्यावरील मुले आणि बालकामगारांना यशस्वीरित्या परत आणणे.
- लोकांना घरे, दुकाने, कारखाने इत्यादींमध्ये मुलांना कामावर ठेवण्यास विरोध करणे.
- सेव्ह द चिल्ड्रेन सारख्या स्वयंसेवी संस्थांना मदत करणे.

### बालकामगारांचे हक्क किंवा अधिकार (Rights of Child Labour):

मुलांनी केलेले श्रम त्यांच्या अनेक अधिकारांवर परिणाम करतात, विशेषतः आरोग्याचा अधिकार आणि अत्याचार आणि शोषणापासून संरक्षण जेव्हा श्रमाचे स्वरूप एखाद्या मुलासाठी मानसिक किंवा शारीरिकदृष्ट्या धोकादायक असते, आणि शिक्षणाचा अधिकार. जेव्हा काम त्यांना प्रतिबंधित करते भारतीय राज्यघटनेने मूलभूत हक्क आणि राज्य धोरणाच्या मार्गदर्शक तत्वांमध्ये 14 वर्षांपेक्षा कमी वयाच्या बालकामगारांना कोणत्याही कारखान्यात किंवा खाणीत किंवा वाड्यात किंवा इतर कोणत्याही धोकादायक रोजगारात गुंतवून ठेवण्यास मनाई केली

आहे (कलम २४). मुलांची सुरक्षितता, विकस याकरिता त्यांचे संविधानिक हक्क पुढील भाग १, भाग २ आणि भाग ३ मधील कलम (Artical) नुसार स्पष्ट केले आहेत.

**भाग एक (Part I) :**

- कलम १: मुलाची व्याख्या.
- कलम २: मुलांचे भेदभावापासून संरक्षण करणे आवश्यक आहे.
- कलम ३: मुलाचे सर्वोत्तम हित (पालकांचे हक्क आणि कर्तव्ये लक्षात घेऊन).
- कलम ४: कराराच्या अंमलबजावणीसाठी वैधानिक उपाय.
- कलम ५: पालकांचे हक्क.
- कलम ६: जगण्याचा अधिकार.
- कलम ७: मुलाचा जन्म नोंदणीचा अधिकार.
- कलम ८: नाव, राष्ट्रीयत्व आणि कौटुंबिक संबंधांवर मुलाचा हक्क.
- कलम ९: मुलाच्या इच्छेविरुद्ध मुलाचा हक्क त्याच्या पालकांपासून विभक्त होऊ नये.
- कलम १०: दोन्ही पालक वेगळे राहिल्यास त्यांच्याशी संपर्क ठेवण्याचा मुलाचा हक्क.
- कलम ११: परदेशात मुलांच्या बेकायदेशीर हस्तांतरणाविरुद्ध उपाययोजना.
- कलम १२: कोणत्याही न्यायिक आणि प्रशासकीय कार्यवाहीमध्ये ऐकण्याचा मुलाचा अधिकार.
- कलम १३: बालकांचा अभिव्यक्ती स्वातंत्र्याचा अधिकार.
- कलम १४: मुलाचा विचार स्वातंत्र्याचा अधिकार.
- कलम १५: मुलाचा सहवास स्वातंत्र्याचा हक्क.
- कलम १६: मुलाचा गोपनीयतेचा अधिकार.
- कलम १७: राष्ट्रीय आणि आंतरराष्ट्रीय मास मीडियावरून माहिती मिळवण्याचा बालकाचा हक्क.
- कलम १८: मुलाच्या संगोपनाची प्राथमिक जबाबदारी पालक किंवा कायदेशीर पालकांची आहे.
- कलम १९: मुलांचे गैरवर्तन आणि अत्याचारापासून संरक्षण करण्याची राज्याची जबाबदारी.
- कलम २०: तात्पुरते किंवा कायमस्वरूपी त्यांच्या कौटुंबिक वातावरणापासून वंचित असलेल्या मुलांसाठी राज्याचे दायित्व.
- कलम २१: दत्तक घेण्याच्या बाबतीत मुलांसाठी राज्याच्या जबाबदारी.
- कलम २२: निर्वासित म्हणून वर्गीकृत असलेल्या मुलांसाठी राज्याच्या जबाबदारी.
- कलम २३: मानसिक किंवा शारीरिकदृष्ट्या अक्षम असलेल्या मुलांसाठी राज्याचे दायित्व.
- कलम २४: बालकांच्या आरोग्य सेवा पुरविण्याचे राज्याचे दायित्व.

- कलम २५: शारीरिक किंवा मानसिक आरोग्य सेवा सेटिंग्जमध्ये ठेवलेल्या मुलांना त्यांच्या परिस्थिती आणि उपचारांचे नियतकालिक पुनरावलोकन करण्याचा अधिकार आहे.
- कलम २६: सामाजिक सुरक्षा विमा आणि फायद्यांचा मुलाचा हक्क.
- कलम २७: मुलाच्या शारीरिक, मानसिक, आध्यात्मिक, नैतिक आणि सामाजिक विकासासाठी योग्य राहणीमानाचा बालकाचा हक्क.
- कलम २८: मुलाचा शिक्षणाचा हक्क.
- कलम २९: मुलाचे शिक्षण कोणत्या उद्दिष्टांकडे निर्देशित केले पाहिजे आणि वैयक्तिक प्रौढांना शैक्षणिक संस्था स्थापन करण्याचा आणि निर्देशित करण्याचा अधिकार.
- कलम ३०: जातीय, धार्मिक किंवा भाषिक अल्पसंख्याक गटातील मुलांचे हक्क.
- कलम ३१: विश्रांती, विश्रांती आणि मनोरंजक क्रियाकलापांचा मुलाचा हक्क.
- कलम ३२: आर्थिक शोषणापासून संरक्षण मिळण्याचा बालकांचा हक्क.
- कलम ३३: अंमली पदार्थ आणि सायकोट्रॉपिक औषधांच्या बेकायदेशीर वापरापासून मुलांचे संरक्षण करण्याची राज्याची जबाबदारी.
- कलम ३४: मुलांचे लैंगिक शोषण आणि लैंगिक शोषणापासून संरक्षण करण्याची राज्याची जबाबदारी.
- कलम ३५: मुलांचे अपहरण किंवा तस्करी रोखण्यासाठी राज्याची जबाबदारी.
- कलम ३६: बालकांच्या कल्याणासाठी प्रतिकूल असलेल्या शोषणाच्या इतर सर्व प्रकारांपासून मुलांचे संरक्षण करण्याची राज्याची जबाबदारी.
- कलम ३७: मुलांना छळ, अमानुष किंवा अपमानास्पद वागणूक किंवा शिक्षा, ज्यामध्ये फाशीची शिक्षा किंवा सुटकेच्या शक्यतेशिवाय जन्मठेपेची शिक्षा दिली जात नाही याची खात्री करण्याची राज्याची जबाबदारी आहे.
- कलम ३८: पंधरा वर्षांखालील मुलांनी युद्धात किंवा इतर शत्रुत्वात थेट भाग घेऊ नये याची खात्री करणे आणि सशस्त्र संघर्षामुळे प्रभावित झालेल्या मुलांचे संरक्षण आणि काळजी घेणे हे राज्याचे दायित्व.
- कलम ३९: छळ, अपमानास्पद वागणूक किंवा सशस्त्र संघर्षाला बळी पडलेल्या बालकांच्या शारीरिक आणि मानसिक पुनर्प्राप्तीस प्रोत्साहन देण्याची राज्याची जबाबदारी.
- कलम ४०: दंडात्मक कायद्यांचे उल्लंघन करणाऱ्या मुलांबाबत राज्याच्या जबाबदारी.
- कलम ४१: कन्व्हेंशनचा कोणताही भाग मुलांच्या हक्कांसाठी अधिक अनुकूल असलेल्या राज्य कायद्यांमध्ये असलेल्या तरतुदींना ओव्हरराइड करू शकत नाही.

#### भाग दुसरा (Part II) - बाल हक्क समिती (Committee on the Rights of the Child)

- कलम ४२: अधिवेशनातील तरतुदी व्यापकपणे ज्ञात करण्यासाठी राज्यांचे दायित्व.
- कलम ४३: बाल हक्कांवरील संयुक्त राष्ट्र समितीच्या भूमिकेचे वर्णन.



- कलम ४४: समितीला अहवाल.
- कलम ४५: समिती अहवालांचे मूल्यमापन करणारी प्रक्रिया.

भाग तिसरा (Part III) - मंजूरी, दुरुस्त्या, इ. (Procedures for ratification, amendments, etc.)

- कलम ४६: अधिवेशन सर्व राज्यांच्या स्वाक्षरीसाठी खुले असेल.
- कलम ४७: अधिवेशन मंजूर होण्याच्या अधीन आहे.
- कलम ४८: अधिवेशन प्रवेशाद्वारे स्वीकारले जाऊ शकते (संमतीप्रमाणेच परंतु स्वाक्षरीपूर्वी नाही).
- कलम ४९: अधिवेशन २० व्या अनुमोदन/प्रवेशानंतर ३० व्या दिवशी अंमलात येईल.
- कलम ५०: राज्य पक्ष दुरुस्तीचा प्रस्ताव देऊ शकतो.
- कलम ५१: राज्य पक्ष आरक्षण दाखल करू शकतो.
- कलम ५२: राज्य पक्ष अधिवेशनाचा निषेध करू शकतो (म्हणजे राज्याचा सहभाग संपुष्टात आणण्याची घोषणा करा).
- कलम ५३: संयुक्त राष्ट्रांचे सरचिटणीस हे अधिवेशनाचे डिपॉझिटरी म्हणून नियुक्त केले गेले आहे.
- कलम ५४: सध्याच्या अधिवेशनाचे मूळ संयुक्त राष्ट्रसंघाच्या महासचिवांकडे असते.

#### निष्कर्ष (Conclusion):

बालमजुरी ही एक देशाच्या विकासातील अत्यंत वाईट समस्या असून समाजात गरिबी, आर्थिक स्थैर्य आणि शिक्षणाचा अभाव, सामाजिक परिस्थिती इत्यादींमुळे निर्माण होते. मुलांच्या शाळेच्या वेळेनंतर कौटुंबिक संस्थांमध्ये काम करण्याची परवानगी मिळाल्यावर, जेव्हा कौटुंबिक संस्थांची योग्य व्याख्या दिली जात नाही, तेव्हा गुन्हेगारांना रोखणे कठीण होते. केवळ बालमजुरी व शोषणाविरुद्ध कायदे आणि संहिता मसुदा तयार करणे आणि अंमलात आणणे हा त्यावरचा मूलभूत उपाय नसून बालमजुरीचा गुन्हा रोखणे आणि कायद्यातील दंडात्मक तरतुदींची कठोर अंमलबजावणी करणे आवश्यक असून मुलांचे पुनर्वसन करणे गरजेचे आहे. सर्व शैक्षणिक, मनोरंजक, सुधारात्मक सहाय्य प्रदान करणे आवश्यक आहे. जे त्याला मुलांना स्वावलंबी बनवेल आणि त्याच्या किंवा तिच्यानुसार आशादायक भविष्य सुनिश्चित करणाऱ्या संधी सुरक्षित करण्यास सक्षम असेल. मुलांचे बालपण हा सुवर्णकाळ मानला जातो आणि बालकामगाराच्या या सुवर्णकाळाला शोषण, हिंसा आणि शारीरिक आणि भावनिक अत्याचार सहन करावे लागतात. बालकामगारांच्या हक्कांचे रक्षण करणे आणि त्यांना बालमजुरी आणि अत्यंत कमी वेतनाच्या कधीही न संपणाऱ्या पळवाटापासून रोखणे आवश्यक आहे. मूल भविष्यातील देशाचा सक्षम नागरिक असून देशाचा विकास व सुरक्षितता त्यांच्या हाती आहे. म्हणून आपण त्यांना केवळ उज्ज्वल उद्याचे वचन देत नाही. तर त्यांच्याकडून राष्ट्राच्या आशादायक विकासात्मक भविष्याची आशाही निर्माण करतो.

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## CHAPTER-53

## भारतीय अर्थव्यवस्था विकास: कृषिक्षेत्राचे योगदान

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अर्थशास्त्र विभाग

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## प्रस्तावना:

कोणत्याही देशाच्या आर्थिक विकासामध्ये कृषी विकासाची भूमिका महत्वाची असते. देशांतील लोकांना अन्नधान्याची पूर्तता करण्याचे महत्वाचे काम कृषिक्षेत्र करते. भारतातील कृषिक्षेत्र ग्रामीण अर्थव्यवस्थेचा कणा असून ग्रामीण भागातील लोकांचा कृषी हा जीवनाधार आहे. भारत हा जगातील दुसऱ्या क्रमांकाची लोकसंख्या असणारा देश आहे. त्यामुळे देशातील कृषिक्षेत्रात प्रचंड प्रमाणात लोकसंख्या गुंतलेली आढळून येते. परिणामी भारतीय अर्थव्यवस्था व कृषिक्षेत्र या दोघांच्या विकासामध्ये पूरक असा संबंध पाहायला मिळतो. या शिवाय उद्योग क्षेत्राला लागणारा कच्चा माल पुरवठा करण्याचे महत्वाचे काम कृषिक्षेत्राद्वारे केले जाते. देशाच्या एकूण विकासात कृषी क्षेत्राचे योगदान एकूण GDP मध्ये सुमारे 17% आणि 60% पेक्षा जास्त लोकांना रोजगार पुरवठा होतो. भारतीय कृषी क्षेत्राने गेल्या काही दशकांमध्ये विविध घटकात उल्लेखनीय वाढ नोंदवलेली दिसून येते. विकासातील वेगवान वाढीमुळे भारतीय शेतीला जागतिक स्तरावर अस्तित्व दर्शविण्यास मदत झाली आहे. म्हणून भारतीय अर्थव्यवस्थेच्या विकास प्रक्रियेत कृषिक्षेत्राच्या योगदानाचा अभ्यास करणे क्रमप्राप्त ठरते. सदर अभ्यासात देशाच्या आर्थिक विकासामध्ये कृषिक्षेत्राशी संबंधित महत्त्वपूर्ण घटकांचे विश्लेषण केले आहे.

## अभ्यासाची उद्दिष्टे:

1. राष्ट्रीय उत्पन्नातील शेतीच्या योगदानाचा अभ्यास करणे
2. रोजगार निर्मितीमध्ये शेतीच्या योगदानाचा अभ्यास करणे
3. औद्योगिक विकासात शेतीच्या योगदानाचा अभ्यास करणे

## संशोधन कार्यप्रणाली:

सादर केलेला अभ्यास हा माहितीच्या दुय्यम स्रोतावर आधारित असून, प्राप्त माहितीचे विश्लेषणात्मक, वर्णनात्मक आणि तुलनात्मक पद्धतींनुसार केला असून प्रस्तुत अध्यानासाठी पुस्तके, जर्नल्स, वर्तमानपत्रे, इंटरनेट या साधनांचा उपयोग करण्यात आला आहे.

## अभ्यासाच्या मर्यादा:

१. सदर अभ्यास पूर्णपणे भारतातील कृषी क्षेत्रावर आधारित आहे.
२. सदर अभ्यास हा केवळ भारतीय अर्थव्यवस्थेतील विकास प्रक्रियेत कृषिक्षेत्राची भूमिका विचारात घेतली आहे.

३. प्रस्तुत अभ्यासाचे निष्कर्ष केवळ याच कालावधीचे प्रतिबिंबित करतात.

भारतीय कृषिक्षेत्राचा विकास हा जगातील विकसित देशांच्या कृषिक्षेत्राच्या तुलनेत कमी झालेला आपणास दिसून येतो. स्वातंत्र्याच्या प्रारंभिक काळात देशाचे कृषिक्षेत्र मागासलेले होते. शेती करण्याची पद्धत पारंपारिक होती. देशातील वाढत्या लोकसंख्येचा शेतीवरील ताण, यांत्रिकीकरणाचा अभाव, भांडवलाची कमतरता, निरक्षरता, संयुक्त कुटुंब पद्धती, रूढी, प्रथा, परंपरा असे अनेक कारणे शेतीच्या विकासात अडथळा ठरली होती. असे असले तरी अर्थव्यवस्थेत देशाच्या विकासात शेतीचे महत्त्व कमी होत नाही. कारण देशातील जास्तीत जास्त लोकांचे जीवन कृषी वर आधारित होते. आजही देशातील अधिक लोकांच्या उत्पन्नाचे आणि जीवन जगण्याचे साधन शेती व शेतीसंबंधित व्यवसायच आहे. भारतीय अर्थव्यवस्थेत ग्रामीण भागातील ७० टक्क्यांहून अधिक कुटुंबे शेतीवर अवलंबून आहेत.

### पंचवार्षिक योजना आणि कृषीची प्रगती:

योजना काळात देशातील शेतीक्षेत्राची प्रगती खालील घटकांच्या आधारे मोजता येते.

#### १. तांत्रिक धोरण:

वाढत्या लोकसंख्येच्या अन्नाची गरज पूर्ण करणे हे एक महत्वाचे तत्त्व या दरम्यान स्वीकारण्यात आले आहे. त्याकरिता कृषीखालील क्षेत्र वाढवणे, सधन शेती करणे, सिंचन सुविधा विकसित करणे यावर भर दिला. अन्नधान्य उत्पादन वाढविण्या करिता उच्च उत्पादन देणाऱ्या बियाणांचा वापर, खते व कीटकनाशके यांची पूर्तता यावर भर दिला गेला. परिणामी अन्नधान्य उत्पादनात १९५०-५१ च्या ५ कोटी ८ लाख टनावरून २०१३-१४ मध्ये २६ कोटी ४८ लाख टन इतकी वाढ झाली.

#### २. संस्थात्मक कर्ज पुरवठा:

शेतकऱ्यांची कर्जाची गरज शेतीमधील पायाभूत सुविधा उभारणे, खते, बी-बियाणे खरेदी करणे इत्यादी करिता असते. शेतकऱ्यांना कर्ज पुरवठा करण्याकरिता संस्थात्मक कर्जपूर्तीच्या सुविधांचा विस्तार केला. सरकारने सहकारी वित्तसंस्थाना आर्थिक मदत उपलब्ध करून दिली. कृषीकर्ज विस्ताराच्या दृष्टीने क्षेत्रीय ग्रामीण बँकांची स्थापना करण्यात आली. १२ जुलै १९८२ रोजी राष्ट्रीय कृषी आणि ग्रामीण विकास बँकेची स्थापना केली. संस्थात्मक कर्जपुरवठ्याच्या सोयी उपलब्ध झाल्यामुळे शेतकऱ्यांचे सावकारांवरील अवलंबित्व कमी झाले.

#### ३. अन्न सुरक्षा व्यवस्था:

लोकांना कमीत-कमी खाद्यान्न व इतर वस्तूची पूर्तता करण्या करिता योजना काळात सरकारने सार्वजनिक वितरण प्रणालीचा देशभर विस्तार केला. सार्वजनिक वितरण प्रणाली द्वारे अन्नधान्याचे वितरण करण्यासोबत साठा करण्यावर भर दिला गेला. योमुळे अन्न सुरक्षेचे उद्दिष्ट साध्य करण्यास मदत होऊ लागली .

#### ४. ग्रामीण रोजगार कार्यक्रम:

देशातील फार मोठ्या लोकसंख्येचा भाग खेड्यामध्ये राहतो. ग्रामीण भागातील लोकांना सार्वजनिक वितरण प्रणालीतील अन्न खरेदी करण्याकरिता आर्थिक सुरक्षा भाल करणे गरजेचे

होते. याकरिता योजना काळात ग्रामीण रोजगार निर्माण करण्यावर भर देण्यात आला. रोजगार निर्मितीजनक विविध योजना कार्यान्वित करण्यात आल्या.

#### ५. हरित क्रांती:

अन्न धान्य उत्पादनाच्या टप्प्यात हरितक्रांती हा एक महत्वाचा घटक आहे. देशाच्या ईशान्यकडील व कोरडवाहू क्षेत्रात हरितक्रांतीच्या प्रसारार्थ सातव्या पंचवार्षिक योजनेत अनेक प्रकारच्या विशेष योजना सुरु करण्यात आल्या.

#### पंचवार्षिक योजनांदरम्यान कृषिक्षेत्राचा प्राप्त वृद्धीदर (%)

अ. क्रमांक	पंचवार्षिक योजना	वृद्धीदर	अ. क्रमांक	पंचवार्षिक योजना	वृद्धीदर
१	पहिली पंचवार्षिक योजना	२.७१	७	सातवी पंचवार्षिक योजना	३.४७
२	दुसरी पंचवार्षिक योजना	३.१७	८	आठवी पंचवार्षिक योजना	४.६८
३	तिसरी पंचवार्षिक योजना	-०.७३	९	नववी पंचवार्षिक योजना	२.०२
४	चौथी पंचवार्षिक योजना	२.५७	१०	दहावी पंचवार्षिक योजना	२.३०
५	पाचवी पंचवार्षिक योजना	३.२८	११	अकरावी पंचवार्षिक योजना	४.१
६	सहावी पंचवार्षिक योजना	२.५७	१२	बारावी पंचवार्षिक योजना	-

Source: Computed from National Accounts Statistics and Agricultural Statistics at a Glance, Ministry of Agriculture, GOI.

तिसऱ्या पंचवार्षिक योजनेत कृषी उत्पादनाचा वाढीचा दर नकारात्मक (-०.७३) होता. ११ व्या पंचवार्षिक योजनेत कृषी क्षेत्राचा विकास दर ४ % च्या वर असून या पंचवार्षिक योजनेत, भारताच्या एकूण GDP मध्ये कृषी क्षेत्राचे योगदान २५ % पेक्षा जास्त असलेले दिसून येते.

#### राष्ट्रीय उत्पन्नात कृषिक्षेत्राचे योगदान:

कोणत्याही अर्थव्यवस्थेत कृषीचा जीडीपी मधील वाटा हा अर्थव्यवस्थेनिहाय बदलतो. विकसित अर्थव्यवस्थेत हा अत्यंत कमी असतो तर विकसनशील अल्प विकसित अर्थव्यवस्थांमध्ये सर्वाधिक असतो. पहिल्या महायुद्धानंतर कृषिक्षेत्राचा जीडीपी मधील वाटा २/३ इतका होता. यांचे कारण म्हणजे भारताची औद्योगिक बाजू कमकुवत होती. देशाच्या स्वातंत्र्यप्राप्ती वेळी कृषीचा जीडीपी मधील वाटा ५६. ४६ % इतका होता तर २०१८-१९ मध्ये कृषी व कृषीपूरक क्षेत्राचा जीडीपी मधील वाटा १६.१ % इतका राहिला. यावरून असे दिसते

की, जीडीपी मधील कृषीचा वाटा सातत्याने घटत असला तरी आजही कृषी हे राष्ट्रीय उत्पादनात योगदान देणारे महत्वाचे क्षेत्र आहे. कृषीचा जीडीपी मधील घटत जाणारा वाटा हा अल्प विकसित अर्थव्यवस्था विकसनशील अर्थव्यवस्थेत प्रवेश करत असल्याचे सूचित करते.

#### स्थूल देशांतर्गत उत्पादनात (GDP) कृषीक्षेत्राचे योगदान (प्रमाण)

अ. क्रमांक	वर्ष	कृषी क्षेत्राचे प्रमाण (%)	अ. क्रमांक	वर्ष	कृषी क्षेत्राचे प्रमाण (%)
१	१९५०	५६.१	१४	२००८-०९	१७.१८
२	१९६०	४७.८	१५	२००९-१०	१७.३४
३	१९७०	४२.८	१६	२०१०-११	१८.२१
४	१९८०	३६.४	१७	२०११-१२	१७.७८
५	१९९०	२९.१	१८	२०१२-१३	१७.८६
६	२०००-०१	२३.०९	१९	२०१३-१४	१७.५२
७	२००१-०२	२४.०	२०	२०१४-१५	१८.२०
८	२००२-०३	२१.०५	२१	२०१५-१६	१८.२०
९	२००३-०४	२१.०७	२२	२०१६-१७	१७.०५
१०	२००४-०५	२०.०७	२३	२०१७-१८	१५.२६
११	२००५-०६	१९.०७	२४	२०१८-१९	१७.७५
१२	२००६-०७	१८.२९	२५	२०१९-२०	१७.६
१३	२००७-०८	१८.२६	२६	२०२० - २१	२०.०२

Source: Computed from National Accounts Statistics and Agricultural Statistics at a Glance, Ministry of Agriculture, GOI.

#### औद्योगिक विकासातील कृषीचे योगदान:

भारतीय उद्योगाचा विकास मोठ्या प्रमाणावर कृषीवर अवलंबून आहे. भारतातील सर्वच प्रकारच्या उद्योगांना लागणारा कच्चा माल कृषी मधून प्राप्त होतो. कापड, ज्यूट, साखर, आदी उद्योग प्रत्यक्षपणे कृषीवर अवलंबून आहेत. तसेच कृषीचा विकास व औद्योगिक विकास यामध्ये घनिष्ठ संबंध आहेत. विचारवंतांच्या मते, कृषी उत्पादनात १.० % ची वृद्धी झाली असता औद्योगिक उत्पन्नात ०.५ % तर राष्ट्रीय उत्पन्नात ०.७ % वृद्धी होते. भारतीय औद्योगिक विकासातील कृषीक्षेत्राची भूमिका पुढील तक्त्यावरून स्पष्ट होते.

#### परकीय व्यापारातील कृषीचे योगदान:

भारत कृषी उत्पादक निर्यातदार देशांपैकी एक प्रमुख देश आहे. परकीय व्यापाराच्या दृष्टीने कृषीचे महत्त्व खूप आहे. भारताच्या एकूण निर्यातीत कृषीचा वाटा १९९१ मध्ये १९.४

टक्के होता. तर २०११- १२ मध्ये १२.८ टक्के झाला असून २०१८-१९ मध्ये यात घट होऊन तो ११.१ टक्के झाला. भारताची कृषी निर्यात १७.५ टक्क्यांनी वाढून २०२०-२१ मध्ये ४१.८ अब्ज डॉलर्सच्या पुढे गेली, जरी २०१९-२० मध्ये एकूण व्यापारी मालाची निर्यात ७.२% घसरून २९०.८ अब्ज डॉलर झाली. भारताने कृषी-निर्यात आघाडीवर चांगली कामगिरी केली आहे.

#### निष्कर्ष:

भारत हा कृषीप्रधान देश असून देशातील बहुसंख्य लोकसंख्या ग्रामीण भागात राहते व ती लोकसंख्या पूर्णतः उपजीविकेसाठी कृषी क्षेत्रावर अवलंबून आहे. एकूणच देशाच्या अर्थव्यवस्थेचा विशेषतः ग्रामीण भागाचा जलद विकासाकरिता कृषीचा विकास करणे हा उत्कृष्ट उपाय असूनच देशाच्या स्वातंत्र्यापासून पंचवार्षिक योजना राबवून कृषी विकास जलदगतीने करण्यासाठी उद्दिष्ट पूर्ण विविध कार्यक्रम, योजना, धोरणाची अमलबजावणी करण्यात आली. देशाच्या राष्ट्रीय उत्पनात, औद्योगिक विकासात, विदेशी व्यापार आणि रोजगार निर्मितीत कृषीची भूमिका अत्यंत महत्वाची आहे. तिसऱ्या पंचवार्षिक योजनेत कृषिक्षेत्राचा विकासातील वृद्धीदर नकारात्मक असला तरी त्या नंतरच्या योजनेत त्यात वाढ झालेली आपणास दिसून येते. आज वर्तमान अर्थव्यवस्थेत कृषिक्षेत्राचा वाटा कमी होत असताना दिसून येत असला तरी शेती व शेतीसंबंधित व्यवसायाचे महत्त्व कमी होत नाही. देशातील प्रत्येक मोठ्या उद्योगात, आंतरराष्ट्रीय व्यापारात शेती उत्पादनाचे योगदानाकडे दुर्लक्षित करण्यात येणार नाही.

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## CHAPTER-54

## भारतीय अर्थव्यवस्था: मंदीकडे वाटचाल

डॉ. डी. एन. कारे

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## गोष्टावारा:

गेले १५ महिने भारतीय अर्थव्यवस्थेचे आर्थिक पूर्वस्थितीवर परतण्याचे प्रयत्न सुरू आहे, मात्र, देशाची अर्थव्यवस्था अद्यापही २०१९-२० सालच्या सामान्य स्थितीत परतण्यासाठी अडखळत आहे. चालू आर्थिक वर्षाच्या पहिल्या तिमाहीत (एप्रिल ते जून आर्थिक वर्ष २०२१-२२) ३२.४ लाख कोटी रुपयांवर (स्थिर मुदतीत) असलेला जीडीपी, २०१९-२० सालच्या पहिल्या तिमाहीतील ३५.७ लाख कोटी रुपयांच्या तुलनेत ९ टक्क्यांनी कमी आहे. चांगली बातमी अशी आहे की, तो मागील तिमाहीपेक्षा (जानेवारी ते मार्च आर्थिक वर्ष २०२०-२१) २१ टक्क्यांनी अधिक आहे. कोविडच्या साथीत गळचेपी झालेल्या अर्थव्यवस्थेचा कल आता प्रत्येक महिन्यागणिक सुधारताना दिसत आहे.

(महत्वाचे शब्द-जीडीपी, ब्रेजिट, पी. आय. एम.)

## प्रस्तावना :

चालू आर्थिक वर्षाच्या दुसऱ्या तिमाहीचे सकल राष्ट्रीय उत्पादन अर्थात जीडीपीची आकडेवारी जाहीर झाली. त्यात आर्थिक विकासाचा दर ४.५ टक्के असा साडे सहा वर्षांच्या नीचांकी पातळीवर आल्याचे राष्ट्रीय सांख्यिकी कार्यालयाने सांगितले विकास दर कमी होण्याची शक्यता वाढल्यामुळे गुंतवणूकदारांनी शेअर बाजारात विक्रीला मोठ्या प्रमाणात सुरुवात केली. त्यामुळे सर्वोच्च पातळीत असलेला निर्देशांक घसरणीला लागला. आर्थिक वर्ष २०१९-२० मध्ये हे प्रथमच घडले. चालू आर्थिक वर्षात आर्थिक आघाडीवरील जवळपास सर्वच आकडेवारी निराशाजनक आहे. त्याचा परिणाम देशातील गुंतवणूकदार, उद्योजक, व्यापारी, पुरवठादार, वाहतूकदार आणि सर्व सामान्य ग्राहक यांच्यामध्ये गोंधळाचे वातावरण निर्माण झाले आहे. त्यांचे महत्वाचे कारण मंदी होय. सरकार जरी मंदी नसल्याचे भासवत तरी समोर येणारी आकडेवारी निराशाजनक आहे. मंदीची स्थिती हळूहळू भारतीय अर्थव्यवस्थेला आपल्या विळख्यात घेत आहे.

## मंदीची व्याख्या :

सर्वसाधारणपणे मंदी म्हणजे ग्राहकांचा विश्वास कमी होणे देशात बेरोजगारी वाढणे, उत्पादन आणि मागणीत तफावत निर्माण होणे परिणामी देशात अर्थचक्र मंद होणे होय.

म्हणजेच ग्राहकांच्या खिशात पुरेसा पैसा आहे, मात्र खरेदी करण्याचा त्यांचा आत्मविश्वास कमी झाला आहे. एवढा पैसा टाकून अमुक वस्तू खरेदी करावी की नाही अशी संभ्रमावस्था तयार होणे म्हणजे मंदी होय.



मंदीच्या स्थितीत देशातील गुंतवणूकदारांकडे, उद्योजकांकडे व्यापारी वर्गाकडे पुरेसा पैसा असुनही ते नवीन गुंतवणूक करण्यास किंवा नवीन उलाढाल करण्यास तयार होत नाही.

### भारतातील मंदीची कारणे :

२१ व्या शतकातील जगात जास्त दराने विकास करणारी अर्थव्यवस्था म्हणून भारतीय अर्थव्यवस्थेकडे पाहिले जाते. सन २०२४-२५ पर्यंत भारतीय अर्थव्यवस्थेला ०५ ट्रीलीयन डॉलरचा टप्पा गाठण्याचे लक्ष ठेवण्यात आले आहे. परंतु जागतिक घडामोडींमुळे व देशात सरकारने घेतलेल्या नोट बंदी, जी.एस.टी. सारख्या निर्णयामुळे देशातील जी.डी.पी. चा दर कमी झाला आहे. भारतातील मंदीची कारणे पुढील प्रमाणे सांगता येतील.

### १. जगातील विविध देशातील संघर्षात वाद:

सध्या जगभरात आर्थिकदृष्ट्या अस्थैर्य निर्माण झालेले आहे. चीन, हॉंगकॉंग, इंग्लंड, अमेरिका, इटली, टर्की, अर्जेन्टिना, इराण, मेक्सिको, ब्राझील इ. देशात आर्थिक पातळीवर संघर्ष सुरू आहे. हॉंगकॉंग गेल्या पाच महिन्यांपासून धगधगते आहे. तेथील नागरिक विविध मागण्यांसाठी रस्त्यावर उतरले आहे. त्यामुळे तांत्रिक मंदी तयार होऊन तेथील तेथील पर्यटन उद्योगावर मोठा परिणाम झाला आहे. इंग्लंडमध्ये ब्रेजिट आणि युरोप समुदायातून बाहेर पडण्याचा मुद्दा गाजतो आहे. जर्मनी या सर्वांत मोठ्या अर्थव्यवस्थेचे उत्पादन क्षेत्र मंदीच्या सावटात आहे. त्यातच वाहन उद्योगातील मंदीमुळे त्यात अजून भर पडली आहे. इटली या युरोपीय समुदायातील चौथ्या क्रमांकाच्या अर्थव्यवस्थेला २०१८ च्या मध्यापासून तांत्रिक मंदीचा सामना करावा लागत आहे. कमी उत्पादकता, वाढती बेरोजगारी, कर्जाचा बोजा यामुळे इटलीची अर्थव्यवस्था बिकट स्थितीतून जात आहे. जगातील दुसऱ्या क्रमांकाची अर्थव्यवस्था म्हणून ओळखली जाणारी चीनची अर्थव्यवस्था मंदीच्या सावटात आहे. चीन आणि अमेरिका व्यापार युद्धामुळे त्यात अजून भर पडली आहे. चीनचा जी. डी. पी. २०१९ मध्ये १६.१ टक्के राहिल असा अंदाज जागतिक नाणे निधीने वर्तवला आहे. जगभरात मंदीची स्थिती असल्याने त्याचा परिणाम भारतीय अर्थव्यवस्थेवरही होत आहे.

### २. औद्योगिक उत्पादनात घट:

भारतात चालू औद्योगिक वर्षात विविध क्षेत्रातून, घटकातून येणारी आकडेवारी पाहिली असता देशाचा औद्योगिक उत्पादन निर्देशांक (आय. आय. पी.) सातत्याने घटतो आहे. सप्टेंबर २०१९ मध्ये या निर्देशांकाने गेल्या आठ वर्षातील निच्चांक गाठत उणे ४.३ टक्के असा निराशाजनक झाला आहे. क्षेत्रनिहाय पाहिले तर औद्योगिक उत्पादन निर्देशांकाची परिस्थिती पुढील तक्त्यावरून स्पष्ट होते.

**क्षेत्रनिहाय कामगिरी**

अ.न.	क्षेत्र	टक्के
०१	भांडवली वस्तु	-०९.०९
०२	ग्राहकोपयोगी टिकाऊ वस्तू	-०८.०५
०३	निर्मिती क्षेत्र	-०३.०९
०४	विद्युत क्षेत्र	-०२.०६

वरील तक्त्यावरून असे दिसून येते की, देशातील औद्योगिक क्षेत्रातील कामगिरीत मोठ्या प्रमाणावर पीछेहाट झाली आहे. देशातील मोठ्या उद्योगांचा विचार केला तर २३ पैकी १७ उद्योगांनी ऋणात्मक वाढीची नोंद केली आहे. त्यात वाहन क्षेत्र या उद्योगाची कामगिरी अतिशय निराशाजनक आहे.

**३. पायाभुत उद्योगांची पीछेहाट :**

औद्योगिक उत्पादन निर्देशांकाइतकेच महत्वाच्या असणाऱ्या आठ मुख्य पायाभुत उद्योगांच्या उत्पादनाने सप्टेंबर २०१९ मध्ये उणे ५.०२ टक्के असा निच्चांक दर गाठला. या आठ उद्योगांमध्ये प्रामुख्याने कोळसा, सिमेंट, पोलाद, कच्चे तेल, नैसर्गिक वायु, रिफायनरी उत्पादने, रासायनिक खते इत्यादींचा समावेश होतो. वरील उद्योगांपैकी खते उद्योग वगळता सातही उद्योगांनी ऋणात्मक उत्पादकतेची नोंद केली.

**४. नवीन मागणीत घट :**

सन २०१९ या आर्थिक वर्षात देशातील विविध उद्योगांच्या वस्तूंना येणाऱ्या मागणीत घट झाली. त्यामुळे उद्योगांच्या मागणी व पुरवठ्यांचे गणित बिघडले आहे असे nikki manufacturing processing managers index अर्थात पी. आय. एम. च्या आकडेवारीवरून दिसते आहे. ऑक्टोबर २०१९ मध्ये पी. आय. एम. ५०.०६ पर्यंत घसरला सप्टेंबर २०१९ मध्ये ५१.०४ होता. पी. आय. एम. ने दोन वर्षातील निच्चांक पातळी गाठत देशातील निर्मिती क्षेत्रातील मंदीवर शिक्कामोर्तब केले. देशात पी. आय. एम. ५० च्या खाली आल्यास ती अर्थव्यवस्थेसाठी मोठी बाब असते.

**५. वाहन विक्रीचा वेग मंदावला :**

भारतासारख्या कृषीप्रधान देशात ट्रॅक्टर आणि दुचाकी विक्री करणारे मुख्य घटक मानले जातात. ऑक्टोबर २०१९ देशातील सर्वाधिक ट्रॅक्टर बिक्री करणाऱ्या कंपनीच्या विक्रीत चार टक्के घसरण झाली. मान्सूनोत्तर पाऊस धरणातील चांगला पाणीसाठा आणि रब्बी पिकांसाठी किमान आधारभूत मूल्य यामुळे आगामी काळात चांगली मागणी येईल या आशावादावर आता ट्रॅक्टर उद्योगाचे काम सुरु आहे. सप्टेंबर २०१९ मध्ये दुचाकी विक्रीत वार्षिक २१ टक्के इतकी घट झाली म्हणजेच वाहन उद्योगाला उतरती कळा लागलेली दिसून येत आहे.

#### ६. पतमानांकनात घट :

सन २०१९ या चालू वर्षात सर्वच घटक ऋणात्मक कामगिरी नोंदवत असतांना पतमानांकन कंपन्यांनी देशाचे रेटिंग घटविले आहे.मुदीज या आंतरराष्ट्रीय पातळीवरील पतमानांकन संस्थेने भारताचे रेटिंग स्थिर (स्टेबल) वरून ते नकारात्मक (निगेटिव्ह) केले.मुदीजने एक्क्यावर न थांबता त्यांनी सन २०१९-२० या आर्थिक वर्षासाठी भारताच्या जी.डी.पी.दराचा अंदाज घटवतांना मुदीजने असे म्हटले आहे की, भारतात बेरोजगारी वाढत आहे,गुंतवणूक कमी झाली आहे,बँकेतर वित्तीय पुरवठा संस्था (एन.बी.एफ.सी.)डबघाईला आलेल्या आहेत,मागणी अभावी तेलाच्या किमतीत नरमाई आली आहे. त्यामुळे आर्थिक विकास दर मंदावण्याची शक्यता आहे.

केवळ मुदीजनेच नव्हे जगातील व देशातील इतर संस्थांनी व बँकानीही भारताचा विकास दर आगामी काळात कमी राहील ही शक्यता घेऊन आपल्या पूर्वी दिलेल्या अंदाजात बदल केले हे सर्व वर्तविलेले अंदाज बदलत असताना या संस्थांनी नव्याने विकास दर पहिल्या अंदाजापेक्षा कमी राहील असे म्हटले.

स्टेट बँक ऑफ इंडियाने आपल्या अहवालात चालू वर्षात आर्थिक ५.०० टक्के राहील असा अंदाज या वर्तवला.स्टेट बँक ऑफ इंडियाने पूर्वी ६.१ टक्के जी.डी.पी.चा दर राहील असा अंदाज व्यक्त केला होता. मात्र आक्टोबर २०१९ मधील आपल्या अहवालात हा अंदाज घटवतांना स्टेट बँक ऑफ इंडियाने असे म्हटले की, वाहनांची घटती विक्री,हवाई वाहतुकीतील मंदावलेल्या हालचाली,पायाभुत आणि बांधकाम क्षेत्रातील गुंतवणूकीत घट याचा आर्थिक विकासावर नक्कीच परिणाम झाला आहे. विविध पतमानांकन संस्थांनी सन २०१९-२० या आर्थिक वर्षासाठी वर्तवलेले विकसदाराचे अंदाज पुढीलप्रमाणे आहे.

#### विविध पतमानांकन वर्तवलेले विकास दराचे अंदाज

अ.न.	पतमानांकन संस्था	पूर्वीचे अंदाज (टक्के)	२०१९-२० साठी अंदाज (टक्के)
०१	स्टेट बँक ऑफ इंडिया	६.१	५.०
०२	फिच	६.६	५.५
०३	रिझर्व्ह बँक ऑफ इंडिया	६.९	५.०
०४	मुदीज	६.२	५.६
०५	एडीबी	६.५	५.९
०६	एस. अँड पी.	७.१	६.३
०७	आय. एम. एफ.	७.०	६.१
०८	वर्ल्ड बँक	७.५	६.०

#### संदर्भ-०८ डिसें.२०१९ ,दिव्यमराठी

वरील तक्त्यावरून दिसून येते की सन २०१९-२० या चालू वर्षात पतमानांकन कंपन्यांनी देशाचे विकास दर कमी जास्त १.०० ते १.५ टक्क्यांनी अंदाज घटवले आहे.

## ७. सरकारची उदासीनता :

अर्थव्यवस्थेत मंदीचे बदल घडत असतांना सरकारनेही करात कपात करणे, अर्धवट गृहप्रकल्पासाठी सवलती करणे, निर्गुंतवणूकीतून पैसा उभा करणे, सरकारी कंपन्यांचे खासगीकरण करणे, बँकाना भांडवलाचा डोस देणे, जीएसटी धारकांची जाचक अटीमधून मुक्तता करणे, इझी ऑफ इयुइंग इत्यादी उपक्रम राबविले गेले मात्र हे धोरण राबवितांना सरकारची उदासीनता वारंवार जाहीर होणाऱ्या आकडेवारीवरून दिसून येते.

### मंदीतून बाहेर पडण्यासाठी उपाय योजना

सर्वच क्षेत्रातून निराशाजनक आर्थिक आकडेवारी दिसून येत असतांना सरकार मात्र अर्थव्यवस्थेचा पाया भक्कम असल्याचे सांगत आहे. जागतिक व देशातील आर्थिक स्थितीत लक्षात घेऊन मंदीकडे देशाची वाटचाल सुरू असल्याचे सरकारने मान्य करून याच स्थितीत संधी शोधणे आवश्यक आहे. मंदीतून बाहेर पडण्यासाठी उपाययोजना पुढील प्रमाणे येतील.

१. अमेरिका आणि चीनमधील व्यापार युद्धाचा फायदा घेऊन आपल्याला अभियांत्रिकी आय.टी. व कृषि क्षेत्रातील उत्पादने जगातील इतर देशात निर्यात करण्यास संधी आहे त्यादृष्टीने प्रयत्न होणे आवश्यक आहे.

२. देशातील ग्राहकांचा आत्मविश्वास वाढेल म्हणजेच एकूण मागणीत वाढ होईल यासाठी योग्य धोरण तयार करणे आवश्यक आहे. याचाच एक भाग म्हणून सरकारने काही महीन्यापूर्वीच सार्वजनिक गुंतवणुकीच्या माध्यमातून १०२ लाख कोटी रुपयांचे पायाभूत प्रकल्प जाहीर केले आहेत. येत्या चार वर्षांत या पायाभूत प्रकल्पांवर काम केले जाणार आहे.

३. शेतकरी, शेतमजूर, औद्योगिक कामगार तसेच सर्वसामान्य ग्राहकाला खरेदीसाठी पोषक वातावरण निर्मिती करणे आवश्यक आहे. जेणे करून एकूण मागणीत वाढ होईल.

४. जास्त रोजगार निर्मितीचे क्षेत्र हेरून त्यांचा विकास करण्यासाठी प्रयत्न करणे आवश्यक आहे. त्यामुळे देशातील लोकांना रोजगार उपलब्ध होईल.

५. देशातील बँका व बँकेतर वितीय पुरवठ्यातील विविध अडचणी दूर करणे आवश्यक आहे. जेणे करून देशातील विविध क्षेत्रात भांडवलाचा प्रवाह वाढेल.

६. कररचना सूटसुटीत करण्यावर भर देण्यात यावा. देशात जी.एस.टी. करात सुधारणा करण्यास आणखी बराच वाव आहे. जी.एस.टी. करात सुधारणा करतांना देशातील उद्योगांना पोषक वातावरण निर्माण होईल याचा विचार होणे आवश्यक आहे.

७. परदेशातून आयात केल्या जाणाऱ्या वस्तूंचे सरकारद्वारे निर्बंध लावणे गरजेचे आहे. त्यामुळे देशात उत्पादित

वस्तूंना मागणी निर्माण होईल.

८. परकीय गुंतवणूक होणे आवश्यक आहे. आजही भारताला एक विश्वासपात्र गुंतवणुकीचे स्थान म्हणून पहिले जाते. त्यामुळेच एप्रिल ते नोव्हेंबर २०१९ या कालावधीत २४.४ अब्ज डॉलरची परकीय गुंतवणूक झालेली आहे. त्यात अजून वाढ करण्यासाठी प्रयत्न होणे आवश्यक आहे.

**समारोप:**

भारताने जगातली पाचवी आर्थिक महासत्ता होण्याचे आणि आपली अर्थव्यवस्था ०५ ट्रीलीयनची करण्यासाठी प्रयत्न सुरू केले आहे.भारताच्या स्वप्नपूर्तीत जागतिक मंदीचा मोठा आहे.भारतासह जगाला मंदीच्या सावटातून वाटचाल करावी लागत आहे.मंदीच्या सावटातून बाहेर पडण्यासाठी सरकारने सार्वजनिक गुंतवणूकीच्या माध्यमातून देशातील सर्वच क्षेत्रातील उद्योगांना प्रोत्साहन देणे आवश्यक आहे.जेणे करून देशात गुंतवणूक,उत्पादन व रोजगार वाढून अर्थव्यवस्था पुन्हा रुळावर येईल.

**संदर्भ:**

१. अजय कुलकर्णी, "मंद मंद पाऊले मंदीकड" दै. दिव्य मराठी, ०८ डिसेंबर २०१९. पृ.क्र.०१.
२. सकाळ न्यूज नेटवर्क, "अर्थव्यवस्था संकटात नाही दै. सकाळ, १२ फेब्रुवारी २०२०, पृ.क्र. ११.

## CHAPTER-55

## महाराष्ट्रातील मृदाधूपेची कारणे व उपाय: एक अभ्यास

डॉ. बबन बाबुराव बोबडे

भूगोल विभाग

महिला कला महाविद्यालय, बीड

ता. जि. बीड (महाराष्ट्र)

## प्रस्तावना :

विज्ञान युगातील मानवाच्या बौद्धिक प्रगतीमध्ये यांत्रिकीकरण आणि औद्योगिकीकरण मानवी जीवन, विकास आणि राष्ट्रहीत साधावयाची ती प्रगतीची परिणामे बनतील. यातूनच मानवी विकासाची प्रगती झाली अन् पर्यावरणाकडे मोठ्या प्रमाणात दुर्लक्ष झाले. पर्यावरणाचा समतोल राखण्यासाठी आज कोणकडेही वेळ शिल्लक राहिला नाही. त्यामुळे आज आपणास असंख्या अशा परिणामांला सामोरे जात आहोत. उद्योगधंद्यासाठी आवश्यक त्या कच्च्या मालांचे अतिशोषण, वृक्षतोड, पाण्याचा बेहिशोबी वापर, शेतीसाठी उपयोगात आणली जाणारी विषारी औषधे रासायनिक खते इ. कितीतरी प्रकारच्या बेशिस्त कार्यवाहीने पर्यावरण प्रदूषित होत आहे.

मृदा ही सर्वात मौल्यवान नैसर्गिक साधन संपत्ती आहे. मृदा ही सर्व वनस्पती व प्राणी या सजीव सृष्टीच्या जीवनाचा आधार आहे. मृदेपासून वनस्पतीला अन्नद्रव्याचा पुरवठा होतो. मृदाही खऱ्या अर्थाने संपूर्ण परिस्थितीला पध्दतीचा पाया आहे. मृदेमध्ये सजीवास आवश्यक असणारे घटक साठवलेले असतात. मृदेच्या निर्मितीवर भुगर्भीय रचना, भूपृष्ठ रचना, हवामान, वनस्पती, प्राणी, पाणी, खडक इ. घटकांचा परिणाम होत असतो. मुळ खडकांवर कायीक, रासायनिक व जैविक विदारणाची प्रक्रिया होऊन मृदेची निर्मिती होत असते.

## उद्दिष्ट्ये :

1. मृदा धूपीमुळे जैवविविधतेत होणाऱ्या बदलांचा अभ्यास करणे.
2. मृदा धूप होण्याची कारणे शोधणे.
3. मृदा धूपेवरील उपाय शोधणे.
4. मृदा धूपेचे महत्त्व जाणून घेणे.

## अभ्यास पद्धती :

प्रस्तुत शोध निबंधासाठी दुय्यम सामुग्रीचा संदर्भग्रंथ, मासिके, संशोधन पेपर, इंटरनेट, वर्तमान पेपर इत्यादीचा उपयोग करण्यात आला.

भूपृष्ठावरील मातीचे एका जागेवरून दुसऱ्या जागेवर स्थलांतर म्हणजेच जमिनीची धूप होय. प्राणी व वनस्पती यांची हालचाल तसेच पर्जन्य यांचे परिणाम यामुळे भूपृष्ठावरील

मातीचे कण वारा व जमिनीवरून पावसाचे वाहणारे पाणी यांच्या बरोबर वाहून नेले जाते व अशा प्रकारे जमिनीची धूप होते.

धूपेची प्रक्रिया ही नैसर्गिक प्रक्रिया आहे. खडकापासून, ऊन, पाऊस, वारा, थंडी, उष्णता इ. च्या परिणामामुळे विदारण प्रक्रियेने माती तयार होत असते. ही विदारण प्रक्रिया अत्यंत संथ गतीने होत असते. 1 सें.मी. जाडीचा मातीचा थर तयार होण्यासाठी अनेक वर्षे लागतात. तसेच पाला पाचोळा साठून कुजून त्यापासूनही माती तयार होते. वारा, पाऊस इ. मुळे माती एका ठिकाणाहून दुसऱ्या ठिकाणी वाहून नेली जाते. सखल भागातील माती पाण्याच्या प्रवाहाबरोबर वाहत जावून दुसऱ्या ठिकाणी गाळाच्या स्वरूपात साठते व तेथे उपयुक्त जमीन तयार होते. महाराष्ट्रात गाळाची, लॅटेराइट, काळी मुरमाड, तांबूस, तपकिरी, रेंताड, पिवळसर, तपकिरी, जांभा व खारट इत्यादी प्रकारच्या मृदा आहेत. सह्याद्री पर्वताचा भाग, बालाघाट डोंगर रांग, महादेव डोंगर रांग, अजिंठा डोंगर रांग तसेच पठारी प्रदेशावर बऱ्याच ठिकाणी बाह्य कारकामुळे मृदेची झील झालेली आहे. मृदेची धूप ही एक नैसर्गिक प्रक्रिया आहे. मानवाकडून मृदेचा शेतीसाठी मोठ्या प्रमाणावर वापर होत आहे. तसेच वृक्षाची तोड, रासायनिक खतांचा वापर, नद्यांचे पूर इत्यादी कारणांमुळे मृदेची धूप होते.

#### **मृदेची धूप होण्याची कारणे :**

मुख्यतः मृदेची धूप भौगोलिक घटकांमुळे व मानवाच्या अनियोजित क्रियांमुळे होत असते.

1. **भूप्रदेशाचा उतार :** मृदेची धूप डोंगराळ भागामध्ये तीव्र उताराच्या प्रदेशात मोठ्या प्रमाणावर होते. याउलट पठार भागात व मैदानी प्रदेशात मंद उतार असतो. त्यामुळे तेथे कमी धूप असते. महाराष्ट्रात सह्याद्री पर्वताच्या उतारावर, कोकण किनार पट्टीच्या पूर्व भाग, बालाघाट, अजिंठा, महादेव डोंगर उतरणीचा भाग इत्यादी ठिकाणी धूप झालेली आहे.
2. **वृक्षांची तोड :** महाराष्ट्राच्या पठारी प्रदेशावरील वृक्षांची बेसुमार तोड झालेली आहे लोकसंख्या वाढीमुळे ही तोड झालेली आहे. वाहते पाणी, नद्यांचे पूर यांना वृक्ष तोडीमुळे अडथळा राहिलेला नाही, त्यामुळे मृदेची धूप जास्त जाणवते. पावसाळ्यात मृदेची धूप मोठ्या प्रमाणात होत असते.
3. **हवामान :** मृदेची धूप घडवून आणण्यात हवामान घटक ही कारणीभूत असतो. सह्याद्री पर्वताच्या भागात विशेषतः कोकण किनारपट्टीला जास्त पाऊस पडतो. तानसा, गड, शुक, काजळी, उल्हास, तेरेखोल इत्यादी नद्या पावसाळ्यात वेगाने वाहतात. त्यामुळे कोकण पट्टीत मोठ्या प्रमाणावर मृदेची धूप होते. वेगाने वाहणाऱ्या वार्यामुळे देखील जमिनीवर खड्डे पडतात. हवामानाच्या घटकांमध्ये मुसळधार पर्जन्य हा मृदेच्या धूपेमध्ये महत्वाची भूमिका बजावतो.
4. **अतिचराई :** महाराष्ट्रात 1993-94 मध्ये कुरणाखाली 13 लाख 63 हजार हेक्टर क्षेत्र होते. या गवताळ कुरणाचा जनावरे चराईसाठी वापर केला जातो. अतिचराईमुळे जमिनीवरचे गवत नष्ट होते. त्यामुळे जमीन उघडी पडते. तसेच जनावरे चरत असतांना ती शिंगाने माती

उकरतात त्यांच्या उकरांमुळे जमिनीवर खड्डे पडतात. पावसाळ्यात उघड्या पडलेल्या मृदेच्या कणांचा संबंध वाहत्या पाण्याशी येतो. त्यामुळे जमिनीची झीज किंवा धूप होते.

5. **रासायनिक खतांचा अतिवापर** : पश्चिम महाराष्ट्रात वाजवी रासायनिक खतांच्या वापरामुळे मृदेची धूप झालेली आहे. जमिनीतील क्षार वरआलेले आहेत. मृदेवर पांढरट थर दिसत आहे.
6. **शेतीची अनियोजित पध्दती** : शेतीच्या विविध क्रिया मशागत, नांगरणी इत्यादी गोष्टीवर मृदेचे विदारण किंवा संवर्धन अवलंबून आहे. शेतकरी उत्तारावरील नांगरणी उत्तराच्या दिशेने करतो. रुढीपरंपरागत पध्दतीने शेती केली जाते. शास्त्रीय ज्ञानाचा मी वापर यामुळे मृदेची धूप होत असते.

#### **मृदा धूपेचे परिणाम :**

1. **वालुकामय मृदेची निर्मिती** : जमिनीच्या धूपेमुळे वजनाने हलकी मात्र अन्नद्रव्ययुक्त अशी कसदार माती वाहून जाते. मात्र वजनाने अधिक असलेले वाळूचे खडे, दगड, गोटे वाहत नाहीत व वालुकामय मृदेची निर्मिती होते.
2. **सुपीक मातीचा विनाश** : धूपेमुळे अन्नद्रव्ययुक्त कसदार मातीचा थर वाहून जातो. परिणामी जमिनीची उत्पादकता घटते व सुपीक जमिनीचा नाश होण्यास सुरुवात होते.
3. **पाणी साठामध्ये टंचाई** : सातत्याने जलाशयांमध्ये मातीचे अथवा गाळाचे स्थिरीकरण होऊन जलाशयांची पाणीसाठ्यात कमतरता येते व भविष्यात पाणीटंचाईच्या संकटांना तोंड द्यावे लागते.

**मृदासंवर्धनाचे उपाय** : शेतकऱ्यांच्या शेत जमिनीचा सकरूपणा व निकसपणा मुरण्यात मातीच्या थरावर आणि प्रकारावर अवलंबून असतो. मृदेची धूप मानवाला पूर्णपणे राखता आली नाही. तरी काही प्रमाणात मृदेचे संवर्धन निश्चितच करता येईल मृदेचे संवर्धन करण्यासाठी प्रामुख्याने खालील उपाय सांगता येतील.

1. ज्या भागात मृदेची धूप जास्त होत आहे, त्या भागात वृक्षांची लागवड करावी त्यामुळे मृदेवर एक प्रकारचे आच्छादन होईल.
2. जंगल तोडीवर किंवा वृक्ष तोडीवर कडक उपाय करावेत वृक्ष तोडीसाठी प्रतिबंधक कायदे करावेत.
3. शेतीच्या बांधावर मोठ्या प्रमाणात वृक्षांची लागवड करावी हे वृक्ष रक्षकाचे काम करतात. वृक्षामुळे वार्याचा वेग कमी होतो, त्यामुळे मृदेची धूप कमी होते.
4. जमिनीला व्यवस्थित बांधबंदिस्ती करून घ्यावी तसेच शेतातील वारा पाणी बाहेर जाईल अशी व्यवस्था करावी.
5. शेतीत हरभरा, ज्वारी, कडधान्ये चार्याचे पिके, वटाणा इत्यादी पिके घ्यावीत ही पिके मृदासंवर्धनास पोषक परिस्थिती निर्माण करतात. तसेच शेतात एकाच प्रकारची पिके वारंवार न घेता ती आलटूनपालटून किंवा पिकसंगती या पध्दतीने घ्यावीत.
6. अतिजलसिंचनाचा वापर टाळावा.



7. अतिचराईवर बंधने घालावीत.

8. रासायनिक खतांचा योग्य प्रमाणात वापर करणे.

महाराष्ट्र शासनाने मृदेचे संवर्धन करण्याकरिता प्रत्येक जिल्ह्यात स्वतंत्र विभाग सुरु केलेला आहे. जिल्ह्यातील मृदासंधारण विभागातर्फे समपातळी बांधबंधिस्ती करणे, नाल्यावर बांध घालणे, चिभड जमीन सुधारणा, जमीन सपाटीकरण सांडव्याची कामे इत्यादी कामे केली जातात.

#### सारांश :

मृदा ही सर्वात मौल्यवान नैसर्गिक साधन संपत्ती आहे. त्यामुळे ह्या नैसर्गिक साधन संपत्तीचा योग्य पध्दतीने वापर करणे आवश्यक आहे. त्याचबरोबर जमिनीची होणारी मोठ्या प्रमाणातली जमिनीची धूप थांबवण्यासाठी भूपृष्ठावर वनस्पतीचे आच्छादन मोठ्या प्रमाणात असणे आवश्यक आहे. तसेच चुकीच्या पध्दतीने शेतीची होणारी मशागत थांबवून योग्य प्रकारे शेतीची मशागत केली पाहिजे.

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## CHAPTER-56

## अन्य धर्मातील संतकवींचे मराठी साहित्यातील योगदान

डॉ. सचिन सि. रुपनर

अण्णासाहेब आवटे कॉलेज, मंचर

महाराष्ट्र ही संतांची आणि वीरांची भूमी मानली जाते. वीरपुरुषांच्या पराक्रमाचे पोवाडे महाराष्ट्राने जसे येथे गायिले तसेच सौंदर्याची लावणीही म्हटली गेली. भाषेच्या पांडित्याचे पंडितांनी दर्शनही घडविले. तसेच संतांच्या वैराग्याच्या वीराण्याही या महाराष्ट्राने ऐकल्या. संतांनी या महाराष्ट्राला आपल्या साहित्यिक रचनेतून भक्तीचा, नामाचा सोपा मार्गही सांगितला. कीर्तन परंपरेतून, भारूडातील रूपकातून सामाजातील अनिष्ट रूढी-परंपरांचे दोषदर्शन घडवून त्यावर, दांभिकतेवर कडाडून हल्ला चढविला व समाजजागृतीचे कार्य केले. संसार करत करत परमार्थही साधता येतो, हे सर्वसामान्यांना पटवून देण्यासाठी अभंगांची निर्मिती केली. असे विविध स्वरूपाचे साहित्य रचून संतांनी मध्ययुगीन कालखंडात ईश्वरभक्तीचा मार्ग दाखवून परमार्थ शिकविला. त्यांच्या या साहित्यिक लेखनामध्ये विषयाची, आशयाची व रचनेची विविधता दिसून येते. हे साहित्य जसे विविधस्वरूपिणी आहे तसेच या कालखंडात विविध संतांनी लेखन केलेले दिसून येते. या रचना जशा हिंदू धर्मातील संतांनी केल्या आहेत तसेच त्यांच्याच बरोबरीने अहिंदू किंवा हिंदू धर्मातील संतांशिवाय इतर धर्मातील संतांनीही मराठी भाषेतून वाङ्मय लेखन करून मराठी भाषेच्या विकासात महत्त्वपूर्ण भूमिका बजावली आहे. त्यांनी मराठी भाषेच्या वैभवात मोलाची भर घातली आहे. त्यामुळे अशा अहिंदू असणाऱ्या किंवा अन्य धर्मातील संतांच्या वाङ्मयीन कार्याचा शोध घेणे गरजेचे ठरते. म्हणून सदर शोधनिबंधात अन्य धर्मातील संतकवींचे मराठी साहित्यातील योगदान यावर प्रकाश टाकण्याचा प्रयत्न असणार आहे.

## ०१. जैन संप्रदाय :

भारतातील इतर प्राचीन धर्मांपैकीच जैन धर्म प्राचीन असून तो जगातील एक प्रमुख धर्म आहे. प्रस्तुत धर्माच्या पुनरुज्जीवनाचे कार्य सर्वप्रथम श्री. ऋषभदेव यांनी केले. एकूणच लोकसंख्येच्या दृष्टीने भारतातील ६ व्या क्रमांकावर असणारा हा धर्म आहे. हा धर्म श्रमण परंपरेचे पालन करतो. लोकशाही विचारमूल्यांचा स्वीकार या धर्माने केलेला दिसून येतो. 'समता, स्वातंत्र्य व न्याय' या त्रिसूत्रीचा स्वीकार आहे. 'अनेकांतवाद' हा या धर्मातील महत्वाचा विचार असून तो मानवी कल्याणाचा पुरस्कार करतो. मानवतेच्या कल्याणासाठी सतत जागृत राहून कार्य करण्याचे अभिवचन हा धर्म देतो. या धर्माला काही प्रमाणात राजाश्रय देखील मिळालेला आहे. इ.स.पूर्व सहाव्या शतकामध्ये जगामध्ये अनेक धर्मसंप्रदाय उदयास आले त्यापैकी जैन संप्रदाय हा एक आहे. जैन साहित्यातील नोंदीनुसार या काळात ६२ धर्मसंप्रदाय उदयाला आले होते त्यापैकीच जैन धर्म हा एक होय. सदर संप्रदायामध्ये एकूण चोवीस

तीर्थकरांची परंपरा सांगितली जाते. त्यापैकी वृषभनाथ पहिले व पार्श्वनाथ हे २३ वे तीर्थकर आहेत. अशा या संप्रदायाचे तत्त्वज्ञान थोडक्यात पाहणे इथे क्रमप्राप्त ठरते. ते पुढीलप्रमाणे -

### जैन धर्मियांचे तत्त्वज्ञान :

- 'अहिंसा परमो धर्मः' हा मुख्य नियम या धर्मात मानला जातो.
- **जीव** - जैन धर्मानुसार जीव हा चैतन्यमय आहे. जीव अविनाशी आहे. जीव हा देव, मनुष्य, पशू, पक्षी, इ. विविध रूपात जन्म घेतो.
- **अजीव** - अजीव हे चैतन्यविरहित आहेत. अजीवाचे धर्म, अधर्म, आकाश, पुद्गल, काल, हे पाच प्रकार व जीव मिळून सहा द्रव्ये तयार होतात. जैनांच्या मते कोणत्याही द्रव्याची तीन अंगे असतात.
- **पाप- पुण्य** - पुण्य म्हणजे, जीवाशी संबंध असलेला व जीवाला स्वर्ग, ऐश्वर्य, इ.चांगले फळ प्राप्त करून देणारा कर्म- समुदाय होय. पाप म्हणजे पुण्याच्या विपरीत असा कर्मसमुदाय होय.
- **ज्ञान** - जैन तत्त्वानुसार ज्ञान परोक्ष व अपरोक्ष असे दोन प्रकारचे असते. अपरोक्ष ज्ञान आत्मा कर्मबंधनातून मुक्त झाल्यावर प्राप्त होते तर परोक्ष ज्ञान म्हणजे मन किंवा इंद्रियाद्वारा वस्तूचे मिळणारे ज्ञान.
- **स्यादवाद** - हा सिद्धान्त सप्तभंगी सिद्धान्त म्हणून ओळखला जातो.
- एखाद्या वस्तूसंबंधी किंवा विषयासंबंधी विचार करतांना ७ वेगवेगळ्या प्रकारे तो विचार मांडता येतो.

### पंचमहाव्रते

- सत्य - सत्य म्हणजे नेहमी खरे बोलावे.
- अहिंसा - अहिंसा म्हणजे कोणत्याही जीवाची मन, वचन अथवा कायेद्वारे हत्या करू नये.
- अस्तेयं - अस्तेय म्हणजे चोरी करू नये.
- अपरिग्रह - अपरिग्रह म्हणजे द्रव्यसंग्रह करू नये, स्वार्थी वृत्तीचा त्याग करावा.
- ब्रह्मचर्य - मनामध्ये कामवासना बाळगू नये.

### तीन गुणव्रते

- दिग्व्रत -
- कालाव्रत -
- अनर्थदंडव्रत

### चार शिक्षाव्रते

- सामायिक
- प्रोषधोपवास
- भोगोपभोग परिणाम
- अतिथी संविभाग

### जैन संप्रदायचे साहित्य :

जैन धर्मियांनी संस्कृत, प्राकृत, अपभ्रंश तसेच तमिळ, कन्नड इत्यादी प्राचीन व देशी भाषांतून साहित्यनिर्मिती करून प्रत्येक क्षेत्रात मोलाची भर घातलेली आहे. त्यांनी वाङ्मयाच्या सर्वच क्षेत्रात म्हणजे काव्य, कथा, व्याकरण, छंद, कोश इत्यादी क्षेत्रात लेखन केलेले आहे. त्याचबरोबर त्यांनी पुराणे, तत्त्वज्ञान, कर्मसिद्धांत इत्यादी विषयावरही ग्रंथनिर्मिती केली आहे. अशा या संप्रदायातील संतांनी मराठी भाषेतही साहित्यरचना केली आहे. त्यातील काही संतांची रचना पुढीलप्रमाणे –

०१. **पंडित मेघराज** : पंडित मेघराज हा १६ शतकाच्या पूर्वार्धात होऊन गेलेला जैन धर्मीय कवी होय. तो ब्रह्मजिनदासाचा शिष्य असून त्याने त्याच्या काव्यरचनेत स्वतःचा उल्लेख 'मेघा' असा केलेला आहे. 'जसोधररास' हा त्याचा ग्रंथ ११६४ ओव्यांचा असून त्यातून त्याने यशोधराचे चरित्र वर्णन केलेले आहे. जैन तत्त्वज्ञान आणि अचारधर्माचे विवेचन या ग्रंथात आलेले आहे. त्याचबरोबर अहिंसा आणि ब्रह्मचर्य या व्रताचे महत्त्व त्याने या ग्रंथातून स्पष्ट केले आहे. त्याचे मराठी व गुजराथी अशा दोन्ही भाषांवर प्रभुत्व असल्याने त्यांनी या दोन्ही भाषांतून ग्रंथरचना केलेली आहे. याशिवाय त्यांची 'पार्श्वनाथ-भवांतर,' 'रामायणी-कथा,' 'गोमटस्वामीगीत,' 'गुजरी-मराठी गीत' अशी इतरही काही रचना उपलब्ध आहे.

०२. **कामराज** : ब्रह्मजिनदासाचा दुसरा शिष्य म्हणजे कामराज होय. तोही १६ शतकाच्या पूर्वार्धात होऊन गेला. हा मूळचा गुजराथी होता. 'सुदर्शनचरित्र' आणि 'चैतन्यफाग' ही त्याची दोन महत्त्वपूर्ण काव्ये. सुदर्शनचरित्रात कामदेव सुदर्शन याने ब्रह्मचर्याचेव्रत पालन अखेपर्यंत कसे केले याची कथा आली असून त्याचे दुसरे काव्य रूपकात्मक स्वरूपाचे आहे.

०३. **पंडित सुरिजन** : पंडित मेघराज आणि कामराज यानंतर जैन धर्मीय संप्रदायातील मराठी भाषेतून रचना करणारा कवी म्हणून पंडित सुरिजन यांचा नामोल्लेख करता येतो. त्याने 'परमहंसकथा' हा ग्रंथ लिहिला. हा ग्रंथ त्याने इ.स.१६५९ नंतर लिहिला असावा असे सुभाषचंद्र अक्कोळे यांचे मत आहे. या ग्रंथातून जैन तत्त्वज्ञानाचे प्रतिपादन केलेले आहे. हा एक आध्यात्मिक ग्रंथ आहे. अशा प्रकारे जैन धार्मिक कवींनी मराठी भाषेतून साहित्य रचना केलेली आहे.

### सूफी संप्रदाय :

इस्लाम धर्मपरंपरेनुसार सूफी पंथाची सुरुवात ह.मो.पैगंबर यांच्यापासून झाली असून त्यांनाच परमेश्वराचा साक्षात्कार झाला. मुस्लिम धर्माच्या सुरुवातीच्या काळात सूफी संतांनी निवृत्ती मार्गाचाच अवलंब केलेला दिसून येतो. संसारातील सर्व ऐहिक सुखांचा त्याग करून एकांतवासात राहून कठोर तपश्चर्या करण्यावर सुखी संतांनी भर दिलेला आहे. योगमार्गाप्रमाणे देहदंडाद्वारे परमेश्वराचा कृपाशीर्वाद मिळवू पाहणारे ते तपस्वी होते. हा पंथ इस्लाम धर्मपरंपरेचा, इस्लाम धर्माच्या चौकटीत असणारा संप्रदाय आहे. "परमेश्वराचे चिंतन करणे ही सूफीची प्रारंभीच्या काळातील तत्त्वे होती. परमेश्वराची वक्रदृष्टी, भीती त्यांच्या मनात सदासर्वकाळ जागृत असे" असे मत इब्ने खालेदूनने व्यक्त केलेले आहे. म्हणजेच सूफींनी

वैराग्य व साधनामार्ग यांना प्राधान्य दिले असून त्यातूनच इस्लाम धर्मात संसार त्यागाची भावना तीव्र झाली असे म्हणता येते. कारण चिंतन व मनन या मार्गाने आपणाला परमेश्वराची कृपादृष्टी प्राप्त करून घेता येऊ शकते अशी भावना प्रबळ होती. त्यातून हा संप्रदाय उदयाला आलेला दिसून येतो.

इस्लाम धर्मातील जे गूढवादी लोक आहेत त्यांच्याकरिता 'सूफी' हा शब्द वापरला जातो. सूफी हा शब्द 'सूफ' या शब्दाच्या रूपापासून निर्माण झालेला आहे. सूफ उनी कापड घालणारा किंवा गोधडी वापरणारा, कालांतराने ऊनी व गोधडी वापरणे सर्वसामान्य झाले. असे कपडे वापरणे ते प्रेषित मोहम्मद पैगंबर याचे अनुकरण समजत. तर काही अभ्यासक सूफी याशब्दाचा उगम 'अहले सुफ्फा' असाही म्हणतात. काहींच्या म्हणण्यानुसार दोस्त, मित्र या अर्थावरून 'असहाबा' म्हणजे ओट्यावर बसणारे असाही अर्थ आहे. या मतप्रवाहावरून असे म्हणता येते की, सूफी शब्दाची उत्पत्ती 'सफ' शब्दावरून झाली आहे. 'सूफीया' या फार्सी शब्दापासून अध्यात्मातील ज्ञानी व्यक्ती या अर्थावरून 'सूफी' हा शब्द आला असेही एक मत आहे. यावरून आपणाला असे नमूद करता येते किओ 'सूफी' या शब्दाच्या उत्पत्तीबद्दल विद्वानांमध्ये एकमत नाही.

### सूफी संप्रदायचे तत्त्वज्ञान :

सूफी संप्रदायाचे तत्त्वज्ञान सर्वस्पर्शी आहे. या संप्रदायावर अनेकांनी लेखन केलेले आहे. सूफी संप्रदाय ज्ञानप्राप्तीचे प्रमुख चार मार्ग मानतो. तरिकत, हकीकत, शरित आणि मारिफत हे ते चार मार्ग आहेत. तर सूफी पंथामध्ये ज्ञानाचे दोन प्रकार आहेत. त्यातला एक ब्राह्मत्कारीज्ञान तर दुसरा म्हणजे आंतरिकज्ञान होय. कर्मठ धर्माचरणाविरुद्ध प्रतिक्रिया म्हणून सूफी तत्त्वज्ञान विकसित झालेले दिसते. तसेच या पंथात इतर संप्रदायाप्रमाणे गुरूला अनन्यसाधारण महत्त्व आहे. कारण गुरुकृपेशिवाय शिष्याला अध्यात्मज्ञान प्राप्त करून घेता येत नाही असे या पंथाचे मत आहे.

त्यांच्या तत्त्वज्ञानानुसार अल्ला हा सर्वस्पर्शी असून तो सर्वत्र व्यापलेला आहे. विश्वातील सर्व वस्तूमात्रांमध्ये, प्राणिमात्रांमध्ये तो सामावलेला आहे. सूफी संत समाधी, नामस्मरण, ध्यान धारणा यांना महत्त्व देणारे आहेत. कारण त्यांच्या तत्त्वज्ञानानुसार त्यातूनच त्यांना फनापर्यंत जाणे सहज शक्य आहे. त्यांनी परमात्म्यात विलीन होण्यास महत्त्व दिले आहे. या पंथात स्वर्गप्राप्तीला महत्त्व दिले नाही तर परमात्म्याची कृपा संपादन करून परमात्म्यात विलीन होणे हे यांचे ध्येय असते. परमेश्वर व मानव यांच्या भेटीतील अडथळा म्हणजे हे सांसारिक जग होय. त्यामुळेच सूफी संत विलासी जीवनापासून दूर होताना दिसतात.

सूफी पंथीय एकेश्वरवादाचा स्वीकार करणारा पंथ आहे. म्हणजेच या सृष्टीवर घडणाऱ्या सर्व घटनांचा सर्व घटना घडविणारा कर्तासवरता तो ईश्वर एकच असून त्याची भीती मनात ठेवली पाहिजे व त्याच्यावर विश्वास ठेवला पाहिजे असे या पंथाचे मत आहे. हाच ईश्वर सर्वशक्तिमान असून तो सर्वगुणसंपन्न आहे. ईश्वराच्या इच्छेशिवाय या सृष्टीतील एक कणसुद्धा

हलू शकत नाही; एवढे या सृष्टीवर त्याचे नियंत्रण आहे. या ईश्वराचे वर्णन डॉबार्याच्या बाहुलीच्या खेळाच्या रूपकातून केले जाते. “डॉबार्याच्या बाहुलीची दोरी ज्याच्या हातात असते तो आपल्या इच्छेनुसार त्या बाहुल्यांना खेळवतो. त्याप्रमाणे सृष्टीची दोरी ज्याच्या हातात आहे तो एकमेव ईश्वर सर्वज्ञानी, तत्त्वदर्शी, कीर्तिमान, शक्तिमान आणि निश्चितच सर्व कर्माचा स्वामी आहे. सृष्टीतील सर्व चल-अचल वस्तूंचे त्यास ज्ञान आहे. विश्वातील सर्व त्याच्यासमोर नतमस्तक आहेत”<sup>२</sup> असे या धर्माचे तत्त्वज्ञान कौसन यजदानी यांनी सांगितले आहे.

तर “ईश्वरच प्रथम व शेवट आहे. तो सृष्टीचा व्यवस्थापक आहे. तो जिवंत आहे. तोच विधाता, तोच शासक आहे. त्याचा आकार नाही, त्याचे काही तत्त्व नाही, ... तो सर्वव्यापी, सर्वज्ञाता आहे. तो स्थळकाळाच्या सीमेपलीकडे आहे”<sup>३</sup> असे सूफी संत इमाम गझली यांनी आपले ईश्वरबद्दलचे विचार मांडले आहेत. त्यावरून परमेश्वराच्या सर्वव्यापीत्वाचा परिचय होतो. त्याचे अस्तित्व समजण्यास मदत होते. अशा स्वरूपाचे सूफी पंथाचे तत्त्वज्ञान आहे आणि या तत्त्वज्ञानावर हा पंथ आचरण करणारा आहे. त्यावरच त्यांचा आचारधर्म आधारलेला आहे.

### सूफींची आचारसंहिता :

सूफींची ईश्वरविषयक अशी संकल्पना आहे की, ‘ईश्वराला आपल्यात भागीदार आणि उत्तराधिकारी मान्य नाही’ ही संकल्पना वेदांताच्या ब्रम्हासमान असून त्यांचा धर्म या संकल्पनेला धरून आहे. त्यामुळे सूफीयांच्या मतानुसार सूफी पंथ म्हणजे एक मार्ग होय, आचार नव्हे. त्यामुळे ज्ञानप्राप्तीसाठी पूर्ण आचरणाला ते निरतिशय महत्त्व देतात. त्यामुळे या पंथियांचा शरियत आचारसंहितेवर खास करून विशेष भर आहे. ती पुढीलप्रमाणे -

०१. कुराण या पवित्र ग्रंथाचे पठण करावे आणि साधकाने नेहमी मिताहार करावा.
०२. संत सेवा करावी व मक्केची यात्रा करावी.
०३. सुखी साधकाने आईवडिलांची व लोकांची सेवा करावी
०४. गुरुची सेवा करावी.
०५. कब्रस्थानात विनोद, खानपान न करता सतत परमेश्वराचे नामस्मरण करावे.

या आचारधर्माबरोबरच “सूफी संप्रदायामध्ये साधकाची दीक्षा कोणाला द्यावी याचे बंधन नाही. मनापासून ईच्छा असणाऱ्या साधकाला दीक्षा देता येते. राजापासून दरोडेखोरापर्यंत सर्वांना सूफी दीक्षा देतात”<sup>४</sup> असे डॉ. एजाज शेख यांनी या संप्रदायाच्या आचारधर्माचे स्पष्टीकरण देताना म्हटले आहे.

### सूफी संप्रदायाची मराठी साहित्यसंपदा :

मुसलमान संतांचे मराठी साहित्य हे मध्ययुगीन मराठी साहित्याला लाभलेले एक अनोखे लेणे आहे. त्यांच्या साहित्यनिर्मितीने मराठी साहित्यात अत्यंत मोलाची भर टाकली आहे. म्हणूनच प्रस्तुत ठिकाणी या सूफी संप्रदायातील संतांनी मराठीत केलेल्या साहित्यनिर्मितीचा थोडक्यात आढावा घ्यायचा आहे.

०१.संत हुसेन अंबरखान : 'भागवद्गीतेचा पहिला मुस्लीम भाष्यकार' म्हणून त्याचा उल्लेख केला जातो, तो संत म्हणजे हुसेन अंबरखान होय. महाराष्ट्रात ज्या मुसलमान संतांनी मराठी भाषेत साहित्यनिर्मिती केली त्यात सर्वप्रथम हुसेन अंबरखान यांचा उल्लेख करावा लागतो. त्यांनी इ.स.१६५३ मध्ये लिहिलेली गीता टीका 'अंबर हुसेनी टीका' म्हणून प्रसिद्ध आहे. त्याने आपल्या टीकेचा उल्लेख 'गीता भावार्थदीपिका' असा केलेला आहे. या गीता टीकेत एकूण ८७१ ओव्या असून त्यामध्ये त्याने आपली कुलपरंपरा प्रारंभी कथन केलेली आहे. गीतेचा 'तात्पर्यार्थ' सांगणे हे त्याचे ध्येय आहे. तसेच त्याने ही गीता टीका लिहिताना इतर टीकाकारांचा उल्लेख करून स्वतःची भूमिका स्पष्ट केलेली आहे. मूळ संस्कृत शब्दाला नेमका मराठी शब्द योजनेचे कवीचे कौशल्य वाखाणण्याजोगे आहे

०२.शेख महंमद : महाराष्ट्रातील कबीराचा अवतार म्हणून शेख महंमद याचा उल्लेख केला जातो. तो कादरिया संप्रदायाचा सुफी संत असून त्याचे वडील राजे महंमद एक विख्यात सूफी संत होते. शेख महंमद एक क्रांतिकारक विचारांचे असून चांद बोधले यांचे ते गुरु होते. वयाच्या २६ व्या वर्षी ते संत म्हणून प्रसिद्ध पावले. छत्रपती शिवाजी महाराजांचे आजोबा मालोजी राजे हे यांचे शिष्य होते. त्याबद्दल उल्लेख त्यांच्या अभंगातून येताना दिसतो. याशिवाय आणखी एका अभंगात त्यांनी चांद बोधले, जनार्दनपंत, संत एकनाथ यांची परंपरा दिलेली आहे. महंमदांनी मराठी, हिंदी, फारसी, उर्दू अशा भाषांतही साहित्यनिर्मिती केली आहे. त्यांच्या नावावर 'योग-संग्राम,' 'पवनविजय,' 'निष्कलंक प्रबोध' व काही भारुडे व अभंगही आढळतात.

०३.शहा मुंताजी बामणी : मुंताजी बामणी यांचे खरे नाव शहा मुर्तुझा कादरी होय. त्यांनी लिहिलेल्या हस्तलिखितावर ब्राह्मणी मुंताजी, ब्राह्मणी मृत्युंजय, ब्राह्मणी आणि ब्राह्मण मुंताजी अशा निरनिराळ्या नाममुद्रा आढळतात. त्यांचे साहित्य लेखन अत्यंत संपन्न आहे. त्यांचा 'प्रकाशदीप' हा ग्रंथ भाषात्मक व अद्वैताचे विवेचन करणारा आहे. या ग्रंथांमध्ये समाधीअवस्थेपर्यंतचे योगविवरण आलेले आहे. तसेच त्यांनी 'सिद्धसंकेत' हा आणखी एक ग्रंथ लिहिला आहे. त्यांनी 'सिद्धांतबोध' हा ९८५८ हा त्यांचा आणखी एक बृहद्ग्रंथ व सहा तत्त्वचिंतनपर प्रकरणे व काही अभंग आणि पदरचना केलेली आहे.

शेख सुल्तान, जमाल फकीर, सय्यद हुसेन, सूफीदादा आतार, गरीब अब्दुल अशा इतरही काही सूफी संत कवींनी मराठी भाषेत साहित्य केली आहे.त्यांचे कार्य मराठी साहित्यातील अमूल्य देणगी आहे त्यात विविधता आहे. या कवितेतील विविधतेबद्दल ल. रा. नसिराबादकर म्हणतात, - "वर उल्लेखिलेली काव्यनिर्मिती पाहता नाथांच्या काळातील मराठी साहित्याची निर्मिती विविध अंगानी होत होती, असे म्हटले पाहिजे. स्वतः नाथांच्या निर्मितीतच विविधता होती" यावरून या साहित्यातील विविधतेचे स्वरूप लक्षात येते.

### ख्रिस्ती संप्रदाय :

"संप्रदाय व पंथ हे शब्द एकाच अर्थाने वापरले जात असले तरीही त्यातून दोन भिन्न गोष्टी सूचित होतात. संप्रदाय शब्दावरून परंपरा सूचित होते. दैवी अनुभूती संपन्न अशा

एखाद्या पुरुषापासून परंपरा सुरू होते. त्यास संप्रदाय म्हटले जाते. ही अनुभूती मानवी जीवनात प्रत्येकास घेता आली पाहिजे, या तळमळीने काही विशिष्ट साधनेची रूपरेषा संप्रदाय प्रवर्तकांकडून निश्चित केली जाते अनुभूती ध्येयाकडे नेण्याचा तो मार्गक्रमच आखलेला असतो. त्या मार्गक्रमासच पंथ हे नाव लागू पडते. संप्रदाय व पंथ ही दोन नावे भिन्न पदार्थ दाखवीत नसून एकाच वस्तूची दोन भिन्न रूपे होत. एकाच प्रवाहाच्या दोन बाजू होत.”<sup>६</sup>

महाराष्ट्रातील ख्रिस्ती धर्माचा धर्माच्या पंथाचा अभ्यास केल्यास असे जाणवते की इ.स. १५१० मध्ये पोर्तुगीजांनी गोवा प्रांतात आपले वर्चस्व प्रस्थापित करून तोपर्यंत आपल्या आधिपत्याखाली घेतला त्यानंतर त्या प्रदेशात इतरही काही धर्म पंथ यांचा प्रवेश झाला त्यांनीही आपला धर्म प्रचाराचे व प्रसाराचे कार्य सुरू केले त्यानंतर थोड्याच कालावधीत ब्रिटिशांचे आगमन झाले आणि त्यांच्या आगमनाबरोबरच गोवा आणि महाराष्ट्रात ख्रिस्ती धर्म संप्रदाय ख्रिस्ती धर्मप्रसारक यांच्या संख्येत मोठी वाढ झाली पुढे चालून ही संख्या वाढत गेली फादर स्टीफन्स, फादर क्रूआ आणि यासारख्या धर्मप्रसारकांनी येथे ख्रिस्ती सेंट पीटर्स यांनी इत्यादी ख्रिस्ती धर्म संतांवर मराठी भाषेतून काही रचना केल्या हा कालखंड म्हणजे मराठीत संस्कृतीच्या वळणावरच्या वृत्तात्मक रचनेचा लोकप्रिय होण्यापूर्वीचा होता या कारणास्तव या रचना संतांनी केलेल्या कथा साहित्याच्या जवळचा निर्माण करणाऱ्या ठरतात त्यामुळे ख्रिस्ती धर्मातील संतांनी आख्यानावर आधारित फवारणी करताना मराठी भाषेत हेतुपूर्वक केली आहे.

#### ख्रिस्ती संप्रदायाचे तत्त्वज्ञान :

‘सर्व समर्थ देव जो पिता, आकाश व पृथ्वी यांचा उत्पन्नकर्ता, यावर मी विश्वास ठेवतो. एकच प्रभू देवाचा एकुलता एक पुत्र, जो पापीजनांना तारावयास ह्या जगात आला. पवित्र आत्म्याच्या योगाने गर्भरूप झाला, कुमारी मेरीच्या उदरीत जनमस आला पिलाताच्या वेळेस ज्याने दुःख भोगले, ज्याला क्रुसावर दिले, ज्याला पुरण्यात आले, जो मेलेल्यामधून तिसऱ्या दिवशी उठून स्वर्गात गेला व सर्वसमर्थ देव यांच्या उजवीकडे बसला व जेथून तो जिवंत असलेल्यांचा व मृतांचा न्याय करण्यासाठी येणार आहे त्याच्यावर मी विश्वास ठेवतो’ अशा स्वरूपाचा सिद्धांत ख्रिस्ती धर्मात पाळला जातो.

परमेश्वरच स्वतः पृथ्वीवरील समग्र मानव जातीचे कल्याण करण्यासाठी मानवाचे रूप धारण करून या भूतलावर अवतरला आहे, अशा स्वरूपाचा या धर्माचा सिद्धांत आहे. आणि या सिद्धांताला चर्चमध्ये महत्वाचे मानले जाते. या पृथ्वीवर मानवी देहाचा स्वीकार करून राहणारा येशू हा प्रत्यक्ष परमेश्वरच होता पण परमेश्वराला स्वतःचे रूप दाखवायचे होते म्हणून त्याने येशूच्या रूपात अवतार घेतला असं या धर्मातील तत्त्वज्ञान सांगते. त्याची मानवाशी सहकार करण्याची इच्छा होती. परमेश्वर मानवाला तो कसाही असला तरी त्याला जवळ करण्यात कमीपणा मानत नाही. उलट तो सदैव मानवावर प्रेमाचा वर्षाव करत असतो, अशा स्वरूपाचे तत्त्वज्ञान या धर्मांमध्ये सांगितले जाते.



### ख्रिस्ती धर्माची उपासना :

ख्रिस्ती धर्माच्या कर्मकांडात सामुदायिक उपासनेला आत्यंतिक महत्त्व दिले जाते. ही सामुदायिक प्रार्थना व उपासना दर रविवारी सकाळी अथवा सोयीच्या दिवशी व सोयीच्या वेळी चर्चमध्ये जाऊन धर्मगुरूंचा मार्गदर्शनाखाली केली जाते. उपासनेच्या कार्यक्रमात सामुदायिकरित्या गीत गाणे, पवित्र शास्त्रातील स्तोत्रे वाचन करणे, 'प्रभूची प्रार्थना' म्हणून प्रचलित असलेली प्रार्थना सामुदायिक रीतीने म्हणणे इत्यादी उपासनांचा समावेश असतो.

या संप्रदायातील काही अनुयायी दर रविवारी सामुदायिक उपासनेच्या शेवटी तर काहीजण महिन्यातून एकदा 'प्रभुभोजन' (लोदर्स सफर) हा विधी पाळतात. याप्रसंगी खमीरविरहित भाकर व द्राक्षाचा उकडून केलेला रस द्राक्षरस दिला जातो. ज्यांचा 'बासिस्मा' आणि 'दढीकरण' हे संस्कार झालेले आहेत त्यांनाच या विधीत भाग घेता येतो. ज्याला हा पवित्रविधी पार पाडण्याची दीक्षा दिलेली आहे तोच किंवा तेच भाकर आणि द्राक्ष पवित्र म्हणून 'वेगळी' करतात. तीच नंतर इतर आचार्यांद्वारे भक्तगणामध्ये वाटली जाते. यात धर्मगुरू बायबलमधील उतारा वाचून द्राक्षरस व भाकर वेगळी करून प्रत्येक उपासकास देतात आणि या विधीनंतर शेवटी गायन, प्रार्थना होऊन 'प्रभू येशूची शांती तुम्हावर असो' असा आशीर्वाद देऊन या विधीचा शेवट केला जातो. अशाप्रकारे ख्रिस्ती धर्मांमध्ये उपासना केली जाते.

### ख्रिस्ती संप्रदायाचे मराठी साहित्य :

इतर सांप्रदायिकांनी, पंथीय प्रचारकांनी ज्याप्रमाणे आपल्या धर्माच्या प्रचारासाठी-प्रसारासाठी आपल्या पंथाच्या तत्त्वज्ञानाच्या प्रसारासाठी अशा इतरही काही हेतूने ग्रंथनिर्मिती केली. तशाच स्वरूपाचे त्याच हेतूने ख्रिस्ती धर्मातील पंथप्रसारकांनी देखील आपले वाङ्मयीन लेखन केलेले आहे. त्याचा थोडक्यात आढावा येथे घेता येईल.

०१. **फादर स्टीफन्स:** फादर स्टीफन्स हा ख्रिस्ती मिशनरी २४ ऑक्टोबर, १९७९ ला गोव्यात प्रवेशित झाले. ही व्यक्ती म्हणजे भारतात आलेली पहिली इंग्रजी व्यक्ती होय. फादर स्टीफन्स यांनी कोकणी मराठीचे एक व्याकरणही पोर्तुगीज भाषेतून लिहिले आहे. त्यांनीच पुढील काळात 'क्रिस्तपुराण' नावाचा दहा हजारांहून अधिक ओवीसंख्या असणारा ग्रंथ इ.स. १६१४ मध्ये लिहिला. प्रस्तुत ग्रंथात लेखकाने मराठी भाषेविषयीचा आदर मोठ्या सौंदर्यात्मक पद्धतीने व्यक्त केला आहे. या ग्रंथाचा विषय हा ख्रिस्ताची कथा आहे. "प्राचीन मराठी भक्तिकाव्याचा विशेषतः तथाकथित ज्ञानदेवकृत योगवशिष्टाचा व विष्णुदासनामाकृत महाभारताचा क्रिस्तपुराणावर विशेष ठसा आहे. बायबली कथाचौकटीवर खास मराठमोळा वेलविस्तार जन्माने इंग्रज असलेल्या एका कवीने करावा, हे विशेष लक्षणीय आहे"<sup>७</sup> यात लेखकाने 'दौत्रिना क्रिस्ता' या नावाची एक धर्मतत्वाचे कथन करणारी प्रश्नोत्तरी मराठीच्या गोमंतकीय बोलीत लिहिली आहे.

०२. **फादर कुआ :** फादर स्टीफन्सप्रमाणे सेंट पीटर यांच्या जीवनावर फादर कुआ याने त्रिखंडात्मक असे 'महापुराण' लिहिले आहे. या पुराणाच्या आरंभी लेखकाने विश्वकर्त्याला नमन करून केला आहे. प्रस्तुत ग्रंथातून हिंदू देवदेवतांवर आणि आचारांवर कडक शब्दात टीका केली

आहे. हा धर्मप्रसारक इ.सं. १६०२ मध्ये गोव्यात आला. त्याने मराठी व कोकणीचा अभ्यास करून 'पीटर पुराण' हा साधारण १५००० ओव्या असणारा ग्रंथ लिहिला.

या वरील दोन लेखकांशिवाय आंतुनियु सालंदाज या संतचरित्रकाने सांतु आंतुनिची जीवनकथा कथन केली आहे. 'जीवित्ववृक्षाची फळे' हा त्याचा ग्रंथ गोमंतकीय बोलीत रचलेला आहे. तर पाद्री मानुएल जोंकीस द नोरोज यांनी 'ख्रिस्ताचे यातना गीत' लिहिले आहे. अशाप्रकारचे साहित्य लेखनाचे कार्य ख्रिस्ती मिशनर्यांनी मराठी भाषेत केले आहे. ही सर्व साहित्यनिर्मिती भक्तिभावनेने झालेली नसून केवळ धर्माच्या प्रचारार्थ झालेली आहे. असे या ग्रंथाच्या स्वरूपावर म्हणता येते. याबद्दल ल.रा.नासिराबादकर म्हणतात, - "या सर्व ख्रिस्तीधर्मियांनी आपल्या धर्मप्रसाराच्या निमित्ताने जे साहित्य लिहिले त्यात धर्मप्रसाराचा आवेश आणि काही ठिकाणी पक्षपातीपणा असला, तरी या काळातील मराठी साहित्यनिर्मितीचे स्वरूप माहित होण्यासाठी त्याची मदत होते. क्रिस्तपुराणाची प्रस्तावना नाथकालीन गद्याची ओळख पटविणारी आहे" हा त्यांचा अभिप्राय ख्रिस्ती संतांच्या ग्रंथनिर्मितीमागील हेतू स्पष्ट करतो.

अशाप्रकारे महाराष्ट्रात हिंदू संप्रदायाच्या संत कवींनी ज्या पद्धतीचे साहित्य लिहिले आहे त्याचाच वसा पुढे चालू ठेऊन अन्य धर्मातील / संप्रदायातील संत कवींनीही मराठी भाषेत साहित्य लेखन केलेले आहे. त्यांचा साहित्यनिर्मिती मागील हेतू धर्माचा प्रसार व प्रचार करण्याचा असला, आपला धर्म / पंथ येथे रुजावा-वाढवा म्हणून त्यांनी येथील बोलीभाषेचा अवलंब करून आपला धर्म व त्याचे तत्त्वज्ञान, त्यांचा आचारधर्म सर्वसामान्यापर्यंत पोहोचवण्याचा प्रयत्न याद्वारे केला असला तरी त्यांनी मराठी भाषेच्या विकासात जे योगदान दिले आहे ते खूप मोलाचे आहे. या सर्व संतकवींनी तत्कालीन कालखंडात मराठी भाषेचा स्वीकार करून समाजात समन्वय साधून एकात्मतेचा विचाराला चालना देण्याचे महान कार्य केले. त्याचबरोबर अंधश्रद्धा निर्मुलनाचाही हा प्रयत्न होता. या सर्वच संप्रदायांचा त्यावेळच्या महाराष्ट्रातील विविध भागातील लोकमानसावर, समाजमनावर एक प्रकारचा प्रभाव होता. आणि हे अन्य धर्मातील संप्रदाय त्याकाळी अस्तित्वात असणाऱ्या इतर हिंदू धर्मातील संप्रदायांच्या प्रभावापासून अलिप्त नव्हते. त्यामुळे या सर्वांनीच महाराष्ट्रात मध्ययुगीन कालखंडात एकात्मतेचे, सामंजस्याचे आणि समन्वयाचे वातावरण निर्माण केले असे म्हटले तर ते धाडसचे होणार नाही असे वाटते. तसेच वाङ्मय निर्मितीतून ग्रामसंस्कृती जपण्याचे, भाषेवर संस्कार करण्याचे, समाजाला विवेकशील बनवण्याचे कार्य या संतांच्या साहित्य लेखनाने केले. या साहित्यामुळे महाराष्ट्राला वेगळ्या धर्माचा, त्या धर्मातील तत्त्वज्ञानाचा-आचारधर्माचा, वेगळ्या समाजाचा, वेगळ्या संस्कृतीचा परिचय झाला. त्याचाच परिणाम म्हणून आज आपणाला मराठी संत साहित्याचे दालन विविधतेने नटलेले फुललेले दिसते. ही विविधता रसिकमनाला निश्चितच भूरळ घालते. त्यास्तव मराठी साहित्य आज विलोभनीय वाटते.

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## CHAPTER-57

## साक्री तालुक्यातील बारीपाडा गावाच्या आर्थिक स्थितीचा चिकित्सक अभ्यास

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## गोषवारा

भारत हा खेड्यांचा देश आहे. असंख्य खेड्यांचा बनलेला सुजलाम, सुफलाम असा भारत देश. पंच्याहत्तर - ऐंशी वर्षांपूर्वी आपल्या राष्ट्रपित्याने भारतीयांना हाक दिली होती 'खेड्यांकडे चला !' महात्मा गांधीजींनी आपल्या राजकीय गुरूंच्या म्हणजेच गोपाळ कृष्णा गोखले यांच्या सांगण्यानुसार १९१६ साली संपूर्ण भारताची पदयात्रा केली होती. त्यामुळे या महात्म्याला हा देश पूर्णपणे कळला होता. भारत हा खेड्यांचा देश आहे, खेडी सुधारली तरच देशाचा विकास होईल, हे त्यांनी जाणले होते. म्हणून त्यांनी युवकपिढीला आवाहन केले, खेड्यांकडे चला ! पूर्वी खेडी ही स्वायत्त, स्वयंपूर्ण होती. विनिमयाचे माध्यम हे पैशांऐवजी वस्तूंच्या स्वरूपात होत असे.

आज सर्वसामान्य तळातील घटक म्हणजे ग्रामीण जनता, ग्रामीण खेडे होय. 'खेडे' हे विकासाचे केंद्र मानले पाहिजे. आज भारतातील खेडेगावांची संख्या साडेसहा लाखांच्यावर आहे. पूर्वी खेडेगावांच्या शिवारात सोन्यासारखी शेती पिकलेली असायची. पण आजच्या खेडेगावांची अवस्था काय? खेडी ओस पडली आहेत आणि शहरे मात्र वेडीवाकडी फुगत चालली आहेत. संशोधनासाठी मी असेच एक खेडे साक्री तालुक्यातील बारीपाडा हे जनजाती (आदिवासी) हे गाव निवडलेले आहे.

**बीजसंज्ञा:-** आर्थिक विकास, रोजगारनिर्मिती, पूरक व्यवसाय, संघटन.

**प्रस्तावना :-**

'बारीपाडा' हे गाव धुळे जिल्ह्यापासून साधारणपणे १०० कि. मी अंतरावर वसलेले आहे. बारीपाडा गावाच्या इतिहासाचा आढावा घेत असताना चार दशकांच्या काळाचा विचार घ्यावा लागेल. साधारणतः १९८१-८२ च्या सुमारास बारीपाडा गावाची स्थिती भयानक होती. पिण्याच्या पाण्यासाठी वणवण, बाहेरच्या गावांमधून पाणी आणावे लागत असे, उपजीविकेचे साधन म्हणजेचे 'हातावर कमवायचे आणि पानावर खावयाचे' अशी परिस्थिती. थोडक्यात तुटपुंज्ये मोलमजुरीतून उदरनिर्वाह करावयाचा, पावसाच्या पाण्यावर होणार्या शेतीतून तूटपुंज्ये उत्पादन, शिक्षणाचे महत्त्व कमी, आरोग्याच्या समस्यांनी ग्रासलेले ग्रामस्थ, उपजीविकेसाठी एका गावातून दुसऱ्या गावात अशी त्यांची भटकंती चालू असे. थोडक्यात 'कासवाचे बिरहाड पाठीवर' अशी म्हण लागू पडत असे.

ही सर्व परिस्थिती गावातीलच युवक श्री. चैत्राम देवचंद पवार महाविद्यालयीन शिक्षण घेत असताना पाहत होता, अनुभवत होता. १९९१ मध्ये आजाराच्या निमित्ताने तो ४ कि.मी अंतरावर असलेला 'वारसा' या गावातील वनवासी कल्याण आश्रम संस्थेच्या माध्यमातून चालणार्या रुग्णालयात तो उपचारासाठी गेला. डॉ. आनंद फाटक यांच्याशी ओळख झाली. त्यांनी सर्व चौकशी केली. डॉ. फाटक यांचे मार्गदर्शन पुढील काळात मिळत गेले. सर्वप्रथम गावात 'वृक्षारोपण' या उपक्रमाचा प्रारंभ झाला. त्यावेळी ११ वृक्ष निलगिरीचे लावण्यात आले. १९९३ मध्ये श्री. चैत्राम पवार यांचे वाणिज्य पदव्युत्तर (M.COM) विद्याशाखेचे अध्ययन पूर्ण झाले. त्यानंतर अनेक ठिकाणी त्यांनी नोकरीसाठी मुलाखती दिल्या. त्यांना नोकरीसाठी बोलवण्यात आले. पण त्यांनी नोकरीच्या मागे न धावता आपल्या गावासाठी काहीतरी केलं पाहिजे, ही भावना मनात रुजवून आपलं सार आयुष्य झोकून दिलं. अगदी काही वर्षांच्या कालावधीत या युवकाने गावाचा कायापालट केला. या गावाने ग्रामस्थांच्या श्रमदानातून आणि सहभागातून 'विकासाची यशोगाथा' निर्माण केली. आज एक 'आदर्श गाव' म्हणून जगाचे लक्ष या गावाकडे आहे.

#### • माहिती संकलनाचे स्रोत:-

या विषयाची माहिती संकलित करण्यासाठी वर्तमानपत्रे, पुस्तके, इंटरनेट साईट्स इ. चा द्वितीयक तथ्य संकलन स्रोत म्हणून वापर करण्याचा प्रयत्न केला आहे. त्याचबरोबर विविध संशोधकांनी केलेल्या संशोधन अहवालांचा संदर्भ म्हणून त्याचा वापर केलेला आहे.

#### • उद्दिष्ट्ये :-

- १) बारीपाडा गावाच्या आर्थिक स्थितीचा अभ्यास करणे.
- २) बारीपाडा गावातील जनजाती जीवनपद्धतीचा अभ्यास करणे.
- ३) बारीपाडा गावातील लघुउद्योगांचा अभ्यास करून निर्माण झालेल्या रोजगारसंधींचा अभ्यास करणे.
- ४) बारीपाडा गावाच्या सर्वांगीण विकासासाठी गावकर्यांनी हाती घेतलेल्या उपक्रमांचा अभ्यास करणे.

#### • गृहीतकृत्ये :-

- १) बारीपाडा गावातील नागरिकांचा राहणीमानाचा दर्जा उंचावला असल्याचे दिसून येतो.
- २) गावातील आर्थिक विकासाचा जनजाती जीवनपद्धतीवर सकारात्मक परिणाम झाला.
- ३) लघुउद्योगांच्या विस्तारामुळे गावातील नागरिकांना रोजगाराच्या संधी गावातच निर्माण झाल्या.
- ४) गावाच्या सर्वांगीण विकासासाठी वनसंरक्षण, बचतगट, सोलर प्रकल्प इत्यादी उपक्रमांचा विस्तार करण्यात आला.

#### • भौगोलिक स्थान आणि रचना:-

'बारीपाडा' हे गाव धुळे जिल्ह्यापासून सुमारे १०० कि.मी. अंतरावर साक्री तालुक्यात वसलेले. तसा हा धुळे जिल्हा 'खानदेश' या महाराष्ट्राच्या प्रादेशिक विभागात मोडतो.

अवतीभवती वसलेल्या विविध जनजाती पाड्यांमध्ये असणारं हे गाव. महाराष्ट्र आणि गुजरातच्या सीमारेषेवर असलेले बारीपाडा हे पांझरा नदीच्या उगमस्थानापासून काही किलोमीटर अंतरावर विविध डोंगराच्या पायथ्याशी वसले आहे.

#### • बारीपाडा गावाची आर्थिक स्थिती

आर्थिक विकासात 'उत्पन्न' हा महत्त्वपूर्ण घटक मानला जातो. उत्पन्न या घटकावर समाजाचे राहणीमान अवलंबून असते. उत्पन्न अधिक असेल तर विकास कार्यात प्रगती होते आणि उत्पन्न कमी असेल तर विकास प्रक्रियेला खिळ बसते. श्रमनिष्ठेचा सन्मान करून 'पुनर्रचनेसह विकास' (Development With Restoration) हे तत्व अवलंबण्यात येते. चिरकालीन विकासाचा रस्ता केवळ याच मार्गावरून जाऊ शकतो आणि यशस्वी होऊ शकतो. याच धर्तीवर बारीपाडा गावातील जनजाती बांधवांनी विविध उपक्रमांच्या साहाय्याने उत्पन्न प्राप्त केले. काबाडकष्ट करून गावाचा विकास घडवून आणला.

#### अ) शेती :-

भारतात पंचवार्षिक योजनांचे युग सुरु होण्यापूर्वी देशातील शेती व्यवसाय अंत्यत मागासलेल्या स्थितीत होता. पण तरीही शेती हाच भारतीय अर्थव्यवस्थेचा कणा होता आणि आहे. म्हणूनच भारताच्या पहिल्या पंचवार्षिक योजनेपासून शेती क्षेत्राला प्राधान्य देऊन अधिकाधिक खर्च शेती व शेतीशी संबंधित घटकांवर केला जातो. शेती क्षेत्राची वाढ ही अन्नसुरक्षा, ग्रामीण रोजगार आणि ग्रामीण जनतेचे राहणीमान उंचावण्यासाठी महत्वाची आहे. म्हणूनच खेडे गावांमध्ये आज शेतीला महत्वाचे स्थान आहे. ग्रामीण भागात अद्यापही शेती हा मुख्य व्यवसाय असून अन्य व्यवसाय हे दुय्यम स्वरूपाचे आहेत. पूर्वीच्या काळी 'उत्तम शेती, मध्यम व्यापार आणि कनिष्ठ नोकरी' असं सूत्र होत. आजच्या परिस्थितीत हे सूत्र 'उत्तम नोकरी, मध्यम व्यापार आणि कनिष्ठ शेती' असं उलट झालेले दिसून येते.

बारीपाडा या गावात २०१२ च्या माहितीनुसार १०४ ही कुटुंबांमध्ये शेती हा मुख्य व्यवसाय असून, प्रत्येक कुटुंबाकडे २ एकर पेक्षाही जास्त जमीन ही शेती लागवडीखालील आहे. शेती ही बागायती केली जाते आणि विविध प्रकारचे उत्पादन घेतले जाते. साधारणपणे पावसाळी शेतीमध्ये भात, नागली, भुईमुग ही पिके घेतली जातात. या पिकांसाठी पावसाच्या पाण्याची उपलब्धता होते. उन्हाळ्यामध्ये विहिरी, तलाव यांमध्ये साठवणूक केलेल्या पाण्याच्या साहाय्याने उत्पादन केले जाते. या शेतीमध्ये गहू, ऊस, ज्वारी, विविध प्रकारची कडधान्ये, भाज्या यांचे उत्पादन घेतले जाते. ग्रामस्थांना अन्नधान्य खरेदी करावे लागत नाही. उलट विक्री केली जाते. शेतीत बैलांच्या साहाय्याने नांगरणी केली जाते. कुटुंबातील व्यक्तीच शेतीत काम करतात. त्यामुळे बाहेरील मजुरांची आवश्यकता पडत नाही. शेतीमध्ये रासायनिक खतांचा कमीत कमी वापर करून शेणखताचा अधिकाधिक वापर केला जातो.

• शेती लागवडीखालील जमिनीचे वर्गीकरण

अ.क्र	लागवडीखालील जमिनीचे वर्गीकरण	कुटुंब संख्या
१	१ ते ३ एकर	११
२	३ ते ५ एकर	४३
३	५ ते ७ एकर	३२
४	७ ते १० एकर	१२
५	१० ते १५ एकर	०४
६	१५ एकर पेक्षा जास्त	०२
	एकूण	१०४

स्रोत : २०१२ मध्ये केलेले संशोधन .

वरीलप्रमाणे बारीपाडा गावातील शेतकऱ्यांच्या शेतजमिनीचे लागवडीखालील वर्गीकरण करता येईल.

**ब) लघुउद्योग :-**

आज देशाच्या विकासात उद्योगांचा मोलाचा वाटा आहे. यामध्ये लघु, मध्यम आणि कुटीर उद्योगांमधून रोजगाराची प्राप्ती होत असते. बेरोजगारांना रोजगार उपलब्ध होत असतो. बारीपाडा गावाने शेती विकासाबरोबरच लघुउद्योगांतही प्रगती केलेली आहे. छोट्या-छोट्या उद्योगांचा प्रारंभ केला आहे. या उद्योगांमुळे गावातील लोकांना रोजगाराची उपलब्धी झाली. लोकांना मिळणार्या या रोजगारातून अन्य जीवनावश्यक वस्तूंची खरेदी करता येऊ लागली. ग्रामस्थांनी गावाच्या सर्वांगीण विकासासाठी घेतलेले लघुउद्योग खालीलप्रमाणे :-

**१) वीटभट्टी :-**

बारीपाडा गावातील कर्त्या लोकसंख्येच्या प्रमाणात साधारणपणे ३% लोकसंख्या ( २५-३० मजुरदार) ही वीटभट्टी या उद्योगात कार्यरत आहेत. दिपावलीनंतर साधारणतः नोव्हेंबर ते एप्रिल या महिन्यात वीटभट्टी हा व्यवसाय केला जातो. या दरम्यान गावातील लोक बागायती शेतीबरोबरच वीटभट्टीवर मजुरीने काम करतात. पूर्वी जे एकदा पावसाळी शेती झाली की दुस-या ठिकाणी जाऊन मोलमजुरी करत. आता या मजुरीसाठी होणा-या स्थलांतराला आळा बसला. वीटभट्टी या व्यवसायासाठी आवश्यक पाणी, माती, भुसा इत्यादी कच्चा माल उपलब्ध होत असल्यामुळे भांडवल हे कमी प्रमाणात लागते. उत्पादन होणा-या वीटेची विक्री केली जाते. त्यामधूनच होणा-या खर्चाची व रोजगाराची प्राप्ती होते. त्यामुळे जनजाती बांधवाच्या वार्षिक उत्पन्नात भर पडली.

**२) नर्सरी :-**

गावातील कर्त्या लोकसंख्येच्या १.५% लोकसंख्या ( ७-१० मजुरदार) ही नर्सरी या व्यवसायात कार्यरत आहे. नर्सरी हा व्यवसाय या वर्षापासून गुप ग्रामपंचायतीच्या आर्थिक मदतीतून सुरू केलेला आहे. यामध्ये आंबा, केळी, काजू, डाळिंब, इत्यादी वृक्षांची रोपे तयार होत

आहेत. गावामध्ये मुबलक प्रमाणात पाणी असल्यामुळे वृक्षांचे संगोपन करणे सहजगत्य शक्य होते. वृक्षांसाठी आवश्यक ती मृदा, शेणखत इत्यादी वेळोवेळी दिले जाते.. या नर्सरीमधील लागवडीत रोपांची आवश्यकतेनुसार विक्री केली जाते. विक्रीतून प्राप्त होणा-या उत्पन्नामधून उत्पादनासाठी होणारा खर्च आणि मजुरांना मजुरी दिली जाते. थोडक्यात वार्षिक उत्पन्नात सरासरी १.५% इतकी वाढ होते.

### ३) कुक्कूटपालन :-

गावातील प्रत्येकाच्या घरी कमीत कमी २०-२५ कोंबड्यांची संख्या असते. खरं तर जनजाती समाजाच्या भोजनात ब-यापैकी मांसाहाराचा समावेश असतो. तेव्हा वाटलं की, घरीच खाण्यासाठी कुक्कूटपालन केले जात असेल, पण चर्चा केल्यानंतर लक्षात असं आलं की, घरामध्ये खाण्यासाठी तर पालन करतात, पण त्याचबरोबर वारसा या आठवडा बाजाराच्या ठिकाणी त्यांची विक्री केली जाते. साधारणपणे १ किलोची कोंबडी १५०-२०० रुपयाला विक्री केली जाते. कुक्कूटपालनासाठी आवश्यक असणारे खाद्यान्न म्हणजे वेगवेगळ्या प्रकारची धान्ये पुरविली जातात. प्रत्येक कुटूंबातून वर्षाला कमीत कमी ३०-४० कोंबड्यांची आठवडा बाजारात विक्री केली जाते. त्यामुळे वार्षिक उत्पन्नात सरासरी १.५% इतकी भर पडते.

### ४) बंधारे :-

ग्रामस्थांना पाटबंधारे बांधणीतून रोजगार मिळतो. वनीकरण विभागाकडून कधी कधी चर खोदणे, बंधारे बांधणे अशा योजना राबविल्या जातात. त्यामुळे गावातील लोकांना रोजगार मिळतो. उत्पन्नात साधारणपणे ०.५% भर पडते.

### ५) मोहफुलाची विक्री :-

ग्रामस्थांच्या मालकीचे जवळजवळ ११०० एकर घनदाट जंगल असल्यामुळे या जंगलात विविध प्रकारचे वृक्ष आहेत. यातील काही वृक्ष हे उत्पन्नाचे एक साधन बनले आहेत. मोह या नावाच्या वृक्षांची संख्या मोठ्या प्रमाणावर आहे. दरवर्षी मोह या वृक्षाला साधारणपणे डिसेंबर, जानेवारी या महिन्यात फुल येतात. या जंगलातील मोहाला फुल आलेल्या वृक्षांची मोजणी करून, प्रत्येक कुटूंबाला त्या वृक्षांची वाटणी केली जाते. प्रत्येक जण आपल्या वाट्याला आलेल्या वृक्षांचीच फुले गोळा करतो. त्यांना सुकवून त्यांची विक्री केली जाते. परिणामी फुलांच्या विक्रीतून प्रत्येक कुटूंबाला रोजगार मिळतो. गावातील एक-दोन कुटूंब ही मोहाच्या फुलापासून दारू काढतात. त्यामुळे या कुटूंबाना दारू विक्रीतून उत्पन्न प्राप्त होते. मात्र या कुटूंबाना मोहफुलाच्या विक्रीमधील उत्पन्नातून काही वाटा हा गावकीच्या खात्यात जमा करावा लागतो. त्याचा उपयोग गावकीच्या सार्वजनिक कार्यक्रमात केला जातो. मोहफुलाच्या विक्रीतून प्रत्येक कुटूंबाच्या वार्षिक उत्पन्नात २% भर पडते.

### ६) मत्स्य उत्पादन :-

मत्स्य उत्पादनातूनही काही ५-६ कुटूंबाना रोजगार प्राप्त होतो. बारीपाडा गावातील ग्रामस्थ आपल्या तळ्यांमध्ये किंवा शेततळ्यांमध्ये विविध प्रकारचे मासे सोडतात. साधारणपणे तीन महिन्यांनंतर त्यांची विक्री केली जाते. त्यांना आवश्यक ते खाद्यान्न तळ्यांमध्ये सोडले

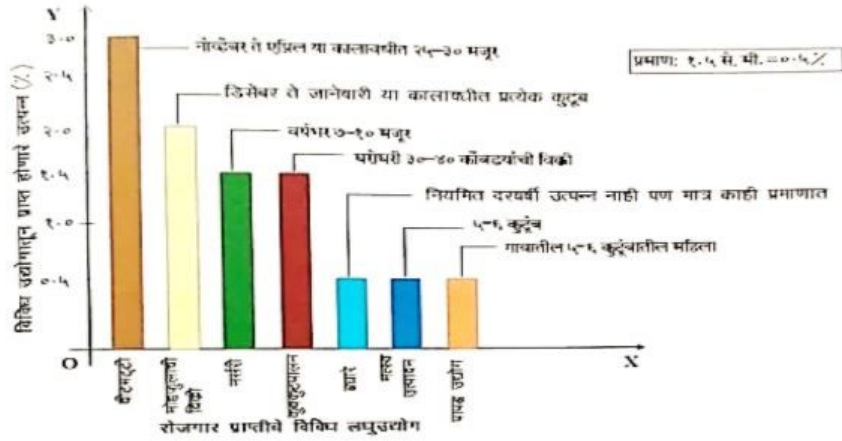


जाते. पापलेट, सुरमय आणि खऊल या प्रकारचे मासे असतात. काही वेळा घरगुती आहारामध्येही त्याचा उपभोग घेतला जातो. मत्स्य उत्पादनामुळेही ०.५% उत्पन्नात भर पडते.

#### ७) पापड उद्योग :-

सर्वप्रथम बचतगटांच्या साह्याने पापड उद्योग केला जात असे. त्यामुळे तेव्हा मोठ्या प्रमाणावर उत्पन्न प्राप्त होत असे. सध्या बचतगटांच्या साह्याने पापड उद्योग न करता घरोघरी पापड बनवले जातात. गावातील ७-८ महिलाच फक्त विक्रीसाठी पापड तयार करतात. अन्य महिला या घरगुती उपभोगासाठी पापड बनवतात. पापड हे नागलीच्या पिठापासून बनवले जातात. त्याचबरोबर नागलीचे सत्वही केले जाते. परिणामी उत्पादित पापडांची विक्री ही गावाला भेट देणा-या लोकांना किंवा बाजाराच्या ठिकाणी केली जाते. त्यामुळे उत्पन्नात ०.५% इतकी भर पडते.

#### • लघुउद्योगांमधील उत्पन्नाचे आलेखाच्या साह्याने विश्लेषण :-



वरीलप्रमाणे बारीपाडा गावातील ग्रामस्थांच्या सरासरी वार्षिक उत्पन्नात वरील लघुउद्योगांचा काहीना काही हिस्सा असतो. बारीपाडा गावातील ग्रामस्थांच्या वार्षिक उत्पन्नामध्ये साधारणपणे ९.५% लघुउद्योगांमधून प्राप्त होणारे उत्पन्न आहे.

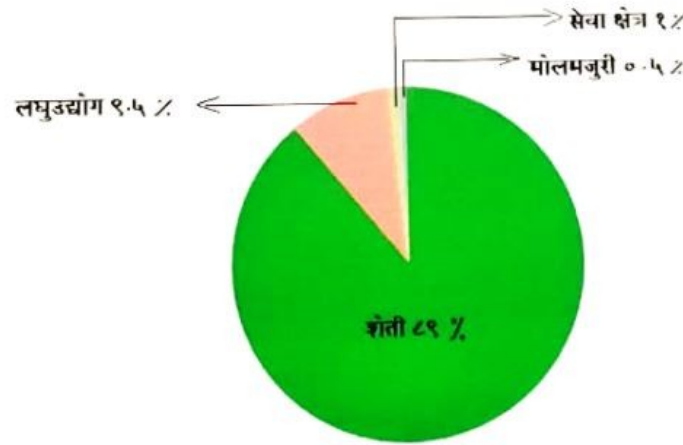
#### क) सेवा क्षेत्र :-

आज देशात कृषी, उद्योग क्षेत्रातील उत्पन्नापेक्षा सेवा क्षेत्रातील उत्पन्न हे मोठ्या प्रमाणावर प्राप्त होत आहे. मात्र बारीपाडा गावामधील ही स्थिती देशाच्या स्थितीपेक्षा विरोधी आहे. आज बारीपाडा गावामध्ये मोठ्या प्रमाणावर शेती केली जाते. त्याचबरोबर लघुउद्योगांनाही महत्वपूर्ण स्थान दिले आहे. सेवा क्षेत्राचा विचार करता फक्त ७ व्यक्ती या क्षेत्रात कार्यरत आहेत. यामध्ये २ प्राध्यापक, ३ शिक्षक, १ ट्रेसर (ITI). १ ग्रामसेवक अशी संख्या खूपच नगण्य आहे. साधारण एकूण उत्पन्नाच्या १% उत्पन्न हे सेवा क्षेत्रातून प्राप्त होत आहे.

**ड) मोलमजुरी :-**

बारीपाडा गावाच्या सुरवातीच्या इतिहासात 'हातावर कमवायचे आणि पानावर खावयाचे' ही स्थिती आता बदलत चालली आहे. आता गावामधील काही लोक ५-६ जण हे शेतीची कामे पूर्णपणे उरकल्यानंतर किंवा रिकाम्या कालावधीत बाहेर ठिकाणी जाऊन मजुरी करतात किंवा रोजगार हमी योजनेअंतर्गत मजुरी करतात, वाहने चालवतात. शेती, लघुउद्योगांमुळे बाहेर मजुरीसाठी जाणा-या लोकांचे प्रमाण हे आज दिवसेंदिवस कमी होत आहे. एकूण उत्पन्नात फक्त ०.५% इतकीच मोलमजुरीतून भर पडत आहे.

- बारीपाडा गावातील लोकांना विविध क्षेत्रातून प्राप्त होणारे उत्पन्न (टक्केवारीमध्ये) :-



वरीलप्रमाणे बारीपाडा गावामधील ग्रामस्थांचे विविध क्षेत्रातून प्राप्त होणा-या उत्पन्नाचा हिस्सा आकृतीच्या साह्याने दर्शविलेला आहे. यामध्ये सर्वाधिक उत्पन्नाचा हिस्सा हा शेती या व्यवसायातून प्राप्त होत आहे. यामध्ये त्याचे प्रमाण ८९% आहे. पूर्वीचं 'उत्तम शेती, मध्यम व्यापार आणि कनिष्ठ नोकरी' या सुत्राची तंतोतंत अमलबजावणी बारीपाडा गावातील बांधवांनी केलेली दिसून येते. त्याचबरोबर लघुउद्योगातून ९.५% उत्पन्न प्राप्त होत आहे. सेवाक्षेत्रातून १% आणि मोलमजुरीतून ०.५% उत्पन्न बांधवांना प्राप्त होत आहे.

बारीपाडा गावाने भारतीय अर्थव्यवस्थेचा कणा मानल्या जाणा-या शेती व्यवसायावर लक्ष केंद्रीत करून, शेती सुधारणेसाठी विविध उपक्रम हाती घेऊन शेती या व्यवसायातून आज मोठ्या प्रमाणावर उत्पन्न प्राप्त होत आहे. याचबरोबर त्यांनी शेती आधारित लघुउद्योगांचा पुरस्कार करून काही प्रमाणात उत्पन्न प्राप्त होत आहे.

• बारीपाडा गावामधील कुटुंबाची वार्षिक उत्पन्नाची वर्गवारी :-

वार्षिक उत्पन्न (रुपये)	कुटुंबसंस्था
३०,००० पर्यंत	५५
३०,००० – ६०,०००	४०
१,००,००० पेक्षा जास्त	०९

**स्रोत :- २०१२ मध्ये केलेले सर्वेक्षण**

वरील तक्त्यामध्ये बारीपाडा गावातील कुटुंबाच्या वार्षिक उत्पन्नाची सरासरी दर्शविलेली आहे. बारीपाडा गावामधील ग्रामस्थांच्या उत्पन्नामध्ये फक्त रोख स्वरूपात प्राप्त होणा-या उत्पन्नाचा समावेश केलेला आहे. शेतीतून प्राप्त होणा-या अन्नधान्य, भाजीपाला यांचा यामध्ये समावेश केलेला नाही. उत्पन्नाच्या आकडेवारीवरून बारीपाडा गावातील कुटुंब ही व्यवस्थितपणे आपल्या मूलभूत गरजांची पूर्तता करू शकतात, हे स्पष्ट होते.

• गावाच्या सर्वांगीण विकासासाठी हाती घेण्यात आलेले उपक्रम :-

१) वनसंरक्षण :-

आज गावाच्या परिसरात वनव्यवस्थापन करण्यात आले आणि चक्क एक-दोन नव्हे तर ३४२ बंधारे जंगलात साकारले गेले आहेत. बंधा-यांमुळे डोंगर पायथा हिरवागार झाला. गावाला स्थानिक पातळीवरच मुबलक पाणी मिळू लागले आहे. वनव्यवस्थापनामुळे दैनंदिन जीवन सुखकर झाले. संशोधन विषयाच्या अध्ययनात वनसंरक्षणातून ग्राम विकास साध्य करता येऊ शकतो असं गृहितकृत्य मानलं ते ख-या अर्थाने सफल झाले आहे.

• वनसंरक्षणासाठी ग्रामस्थांनी तयार केलेली नियमावली :-

१. वर्षभरातून एक महिना लाकूडफाटा गोळा करण्यासाठी निश्चित केला जातो. या महिन्यात गावातील प्रत्येक घरातील एकाने जंगलात जाऊन, डोक्यावर वाहून आणता येईल इतक्या लाकडाची मोळी आणायची आहे. पण एका कुटुंबाला २० पेक्षा जास्त मोळ्या आणता येणार नाहीत.

ब) मोळीसाठी लाकडे मिळविताना ती झाडावर कोरडी झालेली असावी. झाडाच्या फांद्याच तोडव्यात खोड किंवा मुळावर घाव घालता येणार नाही.

१. मुभा असलेल्या महिन्याव्यतिरिक्त झाड तोडताना गावातीलच नव्हे, अन्य गावातील कुणी आढळला तर १०५१ रुपये दंड.

ड) जंगलातून लाकूड वाहून आणण्यासाठी बैलगाडी वापरली तर ७५१ रुपये दंड.

इ) मुभा असलेल्या महिन्याच्या व्यतिरिक्त कुणाही जंगलात फिरताना कु-हाड आढळली तर १०५१ रुपये दंड.

ई) जंगल संरक्षणाची जबाबदारी (वनरक्षक) दरवर्षी गावातील वेगवेगळ्या व्यक्तींवर सोपवून त्याला गावातील बांधवाकडूनच पैसे जमा करून दरमहा मानधन दिले जाते.

## २) बचतगट :-

बचतगट हे ख-या अर्थाने आजही ग्रामीण भागात महत्वाचे पतपुरवठ्याचे साधन झाले आहे. कोणतेही काम करायचे असेल तर पैसा हवाच. पण आपल्याला कोणती बँक पैसा देणार हा विचार न करता चैत्राम पवार आणि त्याच्या सहका-यांनी गावातील लोकांचे मनोबल उंचावत सर्वप्रथम १९९२ ला बचत गटाची स्थापना केली. प्रत्येक घरातील कर्त्या पुरुषाने दरमहा १० रुपये द्यावेत असे ठरले. त्याचवेळी पैसे देता येणार नसतील तर श्रमदान करावे. आज खूप मोठ्या प्रमाणावर श्रमदानाच्या माध्यमातून सार्वजनिक कामे करता आली. बारीपाडा गावात ५ बचतगट आहेत. यापैकी २ पुरुष आणि ३ महिला बचतगट आहेत. त्यातील ३ बचतगट हे बँकेशी नोंदणीकृत व खातेदार आहेत. प्रत्येक गटात साधारणपणे २० सदस्य आहेत.

## ३) सोलर प्रकल्प :-

आज आपणा सर्वांना वीजेच्या समस्येचा सामना करावा लागतोय. आज ऊर्जा संकट हे देशासमोरील आव्हान आहे. मात्र आमच्या बारीपाडावासीय बांधवांनी एक अभिनव उपक्रम राबवून सुर्यकिरणावर आधारित विद्युत दिवे खरेदी करून रात्रीच्या वेळी या दिव्यांचा प्रकाशासाठी उपयोग करतात.

## ४) बायोगॅस आधारित विद्युत निर्मिती :-

बारीपाडा गावाने जनावरांचे शेण आणि वनस्पतींचा पालापाचोळा वापरून मिथेनची निर्मिती करणारे बायोगॅस संयंत्र हे असे एक नव्याने विकसित केलेले उपकरण आहे. या गावातील कुटूंबे ही बायोगॅसचा उपयोग स्वयंपाकासाठी, पाणी तापविण्यासाठी तर करतातच. पण त्याचबरोबर पर्यावरणावर आधारित ऊर्जा प्रकल्प साकारताना आता बारीपाड्याच्या परिसरात असलेल्या महूच्या बियांपासून तेल मिळविल्यानंतर हाती येणा-या पेंडपासून वीज निर्माण केली जात आहे. सध्या गावातील काही कुटूंबांना सायंकाळी ६ ते रात्री १० या वेळेत वीजपुरवठा केला जातो. प्रत्येक घरी एक बल्ब बसवलेला आहे.

## ५) वनभाजी स्पर्धा :-

वनौषधी वनस्पतींची माहिती जनजाती समाजाच्या पूर्वीच्या पिढीला होतीच. तिची उजळणी व्हावी आणि आजच्या पिढीला त्याचा प्रभावी वापर करता यावा यासाठी चैत्राम पवार यांनी, त्यांच्या सहका-यांच्या मदतीने २००३ मध्ये वनभाज्या महोत्सव सुरू केला. स्पर्धेत भाग घेणा-या महिलांनी त्याच दिवशी सकाळी जंगलात जाऊन भाजी आणायची. ती आपल्या पद्धतीने शिजवायची आणि महोत्सवात आणायची. परिक्षकांना भाजीची चव देतानाच त्या भाजीचे आरोग्यासाठी असलेले महत्व सांगितले जाते. पहिल्या वर्षी २० महिलांनी भाग घेतला होता. तर २०११ मध्ये ११८ महिलांनी वनभाजी महोत्सवात भाग घेताना ७० वनभाज्यांच्या ६८५ डिश सादर केल्या होत्या. पहिल्या तीन क्रमांकांना व २ उत्तेजनार्थ पारितोषिके देऊन गौरविण्यात आले.

• बारीपाडा गावाला आतापर्यंत प्राप्त झालेले पुरस्कार व प्रसिध्दी :-

अ) पुरस्कार :-

- १) 'ग्रामीण तंत्रज्ञानाचा शोध' या मथळ्याखाली आंतरराष्ट्रीय स्तरावरील 'International Fund for Agricultural Development' (IFAD) आंतरराष्ट्रीय संघटनेने सन-२००३ साली पुरस्कार देऊन गौरविले.
- २) 'संत तुकाराम वनग्राम योजना' हा जिल्हा स्तरावरील महाराष्ट्र शासनाने पुरस्कार देऊन बारीपाड्याला गौरविले.
- ३) महाराष्ट्र शासनाने 'वैभवशाली इतिहासाचा, गौरवशाली कर्तृत्वाचा, सुवर्ण महोत्सव महाराष्ट्राचा' या वर्षी गावाला शेतीनिष्ठ शेतकरी गाव म्हणून पुरस्कार देऊन सन्मानित केले.
- ४) समर्थ भारत व्यासपीठ, पुणे यांनी 'समर्थ धुळे जिल्हा'-२०२० साली कसा असेल यासंबंधी अभ्यास करून २०२० साली धुळे जिल्ह्यातील सर्व गाव ही बारीपाड्यासारखी असतील. याच वेळी त्यांनी 'वेध उद्याच्या विकासाचा....' या शीर्षकाखाली बारीपाडा गावाला पुरस्कार देऊन सन्मानित केले.
- ५) वनवासी कल्याण आश्रम, नातू फाऊंडेशन, जनसेवा फाऊंडेशन, डॉ. हेडगेवार समिती-नंदुरबार, विश्व हिंदू परिषद, आदिवासी हिंदू अस्मिता मंच, रोटरी क्लब ऑफ दोंडाई, संस्कार कवच सहयोग- नागपूर, पु. भा. भावे ट्रस्ट-मुंबई, गो.नी. दांडेकर ट्रस्ट इत्यादी विविध सेवाभावी संस्थांनी गावाला पुरस्कार देऊन वेळोवेळी गौरविले.

ब) प्रसिध्दी :-

गावाला प्राप्त पुरस्कारांबरोबर विविध प्रसारमाध्यमांनी प्रसिध्दीच्या शिखरावर नेले. जळगाव आकाशवाणी केंद्र, धुळे दुरदर्शन केंद्र, मुंबई दुरदर्शन केंद्र, विविधभारती, सहाद्री वाहिनी (तपस्या), इंटरनेट, विविध

• शिफारशी :-

१. उत्पादित मालाच्या विक्रीसाठी गावातीलच एका व्यक्तीची प्रमुख म्हणून नेमणूक करून त्याच्या मार्फतच उत्पादित विक्री मालाची कार्यवाही करणे.
२. शहराकडे धावणा-या युवकाचा लोंढा थोपविण्यासाठी त्यांना शेती व्यवसायाचे महत्त्व पटवून देणे.
- ३) गावाने अधिक उत्पादनासाठी पशुपालन (गाय, म्हैस), मेंढीपालन व्यवसाय सुरू करणे.
- ४) संघटन कायम टिकविण्यासाठी अभिनव उपक्रम अमलात आणणे.

• उपाययोजना :-

१. बारीपाडा गावात उत्पादित होणारा माल हा आतापर्यंत मध्यस्थांच्या साखळीमार्फत ग्राहकांपर्यंत पोहोचविला जातो. यासाठी गावातील एका शिक्षित तरुणाची उत्पादित मालाच्या विक्रीसाठी नेमणूक करावी. जेणेकरून त्याच्यामार्फत गावातील उत्पादित माल हा प्रत्यक्ष बाजारपेठेत ग्राहकांना विकला जाईल. यासाठी उत्पादित मालाच्या

विक्रीसाठी एक फळी निर्माण करून उत्पादित मालाला चांगला भाव, ग्राहकांना योग्य दरात विक्री आणि उत्पादक शेतक-यांनाही चांगला भाव मिळेल.

2. आजूबाजूच्या वातावरणाचा परिणाम हा समाजाच्या मानसिकतेवर होत असतो. हे स्वाभाविकच आहे. याला बारीपाडा गावही अपवाद नाही. पण मात्र या युवा वर्गाला शहरांमधील समस्यांची ताबडतोब जाणीव होणार नाही. कालांतराने त्याची अनुभूती येईलच. आजच्या या युवा वर्गाला शेती व्यवसायातच आर्थिक विकासाची बीजे पेरली आहेत हे पटविणे गरजेचे आहे. सेवाक्षेत्राबरोबरच शेती हा महत्त्वपूर्ण व्यवसाय आहे. सेवा क्षेत्रातून मिळणा-या उत्पन्नापेक्षा शेती व्यवसायातून अधिक उत्पन्न प्राप्त होऊ शकत हे प्रात्यक्षिकासह पटवून दिले पाहिजे.
3. बारीपाडा गावाच्या परिसरात आज ३० हेक्टर गायरान आणि २६ हेक्टर बिगर कृषी (गावठाण) लागवडीखालील जंगल आहे. बारीपाडा गावाने जर पशुपालन विशेषतः गायी, म्हैशी आणि शेळ्या यांचे पालन केले तर उत्पन्नात वाढ होईल. गायी, म्हैशी व शेळ्यांसाठी आवश्यक चारा या वनक्षेत्रातूनच उपलब्ध होईल. थोडक्यात गायी, म्हैशींपासून मिळणा-या दुधातूनच गावात दुध डेअरी स्थापन करता येईल आणि बारीपाडा गावातील बांधवांच्या उत्पन्न पातळीत वाढ होईल.
4. 'ग्राम संघटन' हे कायम टिकेल काय? हे एक गावासमोरील आव्हान आहे. पण मात्र यासाठी प्रौढ ग्रामस्थांनी आपल्या गावातील युवकांना विश्वासात घेऊन, त्यांना वेळोवेळी एकत्रित करून एकमेकांच्या विचारांची देवाणघेवाण होईल असे उपक्रम हाती घ्यावेत. उदा. गावातील युवकांचा वर्ग, सहभोजन किंवा वनभोजन, अन्य गावातील तज्ञ व्यक्तींची व्याख्याने युवकांसाठी विविध स्पर्धा, आपल्या गावाविषयीचे मुक्तपणे विचारांचे प्रकटीकरण करण्याची युवकांना संधी देणे इत्यादी. जेणेकरून त्यांच्यात गावाविषयीची गोडी निर्माण होऊन त्यांच्यामधील उत्साह वाढेल. अर्थात गावाचे संघटन टिकविण्यास आपोआप मदत होईल.

• **निष्कर्ष :-**

1. बारीपाडा गावाने असंख्य समस्यांवर मात करून, निःस्वार्थ भावनेने श्रमदान करून गावाचा कायापालट केला.
2. जंगलचे राजे ख-या अर्थाने आपण आहोत. या भावनेने सर्वप्रथम वनसंरक्षण हा उपक्रम राबवून गावाला एक आगळी-वेगळी दिशा मिळाली आणि त्यातूनच सर्वांगीण विकासाचे स्वप्न साकार झाले.
3. जंगलाला जीव लावणा-या गावक-यांना जंगलाने मध, मोहफुले, टोळंबी, आंबा वनौषधींचे भंडार उघडून दिले आहे.
4. शेती व्यवसायातच विकासाचे मूळ दडलेले आहे. हे बारीपाडा गावातील बांधवांनी

सुरवातीसच जाणले आणि म्हणूनच सर्वप्रथम शेती व्यवसायाची भरभराट करून आपली उन्नती साधली.

5. शेतीशीच संबंधित असे लघुउद्योग, ज्यांना फारसे भांडवल लागणार नाही, ज्यांना आवश्यक असणारा कच्चा माल गावातच उपलब्ध होईल असेच उद्योग बारीपाडा गावातील बांधवांनी सुरू केले आणि त्यात यश प्राप्त केले. उदा. वीटभट्टी, कुक्कूटपालन, पापड उद्योग, नर्सरी इत्यादी.
6. बारीपाडा गावाने आधुनिक भातशेती पद्धतीचा स्विकार करून चारसुत्री भातशेतीच्या प्रयोगामुळे कुटूंबातील उत्पन्नाचे आकडे वाढले.
7. बारीपाडा गावातील बांधवांनी सर्वांगीण उन्नतीसाठी फार कठोर नियम बनविले. उदा. पुरुष नसबंदी लोकसंख्या नियंत्रण, नियमांचे पालन न करणा-यास दंड, जंगलातील हिरव्या वृक्ष तोडीस कु-हाडबंदी इत्यादी. याला नियमांपेक्षा आचरणाचे संकेत म्हणणे संयुक्तिक ठरेल.

• **सारांश :-**

आज बारीपाडा नाव जरी उच्चारले तरी एक मोठा कॅन्व्हॉस नजरेसमोर तरळतो! काय असते या कॅन्व्हॉसवर.... मातीतल्या माणसांनी आपल्या इच्छेने गुंफलेले, फुलवलेले, विणलेले आपले जग. हिरवेगार आणि निसर्गसंपन्न! आज बारीपाडा गावातील कर्तबगार हातांना स्वतःची जमीन कसायला मिळाली. गावाचे जीवनमान सुधारले. जेवणात मीठ-भाकरीसोबत भाजीपाल्याची व मांसाहाराची जोड मिळू लागली. कच्च्या घरांची जागा पक्क्या घरांनी घेतली. गावात रस्ता व रस्त्यावर वाहने दिसू लागली. प्रगतीच्या या वाटेवर सहभाग नोंदविणा-या अनेक सेवाभावी संस्था होत्या. जे गावं घासभर अन्नासाठी घोटभर पाण्यासाठी वणवण भटकत होते तेच गावं इतर गावांना मदतीचा हात देऊ लागले. आज कष्टाची भाकरी खातांना त्या गावक-यांच्या चेहऱ्यावरचा आनंद बघण्यासारखा असतो.

ही सत्य कथा ऐकायला रंजक, लिहायला सोपी परंतु प्रत्यक्षात साकारताना अत्यंत कष्टप्रद, काट्यांनी, खाच खळग्यांनी भरलेली... टीका आणि बोच-या शब्दांनी जखमी करणारी...तरीही न डगमगता सातत्याने स्विकारलेले हे व्रत आज... समृद्धीच्या मखमली वाटेवरचं एक आश्वासक पाऊल ठरले आहे... त्याचीच ही चित्तरकथा... संशोधन अहवालाच्या निमित्ताने. एका जनजाती पाड्याला सातासमुद्रापार ओळख मिळवून देणारा श्री. चैत्राम पवार आणि त्याचे सहकारी यांनी केवळ गावाच्या इच्छाशक्तीच्या जोरावर गावाला समृद्धीचा मंत्र दिला. गावानेच गावाच्या गरजा भागवाव्यात हा संकेत देणारे साक्री तालुक्यातील बारीपाडा हे गाव.

• संदर्भग्रंथसूची

अ) पुस्तके :-

अनु क्र.	पुस्तकाचे नाव	लेखकाचे नाव	प्रकाशक	प्रकाशन आवृत्ती
१)	संशोधन पध्दती	डॉ. गंगाधर वि. कायंदे-पाटील	चैतन्य पब्लिकेशन, नाशिक	५ वी आवृत्ती १५ जून, २००९
२)	शास्त्रीय संशोधन पध्दती	डॉ. बी. एम. क-हाडे	पिंपळापुरे अँड कं. पब्लिशर्स, नागपूर	२ री आवृत्ती जुलै, २००७
३)	सामाजिक संशोधन पध्दती	डॉ. सुधीर बोधनकर, प्रा. विवेक अलोणी	श्री. साईनाथ प्रकाशन, नागपूर	४ थी आवृत्ती जानेवारी, २००७
४)	शेतीचे अर्थशास्त्र	डॉ. गंगाधर वि. कायंदे-पाटील	चैतन्य पब्लिकेशन, नाशिक	५ वी आवृत्ती ५ सप्टें. २००८
५)	उद्योगधंदे आणि समाज	प्रा. सुहास निर्गुण	प्राची प्रकाशन, मुंबई	प्रथम आवृत्ती २४ जाने. १९९९
६)	भारतीय अर्थव्यवस्था	प्रा. डॉ. राजेंद्र अ. रसाळ	सक्सेस पब्लिकेशन, पुणे	आवृत्ती, २००६
७)	भारतीय अर्थव्यवस्था विकास व पर्यावरणात्मक अर्थशास्त्र	डॉ. जी. एन. झामरे	पिंपळापुरे अँड कं. पब्लिशर्स, नागपूर	५ वी आवृत्ती जुलै, २००९
८)	आपला धुळे जिल्हा	रा. नी. देशमुख	कल्पना प्रकाशन, नांदेड	सुधारीत आवृत्ती जुलै २०१०

ब) अन्य :-

१) विशेषांक

I) योजना- जानेवारी-२०१२

II) साप्ताहिक विवेक



- III) लोकराज्य
  - IV) पर्यावरण विशेषांक
  - V) सांस्कृतिक वार्तापत्र
- २) वर्तमानपत्रे
- I) सकाळ
  - II) लोकमत
  - III) महाराष्ट्र टाइम्स
  - IV) इंटरनेट

## CHAPTER-58

## ‘मेंढका’: समाजचित्रण, व्यक्तिचित्रण आणि अभिव्यक्तीसौंदर्य

डॉ. संदीप वाकडे

एस.एम.जोशी कॉलेज, हडपसर

## प्रास्ताविक:

मेंढपाळांवर होणारे अन्याय, भटकंती दरम्यान त्यांना भेडसावणा-या समस्या यांविषयी विविध वर्तमानपत्रांतून मी वाचत होतो. त्यामुळे मेंढपाळांचे जीवन समजून घ्यावे असे मला मनोमन वाटत होते. वाचनाची आवड असल्यामुळे मला सुरेश शिंदे यांची मेंढक्यांच्या जीवनाची महती सांगणारी ‘मेंढका’ नावाची कादंबरी वाचनात आली व मला माझ्या प्रश्नांची उत्तरे मिळत गेली. यातून विविध जातींमधील भटकंती करणा-या मेंढपाळांचे चित्रण येत असले तरी ते अल्प प्रमाणात आहे. जे चित्रण येते ते धनगर समाजाविषयी येते आणि ते येणे स्वाभाविक आहे. ‘मेंढका’ ही सुरेश शिंदे यांची कादंबरी, २९ प्रकरणात विभागली असून १५२ पृष्ठांची आहे. मेंढक्यांच्या जीवनाविषयी समजून घ्यायचे म्हणून तर रानोमाळ भटकंती करावी लागणार या उद्देशाने स्वतः लेखकही मेंढक्यांच्या तळावर गेला आहे. जिथे-जिथे रानामाळात त्याला मेंढके दिसले, त्यांच्याशी त्याने गप्पा मारल्या. कधी बाहेरगावी फिरायला गेला तर प्रवासावेळी त्याला जे मेंढकं दिसले त्यांच्याशीही त्याने गप्पा मारल्या, या गप्पातूनच त्यांना मेंढक्यांच्या समस्या, त्यांचा संघर्ष, त्यांची भटकंती करताना होणारी ओढातान, ऊन, वारा, पाऊस यांना तोंड देताना त्यांचे होणारे हाल, भटकंतीमुळे मेंढक्यांची मुले शिक्षणापासून कशी वंचित राहतात, त्याचप्रमाणे धनगर समाजातील रीतिरीवाज व प्रचलित असलेल्या अंधश्रद्धेविषयीही समजते. मेंढक्यांचा अविभाज्य घटक असणारी मेंढरे त्यांच्या प्रपंचाला कसा हातभार लावतात हेही समजते. मेंढरांना पोटच्या लेकराप्रमाणे जपणारा मेंढका स्वतः मात्र माणूस असूनही स्वाभिमानशून्य जीवन त्या मेंढरापायी जगतो, त्याला तळहाताच्या फोडाप्रमाणे जपतो, कारण त्याला माहित असते की मेंढरे हीच आपली लक्ष्मी आहे. हे तो कधीच विसरत नाही. या मेंढक्यांच्या जीवनाची माहिती लेखकाला या गप्पातून समजते. यात त्याला मारुती, म्हस्कु, नागू, तातू असे कितीतरी मेंढरामागे भटकंती करणारे मेंढके तर जनाबाई, सगुणाबाई यांची मेंढरामागे बि-हाड सांभाळताना होणारी परवड समजते. त्यांना भटकंती करताना कितीतरी समस्यांना तोंड द्यावे लागते हेही समजते. यातूनच लेखक वाचकांसमोर कादंबरीच्या रूपाने मेंढपाळांचे व त्यांच्या जीवनाचे चित्र उभे करण्याचा प्रयत्न करतात. ‘मेंढका’ या कादंबरीविषयी मधु नेने म्हणतात, “वस्तुतः या लेखनाला स्वतंत्र असे कथानक नाही. त्यामुळे तिला कादंबरी म्हणण्यापेक्षा ललित शैलीतून एका समाजाचे दर्शन घडविणारा तो सामाजिक प्रबंध आहे असे म्हणणे अधिक उचित ठरेल.”<sup>१</sup> अशा या मेंढक्यांचे जीवन चित्रित करणा-या ‘मेंढका’ या कादंबरीतून येणा-या समाजचित्रणाविषयी आपण पाहूया-

### अ) 'मेंढका' या कादंबरीतून येणारे समाजचित्रण:

मानव हा समाजशील प्राणी आहे. तो समूहाने राहणारा आहे. एकमेकांचा आधार घेऊन तो जीवन जगत असतो. जीवन जगत असताना समाजातील चालीरीती, रूढी, परंपरा यांच्याशी तो एकरूप होत असतो. सुरेश शिंदे यांच्या 'मेंढका' या कादंबरीविषयी अनंत मनोहर म्हणतात, "मेंढक्याच्या जीवनातले सगळे चढउतार, सौंदर्य आणि भीषणता सुरेश शिंदे यांनी 'मेंढक्या'मध्ये चित्रित केली आहे."<sup>2</sup> अशा या संबंध जीवनपद्धतीचे समाजचित्रण 'मेंढका' या कादंबरीतून कशाप्रकारे येते त्याचा विचार करूया.

**१. मेंढरामागे भटकंतीची होणारी परवड:** मेंढक्यांना मेंढरे चारण्यासाठी रानोमाळ भटकावे लागते. यावेळी त्यांना इतरांच्या शेतातून मेंढरे चारताना प्रचंड संघर्ष करावा लागतो. बांधानी मेंढरे चारत असता उभ्या पिकावर ती कधी झडप घालल्यात ते सांगता येत नाही. तसे मेंढके सावध असतात, पण नजर चुकवून एखादे मेंढरू जाते उभ्या पिकात, त्यावेळी शेतमालकांच्या शिव्या खाव्या लागतात. हे लेखकाला भेटलेला वसंता मेंढका वाघरं गोळा करता करता म्हणतो, "ह्या वाघरं बरच आमची आब्रूपण गुंडाळून ठेवावी लागतीया. लाजलज्जा अजिबात चालत नाय. कोडणं बनावं लागतं. अगदी निलटासारखं. एक-दोन नाय रोज पन्नास शिव्या खाव्या लागल्यात. दोन तोंडात लगावल्या तरी काय बोलता येत नाय, का मान वर करून हात धरता येत नाय." (पृ.३) यातून त्यांना होणारा त्रास समजतो. त्या वसंता मेंढक्याच्या मनातील मळमळ आपल्याला समजते. असे प्रत्येकच मेंढक्याच्या बाबतीत होते, दुसरा एक भेटलेला मेंढका सांगतो, "तसं आम्ही आमच्या धंद्यात सुखी आणि समाधानी आसतो. पण मुलखाचा कोडगेपणा करावा लागतो. तरच दिवस निभत्यात. चढाला लागून निभत नाय. दादा, काका, मामा, मावशी म्हणून दिवस काढायचं सूत्र आम्ही पाठ केलेलं आसतं." (पृ.३३) यातून मेंढक्याच्या जगण्याचे सूत्र समजते. पुढे तो म्हणतो, "गरजवंताला अक्कल नसती. आज भांडण करून उद्या कुठं जायचं ह्याचं गणित आमच्या डोक्यात असतं. म्हणूनच आम्ही मवाळपणावानी वागत असतो. तसं आम्ही जातीवंत मेंढपाळ करणारी धनगर आहोत. आमची जात सुतावरून स्वर्ग गाठणारी पण ह्या व्यवसायानं गोगलगाईसारखं मऊ वागतो." (पृ.३३) यातून त्यांची आपला व्यवसाय सांभाळण्याची हुशारी, शहाणपण समजते. याविषयी प्रा. भरत सुरेश असे म्हणतात, "मेंढपाळांची त्यांच्या जीवनावर नितांत श्रद्धा आहे. कष्ट घेण्याची मनस्वी तयारी, प्राण्यांवरचं जीवतोड प्रेम, स्वावलंबन, पोटापुरतं कमावणं ही लाखमोलाची जीवनसुत्री या कादंबरीतून वाचकांच्या दृष्टिआड होत नाही."<sup>3</sup> तुळशीराम मेंढक्याशी झालेल्या बोलाचालीत लेखकाला मेंढक्यांची मेंढरामागे फिरतानाची होणारी जीवाची हेळसांड समजते. तो तंबाखूची तलप झालेला मेंढका म्हणतो, "तंबाखू नाय खायची म्हणलं तर आमचं निभतच नाय. रातचं यिरीच आपलं बसावं लागतं, तोंडातनं पिचका-या थुकत. तुम्हासारखी माणसं तळप झाली की, च्या पितात, नास्टा करत्यात तसं आमचं नसतं. एकदा वाघरं सोडली की उभ्या वणव्यानं या खांडामागं होड्या होड्या करीत फिरावं लागतं. कुठला चहा पाणी मिळायला. आवं साधं चांगलं पाणीच प्यायला मिळत नाय. आताबघा उन्हाळा सुरू झालाय. हे दोन महिनं लय जिकीरचं.

पाण्यासाठी लय परवड होती.”(पृ.६) यातून उन्हाळ्यात मेंढक्यांची होणारी दैना आपल्याला समजते. संघर्ष हा त्याच्या पाचवीलाच पुजलेला असं म्हटलं तरी चालेल. मेंढरामागे चालताना काय अवस्था होते, याविषयी एक मेंढका लेखकाला सांगतो की, “मेंढरं पुढं चालत्यात त्यांच्या पेदाम्याव सारखं रहावं लागतं. एक पाऊलही ढळवता येत नाय. ही मेंढरं दिवसभर चालून थकत नाहीत. पण आम्हा मेंढक्याचं पाय बघा पडायला होत्यात. दिवसभर ह्या जनावरांच्या मागं होड्या होड्या फिरावं लागतं. पाणी सुद्धा कव्हा कव्हा भेटत नाय. दिवसभर थुका गिळीत पाण्याची तहान भागवावी लागती. कुठं कसलंही पाणी आसलं तरी आम्ही घटाघटा पितो. आणि तृप्त होतो. तुम्हासारखी लोक त्या पाण्यात पायसुद्धा बुडावणार नाहीत इतकं ती घाण आसतं.”(पृ.३३) सर्व कळत असूनही वळत नाही अशी ही अवस्था दिसते. परिस्थितीपुढे शहाणपण नाही असाच हा प्रकार इथे नजरेस पडतो. उद्धवलेल्या परिस्थितीतून निभावून पुढे कसे जायचे हेच समजते. असे हे भटकंती करणारे मेंढके कोणाशी फारसे बोलत नाहीत, ते त्यांच्या कामात व्यग्र असतात. इतर लोक त्यांची चेष्टाही करतात, याविषयी लेखक म्हणतो, “सहज ही माणसं बिनओळखीच्या माणसावर बोलत नाहीत. जरी बोलली तरी मोजकीच. पण मोहरंच्या माणसांचा अंदाज आला तर मात्र खुलून जात्यात. कारण अनेक माणसं मेंढक्यांची चेष्टा करताना मी स्वतः पाहिलं होते.”(पृ.४०) त्याचप्रमाणे काही शेतकरी शेतात मेंढरं बसवायला धजत नाहीत, याचे कारण सांगताना म्हसकू मेंढका म्हणतो, “बाभळीच्या डाहाळा पाडून त्या पाल्याबरोबर बाभळीच्या शेंगा मेंढराच्या पोटात जात्यात. आण त्याच्या बिया लेंड्याबरोबर पडत्यात. बसवलेल्या रानात सगळीकडं बाबळीची पालवी ऊगावती.”(पृ.५६) या संघर्षालाही त्यांना तोंड द्यावे लागते. असाच एक रोजच्याच भटकंती आणि जीवनाला वैतागलेला म्हसकू मेंढकाही याविषयी सांगतो, “यापुढं मेंढरं पाळणं अवघड झालंया. रानंच चरायला नाहीत. काय पाळून करता? रोज उठून कुणाचं ना कुणाचं जोडं खायचं. मेंढरामागच्या मेंढक्याला ह्या जितराबासाठी लय कोडगं बनावं लागतं. बर प्रत्येक मेंढक्याच्या ठिकाणी तेवढा कोडगेपणा असतो. मला तर आता असं वाटायला लागलय ही खांड आखची आखं यिकून खांडमोड करून एखादी जर्सी गाय घ्यावी. आण बसावं आपलं त्या जर्सीचं दूध पिळीत.”(पृ.५६) यातून त्याच्या मनातील खदखद आपल्याला समजते. कोडगं बनून जगण्याच्या जीवनपद्धतीला तो कंटाळला आहे. तेवढे करूनही या मेंढरांची होणारी आबाळ त्याला सहन होत नाही. तर दुसरा एक मेंढका सांगतो की, “मुळात आमचा धर्मच असा हाय की कुठलाही शेतकरी जोरात बोलला, चार षिट्या हासडल्या तरी मेंढूत किडं पडल्यावाणी ऐकून घ्यायच्या. त्याला फाटं फोडीत बसायचं नाय कव्हा. वाढल्यानी वाढतं आण मिटवल्यानी मिटतं. बरं आपल्याला गरज असती म्हणताना आपूनच नमतं घ्यावं लागतं. आपली मेंढरं जगवायची म्हणजी लाज, अब्रू सोडूनच दिवस काढावं लागत्यात.”(पृ.६०) एकूणच समंजसपणे राहून आपला चरितार्थ कसा चालवता येईल हेच यातून दिसते. पण स्वाभिमानाचं जिणं यात कुठेही दिसत नाही. दुसरा एक मेंढका लेखकाला म्हणतो, “आवं आमचं जगणं लय अवघड हाया. रातून दिवसा ह्या मेंढरामागं फिरत आसतो. त्यामुळं जगात काय चाललय ह्याचा

मागमूसही आम्हाला लागत नाय. काही म्हणता काही आम्हाला कळत नाय. नावाला आम्ही माणसं आहोत. नायतर मेंढराच्यात अन् आमच्यात काहीच फरक नाय. फक्त वाचा हाय म्हणून बोलायचं नायतर काय हाया ह्या जल्मात.”(पृ.९६) एकूणच जगाचा संबंध नसलेले हे मेंढकं रानोमाळ भटकतात, मेंढरांच्या जीवावर आपला चरितार्थ असल्यामुळे ते मेंढरे सोडून देऊ शकत नाही. मेंढरांमुळे प्रपंचाला मिळणारा आधार त्याला चांगलाच ठाव असतो. जीवाची जरी हेळसांड होत असली तरी, तो कष्टाला मागे हटत नाही. मुक्या जितराबाला तो पोटच्या लेकराप्रमाणे जपतो, त्यांचं दुखलं-खुपलं हे सर्व ओळखून त्यांना औषधोपचार करतो. मेंढरांमुळेच आपण आहोत अशी त्यांची भावना दिसते. अशा या मेंढरामागे भटकंती करताना त्याला स्वाभिमानशून्य जगणं जगावं लागतं.

**२. सोशिक बाईमाणूस:** मेंढरामागे भटकंती करत असताना, मेंढक्याबरोबर बि-हाड सांभाळणा-या त्यांच्या कुटुंबातील स्त्रियांचेही चित्रण येते. असेच एका प्रसंगी दळण दळण्यासाठी आलेल्या जनाबायला पाहून लेखक सांगतो की, “आपल्यावाणी पीठ ठेवायला त्यांच्याजवळ डबं नव्हतं का कापडाची पिषवी नव्हती, होती ती गोधडीची जाडजूड नखाव टाकं टाकलेलं घेरबाज. भिकारणीच्या बोचक्यासारखी टिकावू होती.”(पृ.५८) पुढे हीच जनाबाय आपलं भटकं जीवन सांगताना म्हणते, “सगळा ऊगा निगा एकटीला करावा लागतो. रोज एका तळावर मेंढरं बसणीला असल्यात. त्यांच्याबरोबर सारखंच बि-हाड हालवावं लागतं. करून खाण्यापुरतं बि-हाड असलं तरी रोज उचलायचं. म्हणजी थोडा उपद्याप आहे होय. तवा, काटवट, भगुली, हंडा, बादली, अंथरूण-पांघरूण सगळं चंबुगबाळ उचलावं लागतं. बरं इथली माणसं सफाट जागेवर मेंढरं बसवीत नाहीत. नांगरट केलेल्या जमिनीत तळ ठोकायला लावल्यात. असं हाय म्हणताना करून खाण्यापुरती जागा सपाट करावी लागती. थोडासा खड्डा करून तीन टणक ढेकळं घेऊन त्याचीच चूल मांडायची. त्या चूलीला जळण इथल्या बांधाकोंदानी शोधावं लागतं.”(पृ.५९,६०) तिची होणारी हेळसांड, कसरत येथे चित्रित होते. तसेच एका चोळीनीशी आलेली सगुणाबाईही सोशिक वाटते. ती म्हणते, “बि-हाडासंगती आल्यावर सगळा ऊगा-निगा आम्हालाच करावा लागतो. चार-पाच महिनं राहायाचं म्हणल्यावर सुखाचं हाय होय? तरी येताना चटणी करून घिऊन येतो. रानच्या वस्तीला कुठं ऊखाळ आण ठोंबा बघता. जात्यात दिवस निघून. रहात नाहीत. पण काही म्हणा बाईचा जल्म लय वाईट. आण त्यात पुन्हा मेंढक्याच्या पदरी पडणं तर लय वाईट.”(पृ.६३) यातून भटकंती करत असता बाईमाणसांचं काय हाल होतात हेच ती सांगते. “ह्या रानच्या वस्तीला आमच्यासारख्या बायामाणसाजवळ एक दमडीबी घावायची नाय. मस कोंबड्या असल्यात आमच्या बि-हाडासंगं. पण ह्या कोंबड्यांच्या अंड्याला रानच्या वस्तीत गि-हाईक कुठलं भेटायला? चार-दोन दिवसांनी साचत्याल तेवढ्या अंड्याचं उकडून कालवण करायचं. बाजारात यिकाय न्यायची म्हणलं तरी सताट दिवसात यिडाळून जात्यात.”(पृ.६४) चार पैसे जवळ येत नाहीत, ही तिची खंत जाणवते. पुढे ही टेलर काम करणा-या लेखकाची बायको सुलेखाला म्हणते, “तुमचं बरं हाय. आपलं आद्याखाली बसून सुखाचं काम करायचं. आम्हाला चार-पाच महिनं असंच उन्हातान्हात काढावं लागतं.”(पृ.६५) भटकंतीत कशी आबाळ

होते हेच ती येथे सांगून जाते. पुढे कामानिमीतं आलेली, उशिरपर्यंत बसलेली सगुणाबाई जाताना म्हणते, “आता जाया पाहिजे. बि-हाडाजवळचं कुत्रं उठून गेलं तर सगळी धुळधाण होईल. गावातली कुत्री जमा होऊन आमच्या बि-हाडांचा तुडवून चुताडा करत्यान.” (पृ.६६) म्हणजे ती शरीरानं तिथे जरी असली तरी तिचं मन बि-हाडापाशीच घुटमळत होते. या सर्व धबगड्यातून तिची होणारी परवड समजते. मेंढका कादंबरीतून स्त्री चित्रण हे अल्पशा प्रमाणात येताना दिसते. यासंदर्भात मधू नेने असे म्हणतात, “एका समाजाची अशी बरीचशी माहिती प्रस्तुत लेखनातून उलगडत असताना एक गोष्ट मात्र प्रकर्षाने जाणवते, ती म्हणजे या समाजातील महिलांविषयी, त्यांच्या अडीअडचणी, सुख-दुःखं याविषयी यातून फारसे काहीच हाती लागत नाही. पुरुषांबरोबरीने त्या काम करतात, कष्ट घेतात, त्यांना न्याय देणे आवश्यक होते.”<sup>४</sup> ही या कादंबरीची मर्यादा आहे असे म्हणता येईल.

**३. रीतिरीवाज:** धनगर समाजातील रीतिरिवाजाविषयी सगुणाबाई सांगते की, “आमच्यासारखी कुणाचीच लग्नं एवढी जाचीक नसत्यात. आमचं लग्नं म्हणजी आख्या गावात त्याचा गाजावाजा. घरातली घरात कव्हा लग्नं जमत नाय. मग बाराची बारा तोंडं नको त्या खोला रूंदी निघत्यात. जुळत आलेलं लग्न मोडतं. त्यामुळं शक्यतवर आम्ही नवा सोयरा गणितच नाय. जुन्याच सोय-याची वाट चालू ठेवतो.” (पृ.६८) लग्नातील रीतिरीवाजाविषयी ती म्हणते, “प्रत्येकाचं देवाकबी निरनिराळं असतं. कुणाला यीर काढावा लागतो, तर कुणाला जळ काढावा लागतो, तर कुणाच्यात सात सवासणी आसत्यात. कुणाला लिंब नेसावा लागतो. आमचं धनगाराचं लगीन केलं ना तसं ठेपत तर लय बघण्यासारखं आसतं. प्रत्येकाची पद्धत निराळी असती.” (पृ.७१) यातून आपल्याला धनगर समाजातील रीतिरीवाजाचं दर्शन होते. खूप बारकाव्यानिशी यातील प्रथा दाखविल्या आहेत. यीर कसा काढला जातो, जळ कसा काढला जातो, लिंब नेसने याविषयी सविस्तर माहिती लेखक देतो. यासंदर्भात प्रा. मधुमालती कोटीभास्कर असे म्हणतात की, “त्यांनी या मेंढक्यांची सुख-दुःखे, रीतिरिवाज, लोकव्यवहारातील बारकावे जवळून पाहिले आहेत. त्यांच्याच भाषेत त्यांना बोलतं केल्यामुळे मेंढक्यांचे जगच वाचकांसमोर उलगडले गेले आहे.”<sup>५</sup>

**४. अंधश्रद्धा:** ‘मेंढका’ या कादंबरीतून येणारी नागू मेंढका ही व्यक्तिरेखा अंधश्रद्धाळू वाटते, बरे वाटत नसलेल्या पोरासाठी तो दवाखान्याबरोबर देवरूखपणही करताना दिसतो. रानात कुठेही मेंढरांचे खांड बसवावे लागते, कधी कधी मसणवाट्याजवळही शेतात बसवण्याची वेळ येते. मग भूतं वगैरे लागू नाहीत यासाठी त्यावर उपाय म्हणून नागू मेंढका सांगतो की, “तसं आम्ही भीत नाय भूताखेताला. बंदोबस्त आम्ही केलेला आसतो. ही काय आसं भरलेलं ताईत आम्ही गळ्यात किंवा कमरंला करगुट्यात बांधतो. त्यामुळं सहसा भूतबाधा होत नाय.” (पृ.११०) यातून भीतीपोटी अंधश्रद्धेला तो जवळ करताना दिसतो.

**५. माणुसकी:** ‘मेंढका’ या कादंबरीतून ठिकठिकाणी माणुसकीचे दर्शन होताना दिसते. बरोबरीच्या मेंढक्यावर काही आपत ओढवली तर इतर मेंढके त्याला सांभाळून घेतात. अशाच एका दवाखाण्यात अँडमिट असलेल्या एका मेंढक्याला हातभार लावणारी काही मेंढके लेखकाला

सांगतात, “आता आम्ही ठरावलंय तेव दवाखान्यातून घरी येईपर्यंत त्याची मेंढरं चारायला आणायची. आसं आम्हीच एकमेकाला मदत करायची नाय म्हणल्यावर दुसरं कोण करणार? वेळ सांगून येत नाय. वेळेला झालं तर माणूस आयुष्यभर नाव काढतो.”(पृ.४४) त्याचप्रमाणे तातू मेंढक्याची मेंढरं गाराच्या पावसानं मरून पडली तेव्हा, त्याच्या सहकारी मेंढक्यांनी, तातूला भेटून धीर देऊन सांगितलं की, “आमच्या खांडातली पाच-पाच बकरी तुम्हाला दिली. कैकांनी तातूला कवटाळून त्याचं आशू पुसलं. आम्ही कशाला हाय? ही गावगणा मेंढकंच मेंढकं पसरल्यात ती काय तुम्हाला उपासी ठेवत्याल. आज तुमच्यावर प्रसंग आला. उद्या आमच्यावर येईल.”(पृ.१५२) अशाप्रकारे ते मेंढके माणुसकीचा धर्म जागवून त्या तातू मेंढक्याला आधार देतात. माणुसकी धर्म पाळून पुढे जाताना दिसतात. अगदी तुकाराम महाराजांनी सांगितल्याप्रमाणे, ‘एकमेका साह्य करू ! अवघे धरू सुपंथ !’

**ब) ‘मेंढका’ कादंबरीतून आलेली व्यक्तिचित्रणे:** ‘मेंढका’ कादंबरीतून आलेल्या व्यक्तिचित्रणांविषयी पाहत असता असे दिसून येते की, ‘मेंढका’ ही कादंबरीच व्यक्तिरेखांनी भरलेली आहे. लेखकाला प्रवासावेळी, रानोमाळ भटकंती करतेवेळी सभोवतालच्या परिसरातून जे निरनिराळे मेंढके भेटले. त्यांच्याशी झालेल्या संवादातूनच ‘मेंढका’ ही कादंबरी आकाराला आलेली आहे. यात त्याला मेंढराचं केस कातरणारा, शिक्षणाचे महत्त्व जाणून मुलाला मेंढरामागे न लावता शाळेत लावणारा, “आमचं उचल बि-हाड पाठीवर. सारखं गाव सोडून फिरावं लागतं”(पृ.४८) अशी मेंढक्यांची भटकंतीमागे होणारी हेळसांड सांगणारा, “आमची खरी लक्ष्मी म्हणजी मेंढरंच. त्यांच्या पायानं आमचं भलं झालंय.”(पृ.४९) असा मेंढरांवरच आपला प्रपंचाचा गाडा कसा चालतो हे सांगणारा मारुती मेंढका. पिढ्यानपिढ्या मेंढरं पाळण्याचा व्यवसाय असलेला, यात भटकंती करताना मेंढरांच्या होणा-या आबाळाविषयी “माणसं बदालल्यात. कमी कष्टाची पिकं करत्यात. त्यामुळं ती रानं चरायला मोकळी होत नाहीत. कुणाच्या बागा असत्यात तर कुणाचा ऊस असतो. प्रत्येकच शेतकरी काय ज्वारी, बाजरी, गहू, हरभा-याची पिकं घेत नाहीत. त्यामुळं ही बारकी जितराबं पाळणं अवघड झालंय”(पृ.५५) अशी खंत व्यक्त करणारा व यामुळे या मेंढरामागच्या भटकंतीला वैतागून गेलेला म्हसकू मेंढका. आजारी पडलेल्या मुलावर डॉक्टरकीच्या इलाजाबरोबर अंधश्रद्धेला जवळ करून देवरूखपणाचा इलाज करणारा, भूताखेतांवर विश्वास ठेवणारा नागू मेंढका. गारंच्या पावसानं मेंढराच्या खांडाचे होणारे नुकसान, या घटनेत पोटच्या लेकरासारखी सांभाळलेली मेंढरं मरून पडलेली पाहून लहान मुलागत रडणारा तातू मेंढका. मुलबाळ नसलेली, सासरच्यांकडून दुर्लक्षित झालेली, माहेरी येऊन राहिलेली, पुढे आपल्या चौघा भावंडांची काळजी घेऊन मेंढरांच्या मागे बि-हाड सांभाळणारी जनाबाय. तसेच “काही म्हणा बाईचा जल्म लय वाईट. आण त्यात पुन्हा मेंढक्याच्या पदरी पडणं तर लय वाईट.”(पृ.६३) अशी मेंढक्यांबरोबर त्याच्या पाठीमागे बि-हाड सांभाळणारी सगुणाबाई. अशा या प्रमुख व्यक्तिरेखांशिवाय इतरही अनेक गौण व्यक्तिरेखा या कादंबरीतून येतात. त्यांच्या संवादातूनच ही कादंबरी आकाराला येते. त्यामुळे त्यांचे महत्त्वही तितकेच आहे.

**क) 'मेंढका' कादंबरीतून येणारे अभिव्यक्तीसौंदर्य:**

**भाषाशैली:** मेंढरं वळतो तो मेंढका. मेंढरांवरती आपला जीव ओवाळून टाकतो तो मेंढका. मेंढरांच्या खांडाबरोबर राहून त्यांची राखण करतो तो मेंढका. खाली जमीन वर आकाश. अशा उघड्या वातावरणात, मेंढरांबरोबर राहून निसर्गातील असंख्य वादळांना तोंड देतो तो मेंढका. अशा या मेंढक्यांचे वर्णन 'मेंढका' या कादंबरीतून लेखक सुरेश शिंदे यांनी केलेले आहे. म्हणूनच या कादंबरीला योजलेले 'मेंढका' हे शीर्षक योग्य असेच आहे. त्यांना प्रवासादरम्यान, सभोवतालच्या परिसरात जे जे मेंढरांमागे भटकंती करत असताना मेंढके दिसले, त्यांच्याशी ते एकरूप होऊन बोलू चालू लागतात. त्यांचे अनुभव ऐकू लागतात. त्यांच्या वाडग्यावरती जाऊन तेथील जीवनपद्धती त्यांनी स्वतःच्या डोळ्यांत साठवली आणि या सर्वांचे धागेदोरे त्यांनी आपल्या 'मेंढका' या कादंबरीतून विणले आहेत. त्यांचे जीवनचित्रण वाचकांसमोर उभे केले. ते करत असताना, वाचकाला वास्तवतेच्या अगदी जवळ नेऊन सोडण्यात ते यशस्वी झालेले आहेत. प्रस्तुत 'मेंढका' ही कादंबरी ग्रामीण भागातील मेंढरांमागे माळोमाळ भटकंती करणा-या 'मेंढक्यांचे' जीवन चित्रित करणारी असल्यामुळे तिच्यावर बोलीभाषेचे प्रभुत्व जाणवते. यासंदर्भात विवेक जोग असे म्हणतात, "मेंढराची खांड म्हणजे सुवर्णाची खाण असणा-या मेंढक्यांच्या आयुष्याची ही चित्तरकथा अनौपचारिक शैलीतून अस्सल बोलीतून आणि जिद्दाळ्याच्या पोटातून आल्याने ती आपल्या काळजाचा ठाव घेते."<sup>६</sup> या कादंबरीतून येणारे संवाद हे लांबलचक स्वरूपाचे आहेत. या संवादातूनच मेंढका बोलता होतो. त्यातून वाचकाला त्याच्या जीवनाची, भटकंतीची कल्पना येते. लेखकाने कादंबरीतून प्रसंगानुरूप वातावरणनिर्मिती केलेली आहे. यामुळे तो वाचकाला त्या वातावरणात घेऊन जाण्यात यशस्वी झालेला आहे. उदा., "केंनालखालच्या बागायतात मेंढरं बसली होती. मिरगावच्या मेंढक्यांनी येऊन नुकतंच तळ ठोकलं होतं. डांबरी सडकच्या बाजूला वाघरा टाकल्या होत्या. दोनशे-अडीचशे मेंढरांच्या वाघरामागं वाघरा टाकत रानं खतवत होती. मी गेलो तेव्हा सायंकाळच्या सहा वाजून गेल्या होत्या. पण सूर्य अजून मावळला नव्हता आण याच वक्ताला त्या तळावल्या बायकांच्या चुली पेटल्या होत्या. वाघराच्या चोहोबाजूंनी मेंढक्यांची बि-हाडं थाटली होती. दुपारी धुतलेली अंगावरची कांबुरणं अजून तशीच तात्पुरत्या बांधलेल्या दोरीवर लोंबकळत होती. मला पहाताच बायका टवकारल्या आणि खाली बघून आपलं काम करू लागल्या." (पृ. ९४) असे त्या तळावरील वर्णन करताना लेखक वाचकाला त्या वातावरणात घेवून जातो. लेखक या कादंबरीतून बारकाव्यानिशी चित्रमय शैलीच्या आधारे हुबेहूब चित्रच वाचकांसमोर उभे करतो. उदा., "मेंढक्याची बायकू वर न बघता डोईवरचा पदर कपाळापर्यंत घेऊन ती आपली भाकरी थापीत होती. खाली घाँग घालून भाकरीचं पीठ मळीत होती. तिच्या हाताच्या हालचालीनं नाकातली नथ खालीवर खालीवर हालत होती. ती सोन्याची नथ तिच्या रुबाबाला शोभून दिसत होती. मनगाटातल्या बांगड्या हात भरून रवून बसल्या होत्या. मागं पुढं हालत नव्हत्या. त्यामुळं त्या पिठानं भरल्या होत्या. पायातली टपोरी जोडवी निखळ चांदीची पांढरी धुवाट दिसत होती. ती पण काळ्या ढेकळातल्या मातीत पायाबरुबर रूतली होती. कास्टा



घातलेलं लुगडं कमरंला करकचून आवाळलं होतं. त्यामुळं कमरंला मोठं मोठं निळं-पांढरं वण पडलं होतं. अंगात मात्र नक्षीदार चोळी शिवलेली होती. नाकानं नाक्याली व रंगानं गोरी असलेली, फार वय झालेली नसूनही सततच्या फिरतीमुळं ती तरूण स्त्रीचं नेमकं वय किती असेल ह्याचा अंदाज घेणं कठीण होतं, कपाळावरचं कुंकू आडवं पण ते घामानं भिजून कपाळभर झालं होतं. कुंकाखालचं हिरवंगार गोंधाण तेवढं ठळक दिसत होतं. मी भारतीय स्त्रीचं वेगळंच रूप जवळून पहात होतो.”(पृ.९४,९५) अशा या चित्रमयशैलीमुळे कादंबरी वाचनामध्ये वाचक रममाण होतो. हे या कादंबरीचे यश म्हणावे लागेल. ‘मेंढका’ कादंबरीतून प्रसंगानुरूप म्हणी येतात. उदा., ‘धनगराचं कुत्रं लेंड्यापाशी नाय तर मेंढरापाशी’(पृ.२८), ‘गरजवंताला अक्कल नसती.’(पृ.३३), ‘कळ नाय कुठं न शेंबारटीला झटं’(पृ.५१), ‘दाटून यांड न बेंबीला शेंदाड’(पृ.६९), ‘बावळी मुद्रा आण देवळी निद्रा’(पृ.१४४). तर हुटाकणं लावणे, कोडगं बनावं लागणे, चितागती होणे, अवदसा आठवणे, रेघरूपाला लागणे, ह्या बोट्यावला थुका ह्या बोट्यावर करणे, पध्दतीपुढे वंगणे, रंजीस येणे इ. असे प्रसंगानुरूप वाक्प्रचारही येतात. त्याचप्रमाणे ‘मेंढका’ कादंबरीतून प्रसंगानुरूप येणा-या उपमांचाही सुयोग्य असा वापर केलेला आहे. उदा., ‘आता आलेली मेंढी अशीच पुढच्या तोंडाची. अगदी दुलदुल्या बाईसारखी. सारखी मेंढक्याच्या भवतनी चालत्यात.’(पृ.१४३), ‘तेवढ्यात ध्यानीमनी नसताना रान ओढ्यातून हारळीच्या हिरव्यागार पुंजक्यातून ससा उठावा तसा मेंढरू खांद्यावर घेतलेला मेंढका पाऊलवाटेवर आला.’(पृ.१४८), ‘पाकुळीसारखा सूर मारून त्यानं कोकराची तंगडी पकडली.’(पृ.१५०), ‘कापसासारखं मऊ, गुबगुबीत कोकरू माझ्या स्वाधीन केलं.’(पृ.१५०), ‘भिजलेली माती घोरपडीसारखी मेंढरांच्या पायाला कवटाळून धरती.’(पृ.१५१), ‘पाव्हणं ही मेंढकं एकाच बाभळीचं काटं हायत. एखादा काटा मोडला म्हणजे बाभळ पडत नाय.’(पृ.१५२) इ. अशा उपमा येतात. तर बि-हाड, कोंडवाडा, जिण (मेंढराच्या केसांचं), कांबरून, यिरजीक, देवरूपणा, बेंबळ, वावार, हुरवावडी, मेंढीची सूड, इरळून, खळबळा, बटवा, सवासणी, हाळी, कोंडवाडा, कोडगं, वाडगं, डालगं, कास्टा, कडूसं, कणसांचा मुडा, डुसण्या, जितराब, सुगी, सुंब्या, वरूटा, मोथराची बायको, काव्हार, विरजाण, वांज इ. ‘मेंढका’ या कादंबरीतून शब्दकळा येतात. त्याचप्रमाणे शेजार ना पाजार, उठलं कि सुटलं, चोरा चिलटांचं, वा-याहु-या, काही बाही, पुसवडी आण् आखाडी, रोग राय, ऊगानिगा, चंबू गबाळ, बांधाकोंदानी, शाळाबिळा, कोंबड्या कुकड्याचा, चवलीपावली, पाव्हणा रावळा, घासमुटका. इ. विविष्ट लय प्राप्त झालेले शब्दही यातून येतात. अशाप्रकारे ‘मेंढका’ या कादंबरीतून म्हणी, वाक्प्रचार, उपमा, शब्दकळा, लयकारी शब्द यांचा लेखकाने प्रसंगानुरूप उपयोग केलेला आहे. यामुळे कादंबरीच्या अभिव्यक्तीसौंदर्यात भर पडते. ‘मेंढका’ कादंबरीचा शेवटही लेखकाने काव्यमय पद्धतीने पण वास्तव जाणिवेने केला आहे. मेंढक्यांकडे गेलेला लेखक जेव्हा घरी निघतो तेव्हा ते मेंढके उषीर झालेला असल्यामुळे त्याला घरापर्यंत घालवायला येतात. पुढे त्यांच्या पाठमो-या आकृतीकडं पाहून लेखक म्हणतो, ‘धन्य ती मेंढरं आणि धन्य ती मेंढकं.’ या मेंढक्यांच्या विषयी मेंढरंच एकविसाव्या शतकाला सांगतील, “मेंढकंच आमचं मायबाप आमच्यासाठी राहिलं रानात लेकरासारखं कोकराला, त्यानीच वाढवलं आमच्यासाठी फक्त, मेंढकंच रडलं.”(पृ.१५२) अशा

सुंदर काव्यमयतेन लेखकाने 'मेंढका' कादंबरीचा शेवट केलेला आहे. यामुळे 'मेंढका' ही कादंबरी भाषाशैलीच्या दृष्टीने सरस ठरते.

**समारोप:** एकूणच मेंढरामागे रानोमाळ भटकंती करावी लागत असल्याकारणाने हा मेंढका प्रवाहापासून दूर राहिलेला आहे. अशा या मेंढक्यावर लेखक सुरेश शिंदे यांनी 'मेंढका' या कादंबरीतून प्रकाश टाकला आहे. एकूणच 'मेंढका' ही कादंबरी ग्रामीण साहित्याच्या प्रवाहात निश्चितच भर टाकते.

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## CHAPTER-59

## सिन्नर तालुक्यातील कृषी कामगारांवर कोविड-१९ मुळे झालेल्या परिणामांचा अभ्यास

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सी.डी.जैन कॉलेज ऑफ कॉमर्स, श्रीरामपूर (महाराष्ट्र)

### गोषवारा:

कोविड-१९ चा कृषी कामगारावर कोणत्या प्रकारचा परिणाम झाला यावर विशेष लक्ष केंद्रित करणारा हा शोधनिबंध आहे. या शोधनिबंधात सिन्नर तालुक्यांमधील कृषी कामगारांचा समावेश आहे. कोविड-१९ च्या कृषी क्षेत्रावरील परिणामांचे विश्लेषण करणे हा या पेपरचा उद्देश आहे. सिन्नर तालुक्यांमधील कामगार्यांनी कोविड-१९ चा जागतिक आपत्तीचा सामना करून असुरक्षितता आणि लवचिकता पद्धतीचा अवलंब करून पीक प्रणाली विकसित करण्याचा प्रयत्न केला आहे. कोविड-१९ चा कृषी क्षेत्रावरील विशेषतः कृषी कामगार आणि कर्मचार्यांच्या जीवनावर कसा परिणाम झालेला आहे याचा सविस्तर चर्चा करण्यात आलेली आहे. कोविड-१९ चा कृषी क्षेत्रावरील विशेषतः कृषी कामगार आणि कर्मचार्यांच्या समुहाला कोणत्या प्रकारच्या समस्या भेडसावतात याचा अभ्यास या शोधनिबंधात करण्यात आला आहे. प्रस्तुत संशोधन अभ्यासासाठी संशोधकाने सिन्नर तालुक्याची निवड केली आहे. सिन्नर तालुक्यात एकूण १२६ गावे आहेत. एकूण १२६ गावांपैकी संशोधकाने २० गावांची संशोधन अभ्यासासाठी निवड केली आहे. सध्याच्या संशोधनासाठी संशोधकाने कोविड-१९ चा कृषी क्षेत्रावरील परिणामाचा तपशीलवार अभ्यास केला आहे. सिन्नर तालुक्यातील कृषी कामगारांवर कोविड-१९ मुळे झालेल्या परिणामांचा अभ्यास करण्यासाठी कृषी कामगारांनी मिळालेल्या उत्पन्नातून पैशाचा केलेला विनियोग आणि कोविड-१९ महामारीच्या काळात आलेल्या समस्या आणि आव्हाने अभ्यास केला आहे.

**महत्वाचे शब्द :** कोविड-१९, कृषी कामगार, शेतकरी, समस्या, आव्हाने.

### प्रस्तावना

कोरोना १९ विषाणूचा प्रसार रोखण्यासाठी मार्च २०२० पासून भारतात लॉकडाऊन सुरू करण्यात आला. मार्च २०२० मध्ये सुरू झालेल्या लॉकडाऊनचा अत्यावश्यक सेवा क्षेत्र वगळता शिक्षण, लघु आणि मध्यम उद्योग, रोजगार आणि इतर अनेक क्षेत्रांवर गंभीर परिणाम झाला आहे. स्वयंरोजगार आणि अनौपचारिक कामगार, ज्यांच्याकडे सामाजिक सुरक्षा जाळे नाहीत, त्यांना लॉकडाऊनचा नकारात्मक परिणाम झाला. लॉकडाऊनमध्ये वाहतूक केलेल्या मालाच्या पुरवठा साखळी वितरणाचा शेतकऱ्यांवर मोठा परिणाम झाला आहे. भारताची लोकसंख्या मोठ्या प्रमाणावर शेतीवर अवलंबून आहे. कोरोना महामारीचा शेतीवर होणारा परिणाम समजून घेणे महत्वाचे आहे. देशातील हवामान, पीक पद्धती, सिंचन पद्धती आणि

कामगार पद्धती आणि बाजारपेठेतील प्रवेश यानुसार कृषी क्षेत्रावर लॉकडाऊनचा परिणाम बदलतो. हा वर्तमान शोधनिबंध महाराष्ट्रातील सिन्नर तालुक्यात कोविड-१९ च्या प्रादुर्भावादरम्यान कृषी कर्मचारी, शेतकरी आणि कर्मचार्यांना भेडसावणाऱ्या समस्या आणि आव्हानांची चर्चा केलेली आहे.

### संशोधन अभ्यासाची उद्दिष्टे:

१. कृषी कामगारांच्या सामाजिक आणि आर्थिक स्थितीचा अभ्यास करणे.
२. कोविड-१९ साथीच्या काळात कृषी कामगारांच्या विविध पैलूंचा अभ्यास करणे
३. कोविड-१९ मध्ये भेडसावणाऱ्या विविध समस्या आणि आव्हानांचा अभ्यास करणे.

### संशोधन पद्धती

या प्रस्तुत संशोधनासाठी प्राथमिक आणि दुय्यम तंत्राचा वापरण्यात आले आहेत. नाशिक जिल्ह्यातील सिन्नर तालुक्यातील कृषी कामगारांची प्राथमिक माहिती गोळा करण्यासाठी एक सोपी यादृच्छिक पद्धत वापरण्यात आली आहे. तसेच विश्लेषणासाठी परिमाणात्मक आणि गुणात्मक दोन्ही पद्धती वापरल्या जातात. निरीक्षण आणि मुलाखतीच्या माध्यमातून माहिती गोळा करण्यासाठी देखील याचा वापर केला जातो. या अभ्यासाच्या नमुन्यात कृषी कामगार समुदायाचा समावेश आहे. सिन्नर तालुका हा महाराष्ट्राच्या विकासात योगदान देणारा महत्वाचा तालुका म्हणून ओळखला जातो. या विशेष अभ्यासामध्ये सिन्नर तालुक्यातील १२६ गावांपैकी २० गावांचा संशोधनासाठी समावेश केला आहे. नमुना निवड करताना प्रत्येक गावातील ३६ असे एकूण ७२० इतकी कृषी कामगारांची निवड केली आहे. माहिती विश्लेषण आणि चर्चा:

### १. कुटुंब पद्धतीचे स्वरूप

कोविड-१९ चा कृषी कामगारांवर काय परिणाम होतो? हे समजून घेण्यासाठी ते शेतमजूर ज्या कुटुंबपद्धतीत राहतात त्यांचे वर्गीकरण करणे आवश्यक आहे. त्या कुटुंब पद्धतीचे वर्गीकरण खालील तक्त्यामध्ये दर्शविले आहे.

तक्ता क्रमांक:१ कुटुंब पद्धतीचे स्वरूप

अ.क्र.	कौटुंबिक स्वरूप	वारंवारता	टक्केवारी
१.	संयुक्त	६१०	८४. ७२
२.	विभक्त	११०	१५. २८
एकूण		७२०	१००

(स्रोत: प्राथमिक माहिती)

वरील तक्ता क्रमांक १ असे दर्शवितो की, एकूण नमुना निवड प्रतिसादकर्त्यांपैकी ६१० (८४.७२%) कृषी कर्मचारी प्रत्यक्षात विभक्त कुटुंब पद्धतीमध्ये काम करत आहेत. केवळ ११० (१५.२८%) एकत्र कुटुंब पद्धतीत राहतात. यावरून असे दिसून येते की बहुतांश शेतमजूर प्रत्यक्षात विभक्त कुटुंब पद्धतीत काम करत आहेत. संयुक्त कुटुंब पद्धती दिवसेंदिवस ढासळत चालली असून त्याचा परिणाम शेतमजुरांच्या उपजीविकेवर होत आहे.

## २. कृषी कामगारांच्या उत्पन्नाचे स्रोत

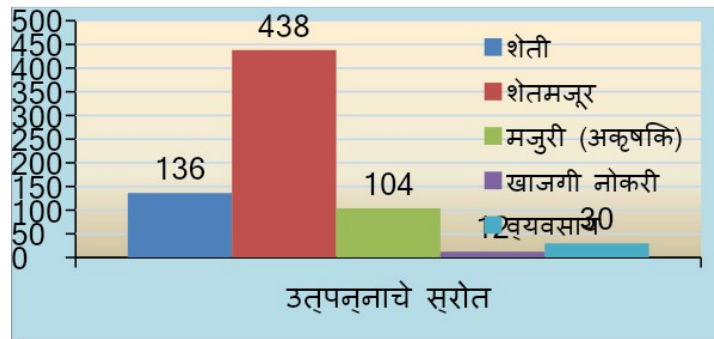
शेतमजूर विविध प्रकारची कामे करून आपला उदरनिर्वाह करतात. विविध कष्ट करून पैसे मिळवण्याचा प्रयत्न करतात. त्यांच्या उत्पन्नाचे स्रोत जाणून घेणे देखील महत्वाचे आहे. खालील तक्ता नमुना निवडलेल्या कृषी कामगारांच्या उत्पन्नाचे वर्गीकरण दाखवते.

तक्ता क्र.२ कृषी कामगारांच्या उत्पन्नाचे स्रोत

अ.क्र.	उत्पन्नाचे स्रोत	वारंवारता	टक्केवारी
१.	शेती	१३६	१८.८९
२.	शेतमजूर	४३८	६०.८३
३	मजुरी (अकृषिक)	१०४	१४.४४
४.	खाजगी नोकरी	१२	१.६७
५.	व्यवसाय	३०	४.१७
एकूण		७२०	१००

(स्रोत: प्राथमिक माहिती)

आलेख क्र.१ कृषी कामगारांच्या उत्पन्नाचे स्रोत



तक्ता क्रमांक २ मध्ये कृषी कामगारांच्या उत्पन्नाच्या स्रोतांचे विश्लेषण केले आहे. एकूण नमुना निवडीपैकी ४३८ (६०.८३%) कृषी कामगार हे शेतमजुरीतून उत्पन्नाचे स्रोत असल्याचे आढळले. तसेच, किमान १२ (१.६७%) खाजगी रोजगार हे उत्पन्नाचे स्रोत दिसून आले. त्याचप्रमाणे मजुरी (अकृषिक) १०४ (१४.४४%), कृषी १३६ (१८.८९%) आणि व्यवसाय ३० (४.१७%) अनुक्रमे उत्पन्नाचे स्रोत असल्याचे आढळले आहे. यावरून असे दिसून येते की, शेतमजुरांच्या उत्पन्नाचा सर्वात जास्त स्रोत हा शेतमजुरीचा आहे आणि सर्वात कमी खाजगी रोजगारातून आहे.

## ३. कृषी कामगारांचा खर्च:

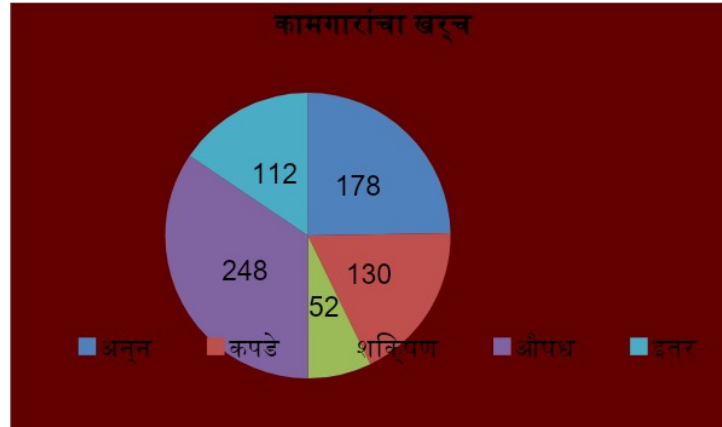
शेतमजूर विविध प्रकारची कष्टाची नोकरी करून आपला उदरनिर्वाह करतात. ते दर्जेदार राहणीमान तसेच दैनंदिन जीवनातील गरजेनुसार पैसे कमविण्याचा प्रयत्न करतात. कृषी कामगार कोणत्या प्रकारच्या गरजांवर खर्च करतात हे जाणून घेणे देखील महत्वाचे आहे. खालील तक्त्यामध्ये निवडलेल्या कृषी कामगारांचा कृषी कामगारांनी केलेला खर्चाचे विश्लेषण केलेले आहे.

## तक्ता क्र.३ कृषी कामगारांचा खर्च

अ.क्र.	कामगारांचा खर्च	वारंवारता	टक्केवारी
१.	अन्न	१७८	२४.७२
२.	कपडे	१३०	१८.०६
३	शिक्षण	५२	०७.२२
४.	औषध	२४८	३४.४४
५.	इतर	११२	१५.५६
एकूण		७२०	१००

(स्रोत: प्राथमिक माहिती)

## आलेख क्र. ३ कृषी कामगारांचा खर्च



वरील तक्ता ३ नुसार कृषी कामगारांनी केलेल्या खर्चाचे विश्लेषण दर्शवितो. कृषी कामगार औषधांवर अधिक खर्च करतात २४८ (३४.४४%) कृषी कामगारांनी खर्च केला असल्याचे आढळून आले. त्यामुळे बहुतांश कृषी कामगार हे फारच कमी कृषी कामगार यांनी मुलाच्या शिक्षणावर ५२ (७.२२%) खर्च करतात. यावरून असे दिसून येते की बहुतेक कृषी कामगार अन्नावर १७८ (२४.७२%), कापड्यावर १३० (१८.०६%), इतर ११२ (१५.५६%) खर्च करत असल्याचे दिसून आले.

वरील विश्लेषणावरून असे दिसून येते की कोविड-१९ कालावधीत त्याच्या उत्पन्नातून अन्न, कापड, शिक्षण आणि औषध यासारख्या मूलभूत गरजांवर खर्च करण्यात आल्याचे दिसून आले.

## ४. कोविड-१९ दरम्यानच्या समस्या आणि आव्हाने

शेतमजूर विविध नोकऱ्या आणि संसाधनांवर उदरनिर्वाह करतात. कोविड १९ महामारीच्या काळात शेतमजुरांना अनेक समस्या आणि आव्हानांचा सामना करावा लागला. संशोधकाने कोविड १९ महामारीच्या परिस्थितीत या कृषी कामगारांच्या समस्या आणि आव्हाने कोणत्या उद्देशाने समजून घेणे आवश्यक आहे. म्हणून, कोविड १९ मध्ये शेतमजुरांना कोणत्या

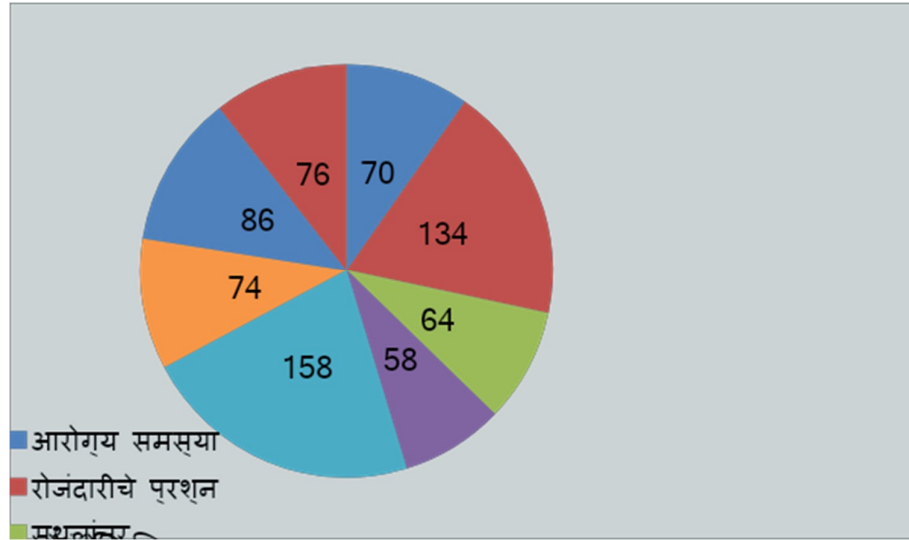
प्रकारच्या समस्यांना सामोरे जावे लागले यासाठी खालील तक्त्यामध्ये निवडक कृषी कामगारांचे वर्गीकरण केलेले आहे.

तक्ता क्र. ४ समस्या आणि आव्हाने

अ.क्र.	समस्या आणि आव्हाने	वारंवारता	टक्केवारी
१.	आरोग्य समस्या	७०	९.७२
२.	रोजंदारीचे प्रश्न	१३४	१८.६१
३.	स्थलांतर	६४	८.८९
४.	मुलांचे शिक्षण	५८	८.०६
५.	आर्थिक समस्या	१५८	२१.९४
६.	अन्न समस्या	७४	१०.२८
७.	कर्ज समस्या	८६	११.९४
८.	कौटुंबिक समस्या	७६	१०.५६
एकूण		७२०	१००

(स्रोत: प्राथमिक माहिती)

आलेख क्र. ४ समस्या आणि आव्हाने



वरील तक्ता ४ मध्ये कोविड १९ कालावधीत शेतकऱ्यांना भेडसावणाऱ्या विविध समस्या आणि आव्हानांचे तपशीलवार विश्लेषण केलेले आहे. एकूण नमुना निवडीपैकी १५८ (२१.९४%) शेतकरी समस्या किंवा आर्थिक आव्हानांना तोंड देत असल्याचे आढळले. तसेच किमान ५८ (८.०६%) कृषी कामगारांना त्यांच्या मुलांच्या शिक्षणात समस्या असल्याचे आढळून आले. त्याचप्रमाणे या कालावधीत मजुरी समस्या १३४ (१८.६१%), कर्ज समस्या ८६ (११.९४%), अन्न समस्या ७४ (१०.२८%), कौटुंबिक समस्या ७६ (१०.५६%) आणि आरोग्य समस्या ७० (९.७२%) कोविड १९ मध्ये अनुक्रमे कृषी कामगार समस्या आणि आव्हाने आढळून आली.

### निष्कर्ष

1. एकूण नमुना निवडीपैकी ४३८ (६०.८३%) कृषी कामगार हे शेतमजुरीतून उत्पन्नाचे स्रोत असल्याचे आढळले. तसेच, किमान १२ (१.६७%) खाजगी रोजगार हे उत्पन्नाचे स्रोत दिसून आले. त्याचप्रमाणे, मजुरी (अकृषिक) अनुक्रमे १०४ (१४.४४%), कृषी १३६ (१८.८९%) आणि व्यवसाय ३० (४.१७%) आहे.
2. कृषी कामगार औषधांवर अधिक खर्च करतात २४८ (३४.४४%) कृषी कामगारांनी खर्च केला असल्याचे आढळून आले. त्यामुळे बहुतांश कृषी कामगार हे फारच कमी कृषी कामगार यांनी मुलाच्या शिक्षणावर ५२ (७.२२%) खर्च करतात.
3. कृषी कामगार अन्नावर १७८ (२४.७२%) खर्च करतात १३० (१८.०६%) कापडयावर ११२ (१५.५६%) खर्च करत असल्याचे दिसून आले.
4. कोविड-१९ कालावधीत त्याच्या उत्पन्नातून अन्न, कापड, शिक्षण आणि औषध यासारख्या मूलभूत गरजांवर खर्च करण्यात आल्याचे दिसून आले.
5. एकूण नमुना निवडीपैकी १५८ (२१.९४%) शेतकरी समस्या किंवा आर्थिक आव्हानांना तोंड देत असल्याचे आढळले. तसेच किमान ५८ (८.०६%) कृषी कामगारांना त्यांच्या मुलांच्या शिक्षणात समस्या असल्याचे आढळून आले. त्याचप्रमाणे या कालावधीत मजुरी समस्या १३४ (१८.६१%), कर्ज समस्या ८६ (११.९४%), अन्न समस्या ७४ (१०.२८%), कौटुंबिक समस्या ७६ (१०.५६%) आणि आरोग्य समस्या ७० (९.७२%) कोविड १९ मध्ये अनुक्रमे कृषी कामगार समस्या आणि आव्हाने आढळून आली.

### संदर्भसूची:

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