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INNOVATIVE SOLUTIONS FOR SNAGS OF TURMERIC FARMERS IN INDIA

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Abstract:

The principal use of turmeric worldwide is as a major ingredient in curry powder, but it is also used in other spice mixes. It was treasured by the ancients not only for its fragrance and flavour but also for its brilliant yellow colour. It is mentioned in the 'Vedas' that turmeric had been used at the time of marriage, worship and other religious ceremonies of the Hindus. Even now it is considered a sign of good omen and given prominence in functions, festivals, etc. The important uses of the turmeric are briefly described here in terms of its medicinal value, food value and industrial value. There are three important issues and challenges playing a dominant role in the production, marketing and economic of turmeric farmers in the country. Here an attempt has also been made to study the problems faced by the farmers in turmeric production. The results of the study are expected to be useful to the local extension agencies, researchers and commercial organizations in framing appropriate extension strategy to help the farmers to reduce the small farmer's problems in adoption of recommended cultivation practices of turmeric.

Key Words: Turmeric, Snags of Turmeric Farmers & Cultivation Practices

Origin of Turmeric (Curcuma Longa):

Turmeric, a herbaceous plant, belongs to the rhizome family.. While details about its origin are not clear, it is widely believed that turmeric finds its roots in South East Asia or South Asia where it is still grown extensively. A related species of turmeric, C. xanthorrhiza grows in Java, Indonesia, where it is known as the temulawak. This species is similar in taste to C.domestica. In India, it has been in use since time immemorial holding a very important place among the spices of India for its proven therapeutic properties. Its vivid, fast yellow colour made it an important dyeing agent in the ancient times and it is once again gaining popularity as a vegetable dye in today's ethnic apparel industry. For more details on the botanical details of turmeric, please navigate to the Turmeric Botany button

Characteristics:

In accordance to the norms of the Spice Board, the physical characteristics of turmeric are finger like in shape, and forms the secondary rhizomes of the plant Curcuma longa L. Typical characteristics include:

- ✓ Well set,closely grained, free from bulbs (primarily rhizomes) and ill developed, porous rhizomes
- ✓ Their shape, length, colour and other characteristics are typical of the variety
- ✓ As stipulated by the Spice Board, good grades of turmeric must conform to the following specifications:
- ✓ Perfectly dry
- ✓ Free from damage caused by weevils, moisture, over-boiling or fungus attack
- ✓ In a sample of good grade turmeric, only 1-2% by weight of rhizomes will be accepted under the damaged or over boiled clause.

History of Turmeric:

The exact origin of turmeric is not known but it is believed to be native to Southern India and Indonesia. In these parts of the world turmeric has been used for thousands of years and has become integral part of their food and traditional medicine. Turmeric has a special place in Indian tradition and worship too. It is used to worship Sun God. It is also worn by people as a part of purification process. The usage of turmeric in India is very old and its usage is documented in various forms. It was used a beauty aid, spice and a medicine – an all in one herb with amazing properties. It is thus not surprising that turmeric has such a place in ancient Indian medical science – Ayurveda. Turmeric has not only been used by Indians, it was used by Buddhists monks which travelled to various parts of the world to die their robes. There are also evidences that turmeric was used as a part of Chinese medicine around 1,000 years ago. Turmeric was not part of western world till recently. There have been only a few evidences stating its usage and importance in Europe. One of the key mentions about turmeric in western civilization was by Marco Polo (1280) – he says that he found a plant which has all qualities of saffron but is a root. While turmeric has always been an important part of Ayurvedic system, western herbalist did not recognize its benefits till late 20th century. But by mid-20th

century, turmeric started gaining popularity in western world too. Today there are numerous research studies and experiments done to identify its benefits. Big pharma companies want to understand its unique composition so that they can make drugs on same lines or use turmeric in some way. Another industry which is using (or in many case misusing) the name of turmeric is beauty products. It is not tough to find beauty creams and face wash mentioning that they have turmeric properties in it etc. Thus in a nutshell from a herb only known to a small part of the world to one of the most sought after spice today, turmeric has come a long way. While we know a lot about this wonder herb right now, but I do believe there is lot more in it which is still unknown and unproved.

Turmeric for Medicinal Uses:

- ✓ Relieves flatulence
- ✓ Useful in controlling periodic attacks of hysteria and convulsions
- ✓ An effective internal antiseptic (when mixed with buttermilk or water) to cure chronic intestinal problems and diarrhoea
- ✓ 20 drops of raw turmeric juice mixed with a pinch of salt taken in an empty stomach dispels germs
- ✓ 1 teaspoon of raw turmeric juice mixed with honey cures anaemia
- ✓ Turmeric roots dried in the sun and powdered fine, mixed with honey and bitter gourd leaves eases the pain of measles
- ✓ Turmeric powder mixed in milk is effective in treating bronchial asthma. When mixed with tsp warm water, it prevents an asthma attack
- ✓ One tsp turmeric mixed with 30 ml warm milk cures cough and cold
- ✓ Smoke from burning turmeric is believed to cure running colds
- ✓ Turmeric paste mixed with lime and salt can ease the pain of sprained joints
- ✓ Raw turmeric juice is effective against skin disorders including eczema, ringworm and scabies
- ✓ Turmeric powder, rubbed on stone on the chest can relieve chest pain
- ✓ Roasted ground turmeric, massaged into the gums relieves aching teeth
- ✓ 5 gms turmeric powder, 2 cloves, 2 dried guava leaves and 200 gms water can be used as mouthwash and prevents dental pain
- ✓ Mixed turmeric powder and lime over insect bitten body parts removes the toxic effect

Turmeric for Cosmetic:

Since time immemorial, turmeric is very popular in cosmetic use Turmeric Cosmetic Use especially for woman. In the East, Turmeric is precious as the therapeutic goldmine inhabits significant position in the psyche of Hindu. It forms an important part of various sanctified Hindu rituals focus its importance for mankind. In the late 1970s a scientific study on turmeric was taken up and in the beginning was restricted mostly to its anti-inflammatory characteristics. Eventually, turmeric has globally attracted for its cosmetic and therapeutic use. In the warmer parts of the world, turmeric is profitably grown. The turmeric powder has a characteristic of aroma and bitter-warm taste with orange-yellow to dark-yellow in colour. As herb, turmeric has been used for centuries for seasoning, but through a series of complex extraction and isolation processes, it will soon be given further potential as a substance to support the medical as well as the cosmetics industries. In the world, the biggest users of turmeric are in India. India is also major producer of turmeric. These natural plant's extracts used in cosmetic products marketed for skin care and hair care.

Turmeric for Dyeing Agent:

Turmeric is the most popular natural dye in textile dyeing. Turmeric is a rich source of phenolic compounds called curcuminoids. The active colouring ingredient in turmeric rhizome is Curcumin, which is also known as Natural Yellow. Its general formula is given in Figure. Turmeric is the brightest yellow natural dye, which belongs to the diaroylmethane group named difer-uloylemethane. It is also well-known for its anti-carcinogenic, anti-inflammatory, anti-microbial, anti-parasitic, anti-mutagenic and anti-inceptive properties, as well as for the formation of sunscreen products. Natural dyes such as turmeric dye are mostly non-substantive

and must be applied on textiles with the help of mordant such as terminaliachebula (kadukkai). Turmeric has antioxidant and skin-lightening properties and might be used to treat skin inflammations, making these compounds useful in cosmetics formulations.

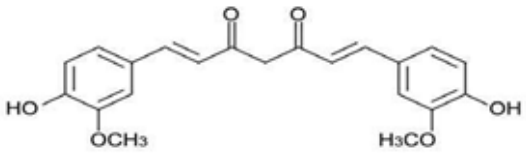

Figure 1: Chemical structure of turmeric (keto form)

The common name of turmeric .This polyphenol compound due to a variety of biological activities has been gained significant attention of researches all over the world. Turmeric, an ancient colouring spice of Asia, as the main source of curcumin is traditionally used for many remedies. Curcumin due to a variety of specific characterizations as many other plant materials, there are differences in the curcumin content for the Curcumalonga from different geographical regions and it could be due to hybridization with other Curcuma species which could be important fact to choose the plant with higher content of curcumin. Curcuma longa rhizome has been traditionally used as antimicrobial agent as well as an insect repellent. Several studies have reported the broad-spectrum antimicrobial activity for curcumin including antibacterial, antiviral, antifungal, and antimalarial activities. Because of the extended antimicrobial activity of curcumin and safety property even at high doses (12 g/day) assessed by clinical trials in human, it was used as a structural sample to design the new antimicrobial agents with modified and increased antimicrobial activities through the synthesis of various derivatives related to curcumin . It was even studied as an antimicrobial agent suitable for textile materials. Results showed that curcumin in combination with aloe Vera and chitosan could be a potential suppressor for microbial growth in cotton, wool, and rabbit hair assessed by the exhaustion method .Either the continuous or batch dyeing process with curcumin provided textiles with antimicrobial properties beside the colour. Curcumin finished wool had semi durable antimicrobial activity, less durable to light exposure than home laundering with 45% and 30% inhibition rates against Staphylococcusaureus and Escherichia coli, respectively, after 30 cycles of home laundering . Mixture of curcumin with other antimicrobial agents is used for the development of antimicrobial skin gels and emulsions with improved skin protection and wound dressing properties. Composition of curcumin with hydrogel silver nanoparticles is used to increase the function of hydrogel silver Nano composites as marked substances for antimicrobial applications and wound dressing. Curcumin-loadedmyristic acid micro emulsion with the 0.86 μg/mL of curcumin suitable for skin consumption inhibited 50% of the S. epidermidis growth as one of the nosocomial infectious agents. It showed 12-fold strongerinhibitory effect compared to curcumin activity dissolved in dimethyl sulfoxide (DMSO).

Turmeric for Food Flavourant:

Turmeric for Food:

Turmeric is widely cultivated for its rhizomes which are used as a brightyellow-orange culinary spice. It has been known as poor man's saffron because it offers a less expensive alternative yellow colouring. In turmeric, curcumin is the primary pigment and is generally used in various food industries as a food color. It is mainly used in dairy products, beverages, cereal, confectionary, ice cream, bakery, and savory products. Turmeric is mostly used in flavored milk drinks, cultured milk and desserts to obtain lemon and banana colors in dairy. Turmeric is added at higher levels to sausages, pickles, relishes, sauces, dry mixes, and fish due to its original usage as a spice.

Composition:

- ✓ Turmeric contains curcumin and an essential oil
- ✓ Dry rhizomes yield 5.8 % essential oil
- ✓ Fresh ones yield 0.24 % oil containing zingiberine
- ✓ Ketone and alcohol are obtained on volatile distillation

Storage:

Turmeric's color properties is everlasting but flavour and aroma is loss quickly if not store properly. Store it in airtight containers away from sunlight. Store in cool, dark, dry places.

Nutritional Value of Turmeric:

Value per 100 grams:

- ✓ Moisture :13.100 gm
- ✓ Protein : 6.300 gm
- ✓ Fat : 5.100 gm
- ✓ Minerals : 3.500 gm
- ✓ Fibre: 2.600 gm

- ✓ Carbohydrates: 69.400 gm
- ✓ Energy: 349.000 K cal
- ✓ Calcium: 150.000 mg
- ✓ Phosphorus: 282.000 mg
- ✓ Iron: 67.800 mg

In addition, it also contains calcium, phosphorous, iron, carotene, thiamine and niacin. Two teaspoons of turmeric contains

- ✓ Iron: 1.88 milligrams
- ✓ Vitamin B: 0.08 milligrams
- ✓ Dietary fiber: 0.96 grams
- ✓ Potassium: 114.48 milligrams
- ✓ Manganese: 0.36 grams

Cuisine Uses:

Turmeric is a spice made from grinding the roots of the Curcuma longa plant, also called curcumin. It is a prime ingredient in curry powder and figures heavily in Asian cuisines. Because it imparts a vivid yellow color to the food it is cooked with; it is often used to color as well as flavor condiments, rice dishes and sauces.

- ✓ It is one of the principle ingredients of curry powder.
- ✓ Turmeric can be used as a substitute for saffron.
- ✓ It is used to flavour and colour butter, cheese, margarine, pickles, mustard, liquor, fruit drinks, cakes, table jellies, fruit dishes and other foodstuffs.
- ✓ Use Turmeric to add Eastern mystery to new favorites as well as in traditional curries, rice and chicken dishes, and condiments.
- ✓ Turmeric is a classic addition to chutneys, pickles, and relishes. Add a pinch of Turmeric to fish soups. Blend with melted butter and drizzle over cooked vegetables, pasta, or potatoes.
- ✓ In Asiatic countries it is utilized as a food adjunct in many vegetables, meat and fish preparations.
- ✓ Turmeric's small quantity is used in medicine and cosmetics and major quantity of turmeric is utilised as a condiment in India.
- ✓ Turmeric oil is also used to impart the flavour in food and perfume industries.
- ✓ It adds a warm, mild aroma and distinctive yellow colour to foods.

Review of Literature:

Bhalerao *et.al*, (1988) in their study on co-operative marketing of agricultural produce in Guntur district of Andhra Pradesh analysed the inter-state variation in the performance of primary marketing societies and stressed that it would be necessary for a rapid progress in the backward states to lay greater emphasis on the acceleration of development.

Cherian Kunju (2001) analysed the features of India's export trade in turmeric. India is the leading producer and exporter of turmeric to the world market. The main markets for Indian turmeric are United Arab Emirates, Iran, United States of America, United Kingdom, Japan, Singapore, Saudi Arabia, Germany and Netherlands. Increase in India's export to America and Western Europe will largely depend upon the availability of sufficient supply of high quality turmeric with higher percentage of curcumin content. India continues to be the dominant supplier of turmeric and in order to keep up this dominant position in the world markets, it is essential to increase the production of varieties of turmeric with higher percentage of curcumin content thereby ensuring steady supply of high quality product. The American Spices Trade Association (ASTA) has notified cleanliness specifications for different spices effective from 1st August, 1991. The ASTA cleanliness specifications for turmeric indicate that dead whole insects should not exceed 3 by count. Mold in turmeric is limited to 3 per cent by weight and insect infestation is limited to 2.50 per cent by weight. A conscious effort by the turmeric growers and traders in maintaining the quality of Indian turmeric, particularly supplying clean product will go a long way in achieving higher levels of exports.

Gala (1997) analysed the importance of Agmark specification of turmeric and turmeric powder and suggested that the Prevention of Food and Adulteration Act should also be applied to turmeric and turmeric powder. The various specifications are also defined by law and the laboratory test analysis is made by the chemist approved by the government. The chemist has to undergo a refresher course for securing the approval of the government. Naidu and Hanumanthaiah (1997) focused their study on the price spread for turmeric and chillies at regulated markets in Guntur district, Andhra Pradesh. The turmeric grower received the net price of 56 per cent in the consumer rupee but in case of the chillies, the growers' earning was only 31 per cent. It concluded that regulated markets facilitate the farmers to receive a remunerative price to turmeric grower than the growers of chillies. However, in regard to marketing margin the retailers of turmeric powder earned only 7

per cent but the chillies powder retailers obtained 40 per cent in the consumer rupee. The study concluded that the chilli powder retailer was enjoying heavy marketing margin.

Lakshmanachar (1992) studied the prospects of turmeric export trade in India. The prospects for turmeric export in most developed countries are related to their domestic production of curry powder and the best opportunities for turmeric will be where the food processing industries in the importing countries have the scope to promote exotic food products. Unlike many spices, turmeric is being increasingly accepted in its ground form by importers in developed countries. As long as producers can provide ground turmeric of assured quality and cleanliness and free of adulteration, the prospects for it should remain good. There are also prospects in the developed countries for greater use of turmeric oleoresin in food colors as legislation restricting the use of synthetic colors is becoming stricter.

Sridhar and Reddy (1999) in their study analysed in detail the price spread in groundnut marketing in Tamil Nadu. The role performed by the commission agents was liked by most of the sample respondents and it was observed that nearly 90 per cent of farmers are interested to dispose of then produce only through commission agents situated in regulated market yard.

Talukdar (1999) in his research study reported that most of the infrastructural facilities created for the benefit of farmers and traders in the market yard were not properly utilized by them. The study also revealed that lack of managerial skills, defect in construction work, delay in issue of licenses to traders were the notable defects in the functioning of regulated markets in the study area.

Objectives of the Study:

- ✓ To study the issue and challenges of turmeric farmers in India
- ✓ To suggest suitable remedial measures to overcome the problems

Methodology of the Study:

The present study uses two major types of variables viz., demographical variables and research variables. The demography variables include the gender of the respondents, age, educational qualification, family size, types of family, income source of family, and annual income. The study identifies the following issues and challenges of turmeric farmers in the study unit. The issues and challenges of turmeric farmers are the research variables of the study. They are: Economic problems, Marketing problems and Production problems. Analytical part of the present study is mainly based on the primary data so that the data are put into analysis with the help of descriptive analysis, (also termed as percentage analysis). At the outset, every variable is put into analysis with the help of simple percentages. The percentage is a commonly used tool to represent the characteristics of data. On the basis of majority or minority arise from the respondents, inferences are made at first. The study of agreed variables and disagreed variables is based on the level of impact of the respondents. For this, '5 point Likert's scale' is used as follows: Strongly Disagree, Disagree, Neither Agree nor Disagree, Agree and Strongly Agree. SPSS 23 version software has been used accordingly to make calculations on the primary data.

Analysis and Recommendations:

Table 1: Offered Suggestions for Production Related Issues and Challenges

S.No	Offered Suggestions for Production	SA	A	N	DA	SDA	AWS	Rank
1	Establishing new machinery for cultivation	**115** (23.0)	**92** (18.4)	**53** (10.6)	**138** (27.6)	**102** (20.4)	3.13	**II**
2	Water resource utilized for other crops	**164** (32.8)	**65** (13.0)	**179** (35.8)	**26** (5.2)	**66** (13.2)	2.48	**V**
3	Find new pesticide against insects	**52** (10.4)	**65** (13.0)	**105** (21.0)	**202** (40.4)	**76** (15.2)	3.19	**I**
4	Government provide compensation against Natural calamities	**79** (15.4)	**13** (2.6)	**180** (36.0)	**202** (40.4)	**26** (5.2)	2.73	**IV**
5	Government provide quality fertilizer and pesticides	**200** (40.6)	**26** (5.2)	**13** (2.6)	**155** (31.0)	**106** (21.2)	2.94	**III**

Source: Primary data

The above table reveals that offered suggestions for production related issues and challenges encountered by the turmeric farmers the main suggestion for that is they recommend it new pesticide against insects (AWS 3.19). They also feel that the next recommendations for 'establishing new machinery for cultivation' and 'Government provide quality fertilizer and pesticides'. And it also recommends that 'Government provide compensation against natural calamities' and 'Water resource utilized for other crops'. So according turmeric farmers provide major solution is find new pesticide against insects because the farmers have not managed from disease and insects attack using pesticides. Hence, the farmers need effective and good quality pesticide to avoid and also safeguard the turmeric from insects.

Table 2: Offered Suggestions for Marketing Related Issues and Challenges

S.No	Offered Suggestions for Marketing	SA	A	N	DA	SDA	AWS	Rank
1	Establishing exclusive market for turmeric by government	**13** (2.6)	**291** (58.2)	**131** (26.2)	**13** (2.6)	**52** (10.4)	2.60	**V**
2	Government procurement at field level	**70** (14.0)	**196** (39.2)	**20** (4.0)	**21** (4.2)	**193** (38.6)	3.14	**II**
3	Installing more cooperative marketing facilities	**109** (21.8)	**114** (22.8)	**77** (15.4)	**81** (16.2)	**119** (23.8)	2.97	**III**
4	Stabilizing the price	**61** (12.2)	**20** (4.0)	**191** (38.2)	**62** (12.4)	**166** (33.2)	3.50	**I**
5	Wide publicity about the market information	**89** (17.8)	**224** (44.8)	**91** (18.2)	**56** (11.2)	**40** (8.0)	2.47	**VI**
6	Establishing government institutional market for all crops	**20** (4.0)	**197** (39.4)	**196** (39.2)	**10** (2.0)	**77** (15.4)	2.85	**IV**

Source: Primary data

The above table found that offered suggestions for marketing related issues and challenges encountered by the turmeric farmers the main suggestion for that is they recommend it Stabilizing the price (AWS 3.50). They also feel that the next recommendations for 'Government procurement at field level' and 'Installing more cooperative marketing facilities'. And it also recommends that 'Establishing government institutional market for all crops', 'Establishing exclusive market' and 'Wide publicity about the market information'. So according turmeric farmers provide major solution is find stabilizing price because the farmers have not effectively managed the fluctuation of prices of the turmeric. Hence, the Government should take effective measures to stabilize the price of turmeric are to improve the marketing of turmeric in a lucid manner.

Table 3: Offered Suggestions for Economic Related Issues and Challenges

S.No	Offered Suggestions for Economic	SA	A	N	DA	SDA	AWS	Rank
1	Providing more finance to meet marketing expenses	**108** (21.6)	**148** (29.6)	**10** (2.0)	**20** (4.0)	**214** (42.8)	3.16	**II**
2	Establishing more financial institutions	**100** (20.0)	**97** (19.4)	**126** (25.2)	**07** (1.4)	**170** (34.0)	3.10	**III**
3	Finance at the time of requirement	**40** (8.0)	**190** (38.0)	**55** (11.0)	**20** (4.0)	**195** (39.0)	3.28	**I**

Source: Primary data

The above table reveals that offered suggestions for marketing related issues and challenges encountered by the turmeric farmers the main suggestion for that is they recommend it Finance at the time of requirement, (AWS 3.28). They also feel that the next recommendations for 'Providing more finance to meet marketing expenses' and 'Establishing more financial institutions'. So according turmeric farmers provide major solution is finding Finance at the time of requirement because the farmers have financial problem at the stage of production of turmeric. Hence, the Government should take effective measures to give the credit facility at the time of requirement.

Recommendations/Suggestions:

- ✓ The government should take necessary steps to establish Agmark laboratory in the Erode market centre. The importers of turmeric are very particular about the quality and the existence of Agmark laboratory would be the solution for the problem. If the Agmark laboratory is established in this market centre, it would facilitate for getting grading certificate without any delay and the traders could also precede with their export formalities easily. It is noticed that the prices prevailing in the turmeric market were highly fluctuating in nature which affected the margin of the turmeric growers. In order to avoid this situation, a steady demand for the turmeric produce has to be identified by expanding the global market for turmeric which would boost the sales volume as well as the price in the local market. The growers should also be educated to study the market conditions regularly and according to the trend existing in the market they have to precede with their cultivation decision.
- ✓ High priority has to be assigned to increase the production and productivity of turmeric by evolving location specific high yielding varieties of turmeric and the Karnataka State Seed Corporation and UHS, Bagalkot may take up the seed production activities of turmeric in the turmeric growing areas of the state, so that the burden of seed transport and non-availability of certified seeds would not be a problem for the farmers.
- ✓ As the change in area and productivity were contributing more towards instability in turmeric production, the government has to stress more on pricing strategies, market facilities and policies, which would help in stabilizing the prices and would maximize profit to farmers. This is necessary to

meet the increasing domestic demand on the one hand and to maintain the monopoly supply position at the international market on the other.

- ✓ In spite of huge variable costs involved in turmeric cultivation returns were quite good and hence, the farmers need to be encouraged to take up the cultivation of this crop in large areas with a provision of financial assistance by the institutional agencies at subsidized rate of interest.
- ✓ Price stabilization measures need to be more pro-active rather than reactive, panic mechanisms. Price risk reduction measures such as providing adequate, timely dependable and farmer centric market intelligence through the collective efforts of all stake holders like farmers, traders, exporters, promotional agencies and R&D institutions assume importance in this context.

Conclusion:

The study revealed that turmeric production is highly profitable. Furthermore, turmeric is labour intensive spices crop. Turmeric is nutritive and it has medicinal value. So cultivation of this spice can help in increasing farm income, employment and nutritional status of farmers. The management practices of turmeric production in the study areas were not found efficient enough Farmers were not known about the application of inputs in right time with right doses. Thus well planned, and management training in accordance with their problems and needs base can lead them to increase farm production and income from turmeric cultivation. If proper remedial measures could be taken, turmeric farming could be a more viable and attractive commercial enterprise.

Scope for Further Research:

Turmeric farming is a new concept and most of the studies have focused on the environmental aspect of turmeric farm practices. Very few researches have been done to study the economics, production and marketing of turmeric farming. Turmeric farming can be studied as a strong link that associates environment with economy.

References:

1. Anderson M.D (1994) "Economics of organic farming in USA" in The economics of organic farming – An international perspective (ed.) by Lampkin N. Hand Padel S., CAB International Publishers
2. Bhalerao, M. M., Ramashray Singh and Asha, A. P., "Co-Operative Marketing of Agricultural Produce - A Macro study", India Journal of Agricultural Marketing. Vol. 52: No. 2, 1988, P. 73.
3. Cheriankunju, N. E., "India's export trade in turmeric", Commerce. Vol. 170, No.3, 2001, PP.50-64.
4. Chhonkar, P. K. 2003.Organic farming science and belief. Journal of the Indian Society of Soil Science. 51 (4): 365-377.
5. Dubgaard A (1994) "Economics of organic farming in Denmark" in The economics of organic farming – An international perspective (ed) by Lampkin N.H and Padel S., CAB International Publishers
6. FAO 1999.Organic Agriculture, Food and Agriculture Organization of the United Nations, Rome.
7. Gala, J.H., "Prevention of food adulteration - Agmark specifications of whole turmeric and turmeric powder", Indian Spices. Cochin, Vol. 34, No. 2, 1997, P.
8. GoI (Government of India) 2001.Report of Working Group on Organic Farming and Biodynamic Farming for the 10th Five-Year Plan. Planning Commission, New Delhi, September.
9. John Henning (1994) "Economics of organic farming in Canada" in The economics of organic farming – An international perspective (ed) by Lampkin N.H and Padel S., CAB International Publishers
10. Kumara Charyulu, D. and Subho Biswas, 2010. Efficiency of organic input units under NPOF scheme in India. Working paper (April, 2010), IIM, Ahmedabad.
11. Lakshmanachar, M.S., "Marketing of Ginger and Turmeric in India", Paper presented at World Spice Congress. Goa, November 92. Ian Hembill, "The Australian market and opportunities for spices including Turmeric from India", Paper presented at World Spice Congress. Goa, November 1992.
12. Lampkin L.H and Padel S. (1994) (ed) The economics of organic farming – An international perspective, CAB International Publishers
13. Lampkin N H (1994) "Economics of organic farming in Britain" in The economics of organic farming – An international perspective (ed) by Lampkin N.H and Padel S., CAB International Publishers
14. Roberts, K.J., Warnken, P.F. and Schnuberger, K.C. 1979. The economics of organic crop production in the western Corn Belt. Agricultural Economics. Paper 1976- Department of Agricultural Economics, University of Missouri, Columbia.
15. Singh, S. 2004. An exploratory study of organic farming in selected plain and hill regions of Uttaranchal. M.Sc. Thesis. G.B.P.U.A. & T., Pantnagar.
16. Sridhar, A., and Reddy, T.G., "Price spread in groundnut marketing, Tamil Nadu", Commerce. Vol. 183: No.3, 1999, P. 79.
17. Talukdar, K.C., uPerformance of regulated markets in Assam", Agricultural situation in India. Vol. 43: No. 3, 1999, P. 87.
18. Uttarakhand Organic Commodity Board Annual Report 2010-11.
19. Uttarakhand State perspective and strategic plan, 2009-2027.

20. Venkatesh, R. (2015) "Investors perception towards investment in Mutual Funds - A Study in Thanjavur District", Global Journal for Research Analysis, Volume-4, Issue-2, Feb-2015 • ISSN No 2277 - 8160
21. Wynen E (1994) "Economics of organic farming in Australia" in The economics of organic farming – An international perspective (ed) by Lampkin N.H and Padel S., CAB International Publishers.