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**EVALUATING IMPACTS OF WATERSHED DEVELOPMENT ON LIVELIHOOD AND SOCIO-ECONOMIC DEVELOPMENT OF TRIBALS IN AKOLE TAHSIL OF AHMEDNAGAR DISTRICT**

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**Abstract:**

*Livelihood and socio-economic development are the most important indices of development of tribal agrarian communities particularly those in rainfed areas. Even in the 21<sup>st</sup> century, the livelihood of the tribal people seems to be traditional and still there is no change in recent years. The income of various tribal groups in India is mainly generated from the land, livestock, cottage industries, forest collection, etc., which depend heavily on inputs like water, fodder, fibre, fuel-wood and forest products. The gradual soil erosion and sinking of these natural resources are one of the basic reasons behind the higher incidence of poverty among the tribal people. To mitigate the hardships and improve the standard of living of the tribal people of the country, the Indian government is vigorously implementing various schemes for rural and tribal development. Watershed Development Programme is one of the strategic programmes, from which efforts are made to minimize the soil erosion, conserve available water, avoid gully formation and thereby improve the soil fertility by which the farmers can gain a good level of income. Through this programme, the beneficiary farmers are guided to use the improved technologies of agriculture by which the farmers can derive better crop yields, obtain sustained returns on their investments and elevate their living standards. This paper presents the impact of the watershed project on the livelihoods of the beneficiaries in terms of change in agricultural production and productivity, change in cropping intensity and cropping pattern, change in employment, and overall change in socio-economic status and agricultural development of tribal people of selected villages from Akole tahsil of Ahmednagar district of Maharashtra state. The assessment and impact of the watershed project on the livelihoods of the beneficiaries showed that there was a marked increase in agricultural production and productivity in the study area compared to the base year. Similarly, the beneficiaries have diversified their agriculture, the mainstay of their livelihood, and are producing more oilseeds, pulses and vegetables rather than traditional cereal crops like Paddy, Nachani, Wari etc. Further, the study also demonstrates that there is a remarkable improvement in the income and socio-economic status of the beneficiary farmers compared to that of non-beneficiary farmers of the study area.*

**Keywords:** Livelihood, Tribal Area, Cropping Pattern, Cropping Intensity.

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**Introduction:**

As most of the world's indigenous people live in remote, mountainous and forest areas, they face food insecurity, income poverty and socio-economic backwardness. These regions have also faced the challenge of resource degradation and low agricultural

productivity. The means livelihoods of many tribal groups seem to be traditional and their main sources of income are agriculture, animal husbandry and forestry. However, this rain-fed agricultural system suffers from various problems. High variability in the amount of rainfall received in short intensive

spells separated by long dry periods during the monsoons exposes the standing crops to the risks of both water stress and floods, resulting in low yields if not outright crop failures (Rockstrom et al., 2010). Watershed management has been seen as a solution to confront such problems (Wani *et al.*, 2009). Watershed management is an 'Area development' strategy in many developing countries, including India. In India, watershed management is considered the main vehicle of rural development (Turton, 2000). Capturing the rainfall in the wet season and increasing the availability of water during dry periods is the principal element of watershed management. This offers several potential benefits including increasing soil moisture for rain-fed agriculture, augmenting groundwater recharge for dry season irrigation or drinking water purposes, and arresting run-off into storage structures (eg. tanks, reservoirs, etc.) for various consumptive and productive usages. Benefits from the adoption of the watershed management approach are reported from many arid and semi-arid tropic regions, where it has helped enhance the agricultural productivity, improve livelihoods of the watershed community and alleviate poverty (Hope, 2007). It also helps in the appropriateness of the method employed in carrying out the project activities and to estimate the medium and long-term social and economic benefits of the activities, efficiencies and impact of the project in the context of its stated objectives (Gupta et al. 2000). Now, poverty alleviation and improving living standards by enhancing sustainable livelihood opportunities for the watershed community is the focal point of most of the Watershed Management Programme (WMP).

Very less information is available on the success of WMP in terms of improvement of livelihoods and socio-economic development of the watershed community and poverty alleviation, even though it uses a huge budget (Hope, 2007). Government bodies mostly evaluate a project's success in terms of physical and financial achievements. Other studies confine to qualitatively evaluated or

quantitatively analysed, heavily supervised projects, with no information about long-term impacts (Kerr, 2002). Evaluative methodology that could measure the changing livelihood profiles of the watershed community quantitatively is needed as it would help determine how far the project has been successful in achieving the basic objective of WMP, i.e. livelihood improvement and poverty alleviation of the watershed community. To accomplish this, a livelihood assessment framework for timely monitoring and evaluation is required that could aid in continual improvements in WMP based on the feedback mechanism. To know the overall effect of soil and water conservation measures adopted in a particular watershed area, it is necessary to evaluate the impact on the livelihood and socio-economic life of the people in that area. Keeping in the view importance of post-project evaluation, a study was undertaken to evaluate the impact of watershed activities on the livelihood and socio-economic development of tribals in Akole tahsil of Ahmednagar District.

#### **Study area:**

Akole tahsil is one of the 14 tahsils in Ahmednagar district which is located in the western part of the district. The tahsil comprises 191 villages. It lies between 19° 15'N to 19° 45'N latitude and 73° 36'E to 74° 06'E longitude. The tahsil is surrounded by the mountain ranges of Sahyadri. Three important rivers originate in the Sahyadri ranges of Akole tahsil namely Mula, Pravara and Adhula which are parts of the upper Godavari watershed. The tahsil has about 98712 hectares of total cultivable land out of about 150989.37 hectares of total geographical area. The net sown area (NSA) is 62198.36 hectares and only 14 percent of NSA is under irrigation. The climate of the tahsil is characterized by hot summer and general dryness except during the southwest monsoon season. The average rainfall in the Akole tahsil is about 900mm and its distribution both spatial and temporal is not uniform. The total population of Akole tahsil is 291950 of which 147880 male and 144170 female

population. The tahsil has a 47.87 percent tribal population.

**Objectives:**

The main objective is,

- 1) To evaluate the impacts of watershed implementation on certain key indicators of livelihoods of tribal communities.

**Research Methodology:**

For the present analysis, the impact of the watershed development programme on the livelihood of the beneficiaries was assessed in terms of changes in cropping pattern, changes in cropping intensity, changes in employment, and overall changes in socio-economic status etc. The impacts were assessed at the household level. The impact of WSD was captured with the help of frequency distribution of farmers reporting different levels of impact. For this purpose, five beneficiaries' villages and five non-beneficiaries villages from the Akole tahsil of Ahmednagar district was selected for the study.

A case study includes qualitative as well as quantitative techniques. The five beneficiary villages where Watershed development Programme (WDP) has implemented and five non-beneficiary villages where WDP has not implemented selected for the present study. From each of the beneficiary and non-beneficiary villages 25 respondents were selected i.e. 125 beneficiaries' respondents and 125 non-beneficiaries' respondents were selected purposively for the study purpose, overall ten villages and 250 respondents were covered under the present study.

**Results and Discussion:****Change in cropping pattern**

A cropping pattern means the proportion of area under different crops at a point as it changes over space and time. Cropping pattern was considered as hectares covered under various crops as compared to base year i.e. 1995. It has been observed that there is a difference in types of crops and seasonal area of kharif, rabi and summer crops grown by the respondent before and after participation

in the watershed project. The changes in the cropping pattern of farmers in selected beneficiary and non-beneficiary villages have been collected and analysed. This was compared with the base year i.e. 1995 versus the sample year 2021.

Significant changes have been observed in the cropping pattern in the beneficiary villages. It is revealed from Table No.1 that, a majority of the beneficiaries (54.40 percent) reported 101 to 150 percent changes in their cropping pattern, followed by 25.60 percent of the beneficiaries found to be in 51 to 100 percent a change in their cropping pattern. About 14.40 percent of the beneficiaries exhibited change in their cropping pattern in the category up to 50 percent. As watershed development has created certainty of water for irrigation, many farmers have started cultivating oilseeds and vegetables along with traditional crops, which has changed the cropping pattern in the beneficiary villages. As well as 4.00 percent of the beneficiaries indicated no significant change in their cropping pattern. The average cropping pattern of the beneficiaries during this period was found 93.60 percent.

However, a slight change has been reported in the cropping pattern of non-beneficiary villages. It is also observed that the majority of the non-beneficiaries (49.60 percent) exhibited 51 to 100 percent changes in their cropping pattern. About 19.20 % of the non-beneficiaries reported changes in the category up to 50 percent and 8.00 percent indicate a change in category 101 to 150 percent. The 22.40 percent of the non-beneficiaries exhibit no significant change in their cropping pattern. The average cropping pattern during this period in the case of the non-beneficiaries was found 53.40. Since the farmers in the non-beneficiary villages were not willing to change their rainfed cropping pattern so there was not significant change in cropping pattern in such group of farmers.

**Table-1: Distribution of the respondents according to their change in cropping pattern**

| Sr. No. | Per cent change in cropping pattern | Number of Beneficiaries (N=125) |         | Number of Non-Beneficiaries (N=125) |         | Overall (N=250) |         |
|---------|-------------------------------------|---------------------------------|---------|-------------------------------------|---------|-----------------|---------|
|         |                                     | No.                             | Percent | No.                                 | Percent | No.             | Percent |
| 1.      | No significant change               | 5                               | 4.00    | 28                                  | 22.40   | 33              | 13.20   |
| 2.      | Up to 50                            | 18                              | 14.40   | 24                                  | 19.20   | 42              | 16.80   |
| 3.      | 51 to 100                           | 32                              | 25.60   | 62                                  | 49.60   | 94              | 37.60   |
| 4.      | 101 to 150                          | 68                              | 54.40   | 10                                  | 8.00    | 78              | 31.20   |
| 5.      | Above 151                           | 2                               | 1.60    | 1                                   | 0.80    | 3               | 1.20    |
|         |                                     | 125                             | 100.00  | 125                                 | 100.00  | 250             | 100.00  |

Source: Primary Survey data year 2021

Overall 37.60 percent, 31.20 percent and 16.80 percent change was observed in the cropping pattern of the respondents ranging from 51 to 100, 101 to 150 and up to 50 respectively. About 13.20 percent of the respondents exhibit no significant change in their cropping pattern. The overall average change in cropping pattern during this period of the respondents was found 73.5 percent. Due to various measures of soil and water conservation, farmers in the beneficiary villages are more inclined to cultivate high-yielding varieties of crops along with traditional crops, oilseeds and vegetables instead of cereals.

#### A. Change in cropping intensity.

For the purpose of investigation, cropping intensity was considered as the proportion of the area under different crops including double cropping to the net cultivated area. Cropping intensity was measured in terms of percentages by calculating the total cropped area divided by the net sown area. The information on a change in the cropping intensity of the beneficiaries and non-beneficiaries was collected and analysed. This was compared with the base year i.e. 1995 versus the sample year 2021. The results are presented in Table No. 2.

**Table-2: Distribution of the respondents according to their change in cropping intensity**

| Sr. No. | Per cent change in cropping intensity | Number of Beneficiaries (N=125) |         | Number of Non-Beneficiaries (N=125) |         | Overall (N=250) |         |
|---------|---------------------------------------|---------------------------------|---------|-------------------------------------|---------|-----------------|---------|
|         |                                       | No.                             | Percent | No.                                 | Percent | No.             | Percent |
| 1.      | No significant change                 | 2                               | 1.60    | 22                                  | 17.60   | 24              | 9.60    |
| 2.      | Up to 30                              | 16                              | 12.80   | 54                                  | 43.20   | 64              | 25.60   |
| 3.      | 31 to 60                              | 58                              | 46.40   | 26                                  | 20.80   | 42              | 16.80   |
| 4.      | 61 to 90                              | 39                              | 31.20   | 18                                  | 14.40   | 76              | 30.40   |
| 5.      | Above 91                              | 10                              | 8.00    | 5                                   | 4.00    | 44              | 17.60   |
|         |                                       | 125                             | 100.00  | 125                                 | 100.00  | 250             | 100.00  |

Source: Primary Survey data year 2021

Major changes have been observed in the cropping intensity in the beneficiary villages. It is revealed from Table No. 2 that, during the year 2021, 46.40 percent of the beneficiaries exhibited a change in cropping intensity in the category of 31 to 60 percent, followed by 31.20 percent of beneficiaries who reported a change in cropping intensity in category 61 to 90 and 8.00 percent reported in category 91 and above. About 12.80 percent of the

beneficiaries reported a change in cropping intensity up to 30 percent. No significant change in cropping intensity was reported by 1.60 percent. The mean cropping intensity of the beneficiaries was found to be increased by 54.6 percent over the base year.

It is also observed from Table No. 2, that there was a slight change has been observed in the cropping intensity of non-beneficiary villages. It is revealed that

maximum i.e. 43.20 percent of the non-beneficiaries exhibited change in cropping intensity in the category of up to 30 percent, followed by 20.80 percent of the non-beneficiaries who reported no change in cropping intensity in the category of 31 to 60 percent. About 14.40 percent of the non-beneficiaries reported change in cropping intensity in the category of 61 to 90 percent and 4.00 percent was reported in 91 percent and above category. About 17.60 percent of the non-beneficiaries reported no change in cropping intensity. Mean cropping intensity in the case of non-beneficiaries was found to be increased by 30.84 percent over the base year.

Overall 30.40 percent, 16.80 percent and 25.60 percent change was observed in the cropping pattern of the respondents ranging from 61 to 90, 30 to 60 and up to 30 respectively. About 9.16 percent of the respondents exhibit no significant change in their cropping pattern. The overall average change in cropping pattern during this period of the respondents was found 52.68.

**Table-3: Distribution of the respondents according to their change in employment.**

| Sr. No. | Per cent change in employment | Number of Beneficiaries (N=125) |         | Number of Non-Beneficiaries (N=125) |         | Overall (N=250) |         |
|---------|-------------------------------|---------------------------------|---------|-------------------------------------|---------|-----------------|---------|
|         |                               | No.                             | Percent | No.                                 | Percent | No.             | Percent |
| 1.      | No significant change         | 0                               | 0.00    | 2                                   | 1.60    | 2               | 0.80    |
| 2.      | Up to 40                      | 14                              | 11.20   | 38                                  | 30.40   | 52              | 20.80   |
| 3.      | 41 to 80                      | 32                              | 25.60   | 44                                  | 35.20   | 76              | 30.40   |
| 4.      | 81 to 120                     | 61                              | 48.80   | 28                                  | 22.40   | 89              | 35.60   |
| 5.      | Above 121                     | 18                              | 14.40   | 13                                  | 10.40   | 31              | 12.40   |
|         |                               | 125                             | 100.00  | 125                                 | 100.00  | 250             | 100.00  |

*Source: Primary Survey data year 2021*

It is revealed from Table No. 3 that, during 1995-2021, nearly half of the beneficiaries (48.80 percent) exhibited a category of 81 to 120 percent increase in their employment in terms of man-days per year, followed by 25.60 percent of the beneficiaries found to be in 41 to 80 percent increase in their employment. About 14.40 percent of the beneficiaries reported a change in their employment in the category of above 121 percent and 11.20 percent increase in the category of up to 40 percent. The average employment generated during this period of the

In the agricultural context cropping intensity above 91 percent is considered a healthy sign for assured crop incomes for farmers. The above results were indicative of the fact that in villages where watershed development has taken place, various measures taken for soil and water conservation measures have a better chance of providing protective irrigation to the crop and reaping another crop throughout the year. In addition, due to the availability of water in some beneficiary villages, groundnut, tomato and other seasonal vegetables are being cultivated even in summer.

#### **Change in employment.**

Change in employment for the respondent was considered as additional employment in the number of days generated as a result of benefits from the watershed project. The distribution of the respondents according to their percent change in employment was studied, for this purpose year 1995 was considered as the base year and change in the employment was studied during 2021 and presented in Table No.3.

beneficiaries was found to be 86.56 (man-days per year).

It is also observed that 35.20 percent of the non-beneficiaries exhibited an increase in their employment in terms of man-days per year in the category 41 to 80 percents, followed by 30.40 percent of the non-beneficiaries who reported up to 40 percent increase in their employment. About 22.40 percent of the non-beneficiaries have reported an increase in their employment in the category of 81 to 120 percent and 10.40 percent reported a change in employment in the category above 121 percent and above. Only 1.60

percent of the non-beneficiaries indicate no significant change in employment. The average employment generated during this period for the non-beneficiaries was found to be 64.16 (man-days per year).

Thus, it can be concluded that the majority of respondents i.e. 35.60 percent reported an increase in the employment category of 81 to 120 percent, followed by 30.40 percent found to be in 41 to 80 percent increase in their employment.

Employment availability during the implementation phase of the watershed program increased employment due to an increase in the irrigated area during the Rabi season and increased employment due to the development of the double-crop area are taken into consideration. On probing the employment phenomenon more deeply it was noticed that the agriculture sector was contributing to 35 to 40 days of

employment per hecter during kharif season and almost no employment in Rabi before the implementation of the watershed programme. However, significant changes were noticed in terms of availability of employment days in kharif and Rabi season to the extent of 90 to 110 days per hecter in a year after implementation of watershed activities.

#### **Change in socio-economic status.**

Change in socio-economic status for the investigation was considered as the change in the position of respondent occupied concerning prevailing average standards of cultural position, effective income, material possession and participation in the group activity of the community. The distribution of the respondents according to per cent change in socio-economic status has been presented in Table No. 4.

**Table-4: Distribution of the respondents according to their change in socio-economic status.**

| Sr. No. | Per cent change in socio-economic status | Number of Beneficiaries (N=125) |         | Number of Non-Beneficiaries (N=125) |         | Overall (N=250) |         |
|---------|--|---------------------------------|---------|-------------------------------------|---------|-----------------|---------|
|         |  | No.                             | Percent | No.                                 | Percent | No.             | Percent |
| 1.      | Low (Up to 30)                           | 34                              | 27.20   | 62                                  | 49.60   | 96              | 38.40   |
| 2.      | Medium (30 to 60)                        | 75                              | 60.00   | 52                                  | 41.60   | 127             | 50.80   |
| 3.      | High (60 and above)                      | 16                              | 12.80   | 11                                  | 8.80    | 27              | 10.80   |
|         |  | 125                             | 100.00  | 125                                 | 100.00  | 250             | 100.00  |

*Source: Primary Survey data year 2021*

It is revealed from Table No. 4 that, a majority of the beneficiaries (60.00 percent) exhibited medium i.e. 30 to 60 percent change in their socio-economic status, followed by 12.80 percent of the beneficiaries found to be in the high category i.e. 60 per cent and above a change in their socio-economic status. About 27.20 percent of the beneficiaries reported change in their socio-economic status in the low category i.e. up to 30 percent. The average socio-economic status of the beneficiaries during this period was found 40.68.

It is also observed that half of the non-beneficiaries (49.60 percent) exhibited a change in their socio-economic status in the low category i.e. up to 30 percent, followed by 41.60 percent of the non-beneficiaries exhibiting a change in their socio-economic status in the medium

category i.e. 30 to 60 percent. Only 8.80 percent of the non-beneficiaries reported change in their socio-economic status in the high category i.e. 60 and above percent. The average socio-economic status of the non-beneficiaries during this period was found 32.76.

The 50.80 percent change in the socio-economic status of the respondents was ranging from 30 to 60 percent i.e. medium, followed by 38.40 percent of the respondents indicating percent change in their socio-economic status in low category i.e. up to 30 percent. Only 10.80 percent of the respondents exhibited high i.e. 60 and above percent change in their socio-economic status. The overall average percent change in the socio-economic status of the respondents during this period was found 36.72. The above results show that watershed development has

increased the income of the people in the beneficiary villages which has helped in improving their social life as well as their material possessions.

**Conclusion:**

Watershed development in the study area encouraged farmers to change their cropping pattern and crop intensity due to the availability of water for agricultural irrigation along with soil and water conservation. The present investigation revealed that there was a considerable change in the cropping pattern and cropping intensity in the beneficiary villages compared to that of non-beneficiary villages of the watershed development programme. Further, the WSD programme has also provided various avenues of employment, in the form of catchment area development and land development activities, to the members of the beneficiary families. Secondly, the intensification in crop and livestock production resulting from an increase in irrigation was also responsible for employment availability to more family members of the beneficiaries. The availability of employment has helped in increasing the economic income of the beneficiary villagers and raising their physical wealth, health, education and social life. Thus, the WDP, along with other government schemes for tribal development, has made significant contributions to the overall improvement of the resource-poor tribal communities in the field of study.

**References:**

1. GOI (2008): Common Guidelines for Watershed Development Projects, Government of India.
2. Gupta, V.P., Sharma, R.P. & Goyal, R.K. (2000): Impact assessment of conservation measures in arid areas: a case study of Osian Bigmi (Jodhpur) watershed. Proc. International conf. on integrated water resource management for sustainable development, New Delhi: 1012-1019.
3. Hope, R.A., (2007): Evaluating social impacts of watershed development in India. World Development 358, 1436-1449.
4. Kerr, J. (2002): Watershed development, environmental services, and poverty alleviation in India. World Development 308, 1387-1400.
5. Ninan, K.N. and S. Lakshmikanthamma (2001): Social Cost-Benefit Analysis of a Watershed Development Project in Karnataka, Vol.30 No.3, Royal Swedish Academy of Sciences.
6. Rockstrom, J., Karlberg, L., Wani, S. P., Barron, J., Hatibu, N., Oweis, T., et al. (2010): Managing water in rainfed agriculture – The need for a paradigm shift. Agricultural Water Management, 97, 543–550
7. Turton, C., (2000): Enhancing livelihoods through participatory watershed development in India. Working Paper No. 131, Overseas Development Institute (ODI), London, UK.
8. Wani, S.P., Sreedevi, T.K., Rockstroma, J. and Ramakrishna, Y.S., (2009): Rainfed Agriculture– Past Trends and Future Prospects. In: Wani, S.P., Rockstroma, J. and Oweis T. (eds) Rainfed agriculture: unlocking the potential. Comprehensive Assessment of Water Management in Agriculture Series 7. Wallingford Oxfordshire, UK: CAB International, pp. 1-35. ISBN 978-1-84593-389-0.