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WATERSHED APPROACH THROUGH TRIBAL LIVELIHOOD OF KORAPUT DISTRICT IN ODISHA

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ABSTRACT

Water, the most important natural resource, is indispensable for the entire living organism as well as vital for the growth of plants, agriculture, fish culture and industrial development. Watershed development as a strategy for raising agricultural productivity has been indispensable particularly in dry land areas- one that integrates sectors and provides the foundation for subsequent development. Odisha is the poorest state in India, with 46% of people living below the poverty line in 1999-2000, as against 26% for the entire country. Tribals constitute 23 per cent of total population of Odisha who are the backward, marginalized and poverty stricken population. If the agriculture needs to be diversified in terms of crop variations and production, the traditional cropping pattern has to be changed and in its place new HYV should have to be introduced for higher productivity; which apparently is feasible with the development of watershed program in tribal regions of KBK districts. A participatory watershed approach as a strategy seems more pragmatic in view of its socio-economic and ecological impacts on the livelihoods of the impoverished tribes and as such, an attempt has been made in this paper to discuss the pro-poor implications of watershed among the KBK tribals that have occurred as a result of the implementation of watershed program.

KEYWORDS

participatory irrigation management, kbk tribes, impact of watershed program.

INTRODUCTION

India is a mountainous country with hundreds of sub-watersheds and thousands of Micro watersheds. The Micro-watersheds in mostly high hilly area suffer a certain degree of degradation. The micro watershed concept aims to 'establish an enabling environment for the integrated use, regulation and treatment of water and land resources of a watershed based ecosystem to accomplish resource conservation and biomass production objectives' (Jensen *et al*, 1996). Owing to the rapid growth of population, insufficient agricultural production, low off-farm sector production and concomitant developmental changes, the natural resources particularly public lands and forest lands are being over exploited to meet the basic needs of the people. This has brought rapid changes in the environment and the power of the nature, instead of being used in the welfare of mankind, is being diverted to bring natural calamities in the forms of landslides, soil erosion, floods, drought and so on. Therefore, the country's fragile natural environment is now under serious threat. The increasing trends of hill-landslides and silt load in the major river systems are indicators of serious watershed natural resources and environmental degradation problems. In order to combat with and to address these problems, sustainable development of the watershed is, no doubt, the most appropriate policy strategy. However, an even more daunting challenge is how to operationalize the concept of sustainable development of watersheds in a resource-scarce country like India. It is obvious that the living standard of people in sustainable way is only possible if watershed management planning focusing on conservation of natural resources is done along with local people's participation. Participatory watershed management planning allows local people to determine programs based on their needs, ability and resource available at the local level. At the same time, they utilize their knowledge and skills to set objectives for the betterments of their villages or places. "To promote the economic development of the village community which is directly or indirectly dependent on the watershed" (MORAE Watershed Guideline, Govt. of India, 1994). When it comes to ensuring food security for all, two major water realities face humankind. Rainfed agriculture will continue to produce bulk of world's food and productivity is very low in rainfed agriculture, thus providing significant opportunities for producing more food with less fresh water. Rainfed agriculture is practised in 80% of the world's physical agricultural area and generates 62% of the world's staple food (FAOSTAT, 2005). A new green revolution is the need of the hour in small scale rainfed agriculture in arid, semi-arid and dry sub-humid regions of the world. This can be possible by investing in the untapped potential of upgrading rainfed agriculture through integrated water investments.

Development of watershed/catchments is one of the most trusted and eco-friendly approaches to manage rain water and other natural resources, which has paid rich dividends in the rainfed areas and is capable of addressing many natural, social and environmental intricacies (Samra, 1998). Management of natural resources at catchment / watershed scale produces multiple benefits in terms of increasing food productions, improving livelihoods, protecting the environment and addressing the gender and equity issues along with bio-diversity concerns. Watershed development programmes (WDPs) are, therefore, considered as a growth engine for the development of fragile and marginal rainfed areas. (Wani *et al.*, 2008)

The most important feature of watershed development is in-situ conservation and harvesting rainwater for augmenting surface and ground resources in rainfed areas. Watershed development aims at optimum and prudent use of soil and water resources in sustainable and cost effective mode. Augmentation of water resources is at the heart of WDPs (P. K. Joshi *et al*, 2009). The catchment watershed development approach is a viable option for unlocking the potential of rainfed areas and doubling or quadrupling the productivity through augmenting water resources in the rainfed areas (Rockstrom, 2007). Watershed management is of strategic importance in bringing the second green revolution and achieving the goal of 4% agricultural growth in the country. The Government of India, therefore has, accorded high priority to the holistic and sustainable development of rainfed areas through the integrated watershed development programmes (Wani *et al.*, 2008).

The concept of integrated and participatory watershed development and management has emerged as the cornerstone of rural development in the dry and semi-arid regions and other rainfed regions of the world, and is a paradigm shift from earlier plot based approaches to soil and water conservation. The watershed approach enables planners to harmonise the use of soil, water and vegetation in a way that conserves these resources and maximize their productivity. The watershed is the appropriate hydrological unit for technical efforts to manage water and soil resources for production and conservation. But watershed management is complicated by the fact that watershed rarely correspond to human defined boundaries. The fundamental social problem of watershed development is that it often distributes benefits and costs unevenly, making it a likely source of disagreement and conflict. Mostly watershed projects distribute cost and benefits unevenly, with cost incurred disproportionately upstream, typically among the poor farmers, and benefits realized disproportionately downstream, where water use is concentrated and richer farmers own most of the land. The challenge is to internalize the costs and benefits in such a way that all the stakeholders are part of a win-win scenario (Sharma *et al.*, 2004)

Over the last couple of decades, the Government of India has addressed the challenges of watershed development and made major investments through an appropriate mix of technical innovation, participatory approaches. There is certainly evidence of positive impacts in terms of improved soil and water conservation and agricultural productivity in normal rainfall years in regions that have been ignored in the conventional green revolution based rural development (Samra, 1999).

METHODOLOGY**THE SAMPLE STUDY**

In order to evaluate the performance of the watershed projects on the social and economic condition of the rural people of an underdeveloped area, like Koraput district a sample study was conducted by the scholar to assess the impact of the projects in pre and post project period. In the study, the study area is one of the most backward districts in India which has come under the revised long term action plan (RLTAP) programme of the central government. More than 80% of the

population of the district, as per the official statistics belongs to below poverty line (BPL) category. At the same time, almost half of the population of the district belong to the scheduled tribe and it comes under the 5th schedule area of the state. The literacy rate in the rural areas of the district is abysmally low as compared to the state and the district average. Keeping all these in mind the central and state government are spending huge amount of money through various plans and schemes to enhance the standard of living of these people. The watershed development programme which has been accepted as one of the flagship programmes of the Government for the improvement of livelihood of rainfed area people and increase the productivity in agriculture needs to be reviewed on the basis of its impact on the people of the tribal dominated district of Koraput.

METHOD

Out of various watershed projects implemented in the district only some of the completed projects have been taken up for an in depth study. Out of the 14 blocks in the district, five blocks (about 35%) have been taken as the sample size keeping in view the composite development index of these blocks in the district. Some of the most irrigated and least irrigated blocks with different agro climatic zone of the district have been taken purposively for a comparative evaluation purpose. Four watersheds from each of the above sample blocks have been selected on the purposive random sampling basis which was taken up during the period from 1998-99 to 2002-03.

The current study is also to make a comparative analysis of the performance of the watershed projects after the project period is over with that of the pre watershed period. The biophysical aspects and the socio-economic benefits of the projects are assessed through a total sample size of 300 households. For this purpose for the sample, 15 numbers of households from each chosen watersheds are selected randomly and a structured questionnaire prepared exclusively for the purpose was administered. The scholar visited each of the watersheds which comprises of one or more than one village and collected information from the households and also conducted focus group discussions with the villagers and discussed with the elected representatives of the village, the watershed committee members and the officers of the line departments of government. As all the watershed projects completed so far have been implemented by the Government agencies, the Programme Implementing Agencies (PIA) of all the 20 watershed projects selected in the sample belongs to various departments of the Government.

FINDINGS

Out of the 300 sample households 18 (6%) households are found to be landless, 148 (49.33%) are marginal farmers having up to 1 hectare of land, 80 (26.6%) households belong to small farmers category having on an average more than 1 hectare but less than 2 hectares of land, 53 (17.67%) households belong to medium farmers having more than 2 hectares but less than 10 hectares of land and only one household is a large farmer having more than 10 hectares of land.

TABLE 1: STATUS OF LAND USE PATTERN BY THE SAMPLE HOUSEHOLDS IN PRE AND POST WATERSHED PERIODS

| Sl. No | Area (in acres) | Pre W/S* | % of total | Post W/S** | % of total |
|--------|-----------------|----------|------------|------------|------------|
| 1 | Total Area | 1018.12 | 100 | 1064.44 | 100 |
| 2 | Irrigated | 318.70 | 31.30 | 499.90 | 46.96 |
| 3 | Non-Irrigated | 663.17 | 65.13 | 550.04 | 51.67 |
| 4 | Wasteland | 36.25 | 3.56 | 14.50 | 1.36 |

Source: Household Survey 2011-12

* - Pre watershed ** - Post watershed

The irrigated area has increased from 318.70 acres in pre watershed period to 499.90 acres in post watershed period, which implies that there is an increase in irrigation potential in the sample area from 31 per cent in pre-watershed to 47 per cent in post watershed. The non-irrigated area has been reduced from 65 per cent to 52 per cent during the post-watershed period. Similarly, the waste land which was 3.56 per cent of the total land in pre watershed period has been reduced to 1.36 per cent of the total area during the post watershed period.

Agriculture is the most important activity among the sample households on which about 85 per cent of the total household depends upon as their primary source of living. It has been opined that the most of the farmers of the study area are subsistence farmers engaged particularly in cereal production. It is further reported by the farmers that there has been a diversification of crops during the post watershed period on account of availability of irrigation, high yielding varieties of seeds and fertilisers to them. It is also found that in case of most of the crops, per hectare yield has been increased as compared to the pre-project period. Comparative figures of the per hectare yield of important crops of the area in pre and post watershed period are given below. The diversification of crops from paddy to non-paddy crops like turmeric, sugarcane, cabbage, cauliflower, tomato, brinjal, carrot, cucumber, ginger, banana, onion etc has become possible mainly for the availability of water and other supporting inputs.

TABLE 2: AVERAGE YIELD OF MAJOR CROPS IN STUDY AREA OF KORAPUT (Kg/Ha)

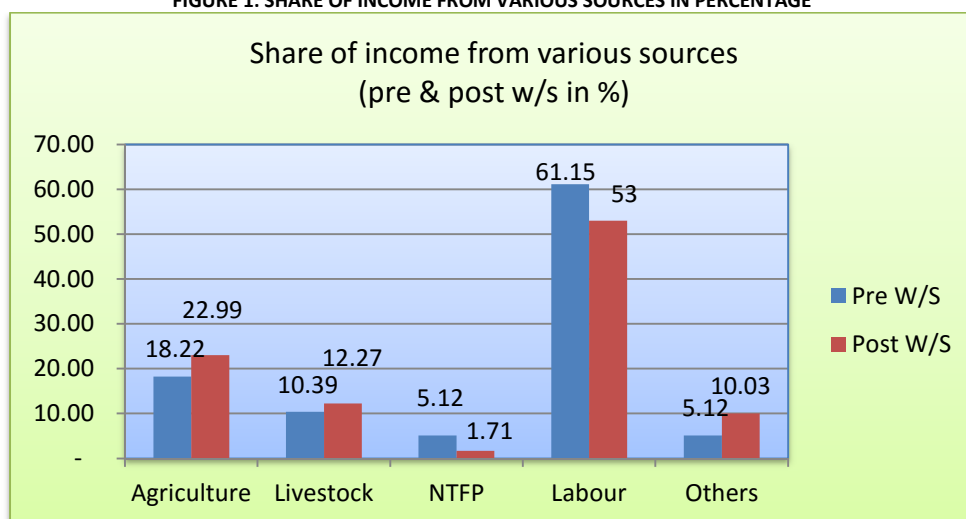
| Sl. No | Crops | Pre watershed | Post watershed | % change in Production |
|--------|--------------|---------------|----------------|------------------------|
| 1 | Rice | 920 | 1645 | (+) 78.8 |
| 2 | Ragi | 256 | 287 | (+)12.1 |
| 3 | Niger | 360 | 375 | (+)4.16 |
| 4 | Maize | 670 | 762 | (+)13.73 |
| 5 | Dal | 764 | 972 | (+)27.22 |
| 6 | Kating | 187 | 512 | (+)173.79 |
| 7 | Green gram | 487 | 650 | (+)33.47 |
| 8 | Potato | 470 | 728 | (+)54.89 |
| 9 | Tomato | 645 | 760 | (+)17.82 |
| 10 | Carrot* | 0 | 745 | (+)100 |
| 11 | Ginger* | 0 | 870 | (+)100 |
| 12 | Cauliflower* | 0 | 1567 | (+)100 |
| 13 | Cabbage | 312 | 1060 | (+)239.74 |
| 14 | Papaya | 673 | 1342 | (+)99.4 |
| 15 | Radish | 460 | 736 | (+)60 |
| 16 | Beans | 260 | 475 | (+)82.69 |
| 17 | Brinjal | 975 | 1475 | (+) 51.28 |
| 18 | Onion* | 0 | 743 | (+)100 |
| 19 | Cucumber | 376 | 728 | (+)93.61 |
| 20 | Chilli | 278 | 456 | (+)64.02 |

Source: Household Survey, 2011-12

* - Crops which were not produced during pre- watershed period.

In the sample survey, information was collected from the households in the watershed area about their income received from various sources. A comparative statement of the income received in pre and post watershed period has been prepared by compiling the various income sources. It is found that the main sources of income of the sample households are the income from agriculture, wage employment, livestock and non-timber forest produce etc. The other sources of income include the income from small business, service, contractual works etc.

FIGURE 1: SHARE OF INCOME FROM VARIOUS SOURCES IN PERCENTAGE



The comparative share of income from various sources in the pre and post watershed period is given in the above table. The share of agriculture in the total income has been increased from 18.22 % in pre watershed period to 22.99 % in post watershed period. The share of livestock has also marginally increased from 10.39% to 12.27 % during the same period. The share of NTFPs in the total income of the sample households has declined in the post watershed period as compared to pre watershed period. The share of NTFPs was 5.12 per cent in pre watershed period which has declined to 1.71 per cent in post watershed period. It is because of the fact that the inhabitants in the Watershed areas spend more time in agriculture and other related activities, and also in wage labour which is presently available under various employment schemes, and spend less time in collection and sale of NTFPs. Whatever, NTFPs they collect; it is mostly used for self-consumption. Similarly, the share of wage income has also declined in the post watershed period as compared to pre watershed period. The share of labour income in the total income of the household has declined from 61.15 per cent in pre watershed period to 53.00 per cent in post watershed period. Still the contribution of income from wage labour is the highest both in pre and post watershed periods. The share of income from other sources which includes the business, services etc. in the total income of the household has almost doubled in post watershed period as compared to pre watershed period. The share of other income was only 5.12 per cent in the pre watershed period which has been increased to 10.03 per cent of total income in post watershed period.

An increase of income from agriculture and livestock activities may be ascribed to the boom in the agricultural activity mainly an account of the implementation of the watersheds in these areas. Also the increase in the cropping intensity and use of HYV seeds and other agricultural inputs has contributed to the increase in income of the agricultural sector in the post watershed period over the pre watershed period. The increase in the availability of fodder and drinking water in the watershed areas has increased the number of livestock population in these areas.

The important expenditures of the households have been broadly categorized under Food, Clothing, Housing, Education, Health, Festivals, Fuel and Others. An attempt was made to collect the amount of expenditure made by the sample households on various items mentioned above through the questionnaires served. The item wise average annual household expenditure in percentages is given below

TABLE 3: ANNUAL HOUSEHOLD EXPENDITURE ON VARIOUS ITEMS (PERCENTAGE) IN PRE & POST w/s

| Sl. No | Items of Expenditure | Pre Watershed (2002-03) | Post Watershed (2006-07) |
|--------|----------------------|-------------------------|--------------------------|
| 1 | Food | 52 | 43 |
| 2 | Clothing | 16 | 18 |
| 3 | Housing | 7 | 8 |
| 4 | Education | 2 | 3 |
| 5 | Health | 5 | 7 |
| 6 | Fuel | 2 | 4 |
| 7 | Festivals | 12 | 13 |
| 8 | Others | 4 | 4 |
| 9 | Total | 100 | 100 |

Source: Household Survey 2011-12

The share of expenditure on food has declined from 52% in pre watershed to 43% in post-watershed period. However, out of the total household expenditures, the share of food is the highest both in pre and post watershed periods, followed by clothing, festivals and housing etc. On the other hand, the share of expenditure on other non-food items like clothing, housing, education, health, festivals and fuel has increased in post watershed period in comparison to the pre watershed period. The percentage share of miscellaneous items coming under the head others has remained constant at 4% in both pre and post watershed period.

As per the Report of the Expert Group on Estimation of Poverty (Tendulkar Committee, 2009) of Planning Commission, Government of India, poverty line is determined as a monthly expenditure of Rs. 407.78 for rural areas and Rs. 497.31 for urban areas in Orissa. The base year of calculation of poverty line was 2004. On the basis of this estimation, at the outset, all the sample households in the watershed area on an average lived below the poverty line during the pre-watershed period. In the post watershed period (2006-07), the average per month expenditure of 10 watersheds is above Rs. 408.00. That means the average per month expenditure of sample households of 10 sample watersheds are below the poverty line. It may be mentioned here that the above figures are projected with reference to expert group estimation of poverty taking 2004-05 as the base year, without making any adjustment taking into account the rate of inflation during these periods. But one thing becomes clear that there has been a positive change in the standard of living of the people living in sample watershed area, as a result of which about 50% of them have crossed the poverty line by post watershed period.

Food security refers to the availability of food and one's access to it. A household is considered as food secured when its occupants do not live in hunger or fear of starvation (Wikipedia). Food insecurity is one of the important issues in the tribal belt of Orissa particularly in the KBK (Koraput-Balangir-Kalahandi) districts. This area is known for prevalence of hunger and sometimes for the sale of child due to severe poverty and hunger. The food security aspect of the sample households has been projected and analysed in the following table.

TABLE 4: FOOD SECURITY OF SAMPLE HOUSEHOLD IN PRE & POST WATERSHED PERIODS

| Sl No | Period | Pre watershed | % of total in pre w/s | post watershed | % of total in post w/s |
|-------|----------------|---------------|-----------------------|----------------|------------------------|
| 1 | Up to 3 Months | 67 | 22.33 | 17 | 5.67 |
| 2 | 3-6 Months | 146 | 48.67 | 104 | 34.67 |
| 3 | 6-9 Months | 59 | 19.67 | 96 | 32.00 |
| 4 | 9-12 Months | 28 | 9.33 | 83 | 27.66 |
| | Total | 300 | 100 | 300 | 100 |

Source: Household Survey 2011-12

Pre W/S-Pre Watershed, Post W/S- Post watershed

In the post watershed period (2006-07) about 28% of the total households were food secured for the whole year, 32% were secured for up to 9 months, 35% were food secured up to 6 months and the rest 6% were secured only up to 3 months. This shows that there is a positive impact of the implementation of the watershed programmes in a tribal dominated backward district of the state. A comparative analysis of food security in pre and post watershed period has been shown in table no 4.

One of the important findings of the study is that the gross savings of the sample households has considerably increased in the post watershed period as compared to the pre watershed period. The banking habit of the sample household has also improved in the post watershed period as people prefer to save their money with the banks rather than keeping it at home or with the post office. People now borrow money more from the institutional sources like the banks and other financial institutions. The importance of non-institutional sources of borrowing has declined during this period. It is pertinent to mention here that the institutions like the watershed committee and the self-help groups play an important role in linking their financial requirements to the banks. Another important finding of the study is that in the post watershed period the borrowed funds are mostly used for the productive purposes rather than for consumption purposes.

The data on minimum and maximum level of ground water table for the year 2002-03 and 2006-07 were collected from secondary sources. The data collected reveal that in most part of the district the water table in the minimum and maximum level has increased substantially in the year post project period (2006-07) with comparison to pre project period (2002-03). Out of the five blocks taken as sample only one block i.e Boipariguda has recorded a negative growth in the post watershed period. The other four blocks viz. Borigumma, Pottangi, Semiliguda and Iaxmipur have recorded an increase in the water table in the post watershed period as compared to the pre watershed period.

Another positive contribution of the implementation of watershed project is that in the sample watershed villages the availability of safe drinking water has improved. The data collected from the sample households reveals that in the sample watershed villages the availability of safe drinking water has increased in most of the watershed areas. In the pre watershed period the availability of safe drinking water for the entire watershed area was 270 days which has increased to 326 days in the post watershed period. In the pre project period there were only two watersheds which were getting safe drinking water throughout the year but in the post project period the same has gone up to eight.

Another important aspect to be noticed is that the area under tree cover has increased substantially in the post watershed period due to the block plantation by soil conservation, forest and horticulture departments. It was also found during group discussion with the watershed villagers that the number of water bodies in and around the watershed villages has also increased. The people of the area agreed that the soil, moisture and bio mass conservation of the sample watershed area has improved in the post watershed period than that of the pre project period.

With the initiative taken and incentives provided in the watershed area, there have been formation of a large number of user groups (UGs) and self-help groups (SHGs). Some of the SHGs are undertaking various economic activities like mushroom cultivation, dal processing, agricultural activities, pisciculture, sugarcane processing, small business etc. It is important to mention here that in the tribal dominated district of Koraput about 90% of the total SHGs are operated by the women. It is noteworthy to mention here that the SHG movement in the watershed area of the district has not only empowered the women of the area economically but also politically.

The beneficiaries of the sample blocks have admitted that on account of the implementation of the watershed programmes there has been an improvement in the field of employment generated and the value of their land has also gone up on account of an increase in irrigation facility. The community members admitted that the watershed programme has been successful in checking migration to a great extent.

The community members further opined that the water harvesting structures like nala bund, check dam, farm ponds, gully checks had helped in conserving the moisture and improving the water table of the area. Similarly, the bunds, block plantation, gully checks have contributed towards checking soil erosion to a great extent and also improved the soil health in the watershed areas.

The massive plantation Programme undertaken by the forest and soil conservation department through the convergence scheme has benefitted the sample villagers in many aspects. Among other benefits reaped by the villagers the above activity has created labour employment opportunity for the villagers, eased out their fuel problems and increased availability of fodder for the livestock population.

SUGGESTIONS

Few humble suggestions to make the watershed program perform better in a backward and tribal dominated locality like Koraput district are as follows:

- It is felt that the poor and landless farmers are not getting much of the benefits of the watershed projects. The externalities in the watershed programmes in the form of benefits received by various sections of the society should be so managed that the gap between the small and big farmers should be minimised. More attention should be given to the poor and landless to enable them to have access to resources they need.
- In order to make the participatory approach of development more meaningful the role of Non-Government Organisations (NGOs) is felt very important. The social organisation part like awareness creation in the field of education and health may be entrusted to the NGOs so that villagers can participate at different stages of project implementation.
- The watershed development fund (WDF) should be kept in the form of term (fixed) deposits from the first year onwards till the completion of the project so as to earn better rates of interest on the deposits.
- The local institutions and indigenous technologies of the tribal people of the area should be given respect while planning the development of that community.
- More emphasis should be given in the projects for development of social aspects like the education and health of the villagers particularly in the tribal areas like that of Koraput district. The economic development without the social development is meaningless to achieve the goal of overall development.
- Further, measures may be initiated for the increase in income of the beneficiaries through horticulture, livestock and pisciculture which is not yet fully exploited.
- It is felt that the banks should cooperate more with the SHG groups and farmers in providing loans in time for productive purposes.
- The marketing facility for the agricultural products in terms of process and storage facilities may be strengthened for the farmers so that they are not exploited by the unscrupulous traders.
- The project period of a watershed development project should be at least 10 years and people should feel that the project is for their own benefits. The villagers are to be convinced that the facilities extended by the watershed and capacity building programmes like improved farming, animal husbandry, bee keeping etc. are meant to make them stand on their own leg in the years to come.
- All departmental programmes implemented in the district should be mandatorily converged in the watershed area to saturate the development process.

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