



WATERSHED DEVELOPMENT: A CASE STUDY OF DROUGHT PRONE VILLAGE DAREWADI

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Abstract:

A watershed can be defined as the drainage basin or catchment area of a particular stream or river. Simply put, it refers to the area from where the water to a particular drainage system, like a river or stream, comes from. People and their environment are interdependent. Any change in the surrounding environment directly affects the people living therein. A degraded environment results in a degraded quality of life of the people. Thus efforts to reduce poverty and improve the standard of living of the people must aim at improving the environment they live in. The environment does not recognize people determined administrative boundaries. A watershed provides a natural environmental unit for planning a developmental initiative.

The present study was carried out at Darewadi village of Ahmednagar District of Maharashtra to find out the impact of watershed management in rural area. A research design used for the study was 'Before-After with Control' and data was collected through 'Personal Interview' and 'Secondary Sources'.

The present study revealed that, watershed management achieved great success particularly in the drought prone areas. Due to watershed management; today ensured water availability is the biggest asset in the village. Agriculture and allied field has been revitalized. Villagers have turned toward the commercial cropping system. Today nearly 80 percent of villagers are engaged in dairy farming, cash crops, and horticulture as a subsidiary occupation. The overall impact of Watershed management can be summarized in terms of economic development, as earlier (Before 1996) and 2010 it was noted cultivated area and per capita income increased significantly.

The findings of present study have revealed that, this approach is very much successful in achieving the set objectives and can further be replicated to other villages also.

KEYWORDS:

water shed development, natural resource management.

INTRODUCTION:

Village economy and its development are based on its natural resource and their management for production. Natural resource management therefore has to be the key pin for an effective strategy for rural development in general and watershed development. Most of the rural development models have therefore considered natural resource management as the means for rural transformation. (Singh 2004)

Watershed development refers to the conservation, regeneration and the judicious use of all the resources - natural (land, water, plants, and animals) and human - within a particular watershed

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region. Darewadi and Shelkewadi are two villages in Darewadi Panchayat of Ahmednagar district in Maharashtra. It is a drought prone area receiving only 200-250 mm annual rainfall. Most of the rainfall here is between the months of June to September. We have surveyed 25 households of these two villages combined (Out of 132 households). Before the beginning of the watershed project in 1996-97 the area had a deserted look with no greenery anywhere. Under the watershed development project the water harvesting structures such as Water Absorption Trenches (WATs), Continuous Contour Trenches (CCTs), Check Dams, Gully Plugs, Earthen Plugs etc. have been created. Both the WATs and the CCTs restrict the run off of water and water also accumulates in these trenches thus raising the water level of the soil.

People in Darewadi have started using sprinkler irrigation instead of flood irrigation. In sprinkler irrigation they can supply water to 5 hectares of land whereas under flood irrigation the same amount of water can be used to irrigate only one hectare land. The main crops in Darewadi are Bajra, Tomato, Onion, Wheat, and Gram. While tomato and onion are sold the rest are mostly kept by the villagers for self consumption. Villagers do not undertake cultivation of crops like sugarcane which require huge amount of water.

STUDY AREA:

The study area is located in Sangamner taluka of Ahmednagar district; Latitudinal extent of this village is 19°21' to 19°23' north and longitudinal extent is 74°03' to 74°07' east. This village is situated at a distance of 30 km. from Sangamner towards its south west side and is around 12 km off the Pune Nasik National highway. It covers 1535.24 Ha. watershed area. As per the agro climatic zone classification of Maharashtra state, the village lies in the scarcity zone which is characterized by very low rainfall with uncertainty and ill distribution. Drought occurs every three years. (www.mahaagri.gov.in). Rainfall in this region is varies from 200-250 mm. There are 132 households in the village. As per land holding criterion, small and medium farmers together form the majority (80%) of the farmers. Large farmers constitute 9% of the households.



OBJECTIVES:

To overcome above drawbacks the present project focuses on the following two major objectives.

1. To study impact of implementation of watershed development in study area.
2. To provide long term sustainability to the watershed project by improving the income level of the

beneficiaries.

RESEARCH METHODOLOGY:

A research design used for the study was 'Before-After with Control' to reveal the impact of implementation of watershed development Program in selected village.

DATA COLLECTION:

A semi structured interview schedule and direct observation was utilized for data collection. The data was collected on 'Before- After' basis which includes personal variables (age, education, family size, occupation, land holding size), Natural resource management and watershed development variables (continuous contour trench, loose boulder, earthen structure, percolation tank, water storage structures, cement bunds), Livestock development variables (herd size, herd management, milk productivity, milk production), Economic traits (annual income from livestock sector, total income). In addition secondary data was also collected from Grampanchayat office WOTR and NGO involved in the implementation of Watershed to crosscheck the respondent's response

DATA ANALYSIS:

Descriptive statistical tools like frequencies, percentages and percent change were utilized for analyzing the data.

'BEFORE-AFTER' CONCEPT

In the present paper the 'Before-After' concept has been used which is explained as follows; The year '1996 has been taken as reference point to explain situation of "Darewadi" water shed was implemented on 1996 in that village, while the year 2010 watershed development program (NGO) has taken as to show the impact of as the study was undertaken in this particular year. i.e. about 15 years of implementation period. This period was considered to explain comparative situation in this village.

Before the 1996 the condition of villagers was very poor The Darewadi watershed covers 1,535 hectares. Two-thirds is privately owned (1063.43Ha); the rest is made up of common lands owned by the Maharashtra state government's Forest Department (306.53 Ha.). WOTR's first task was to overcome the mistrust of many villagers, especially sheep and goat farmers, including many poorer families, who feared that grazing bans on regenerating land would cut down the available fodder, harming their already fragile livelihoods. Through a series of village meetings, the NGO explained how the temporary bans would allow trees to grow, after watershed development yielding more fodder and more water for crops.

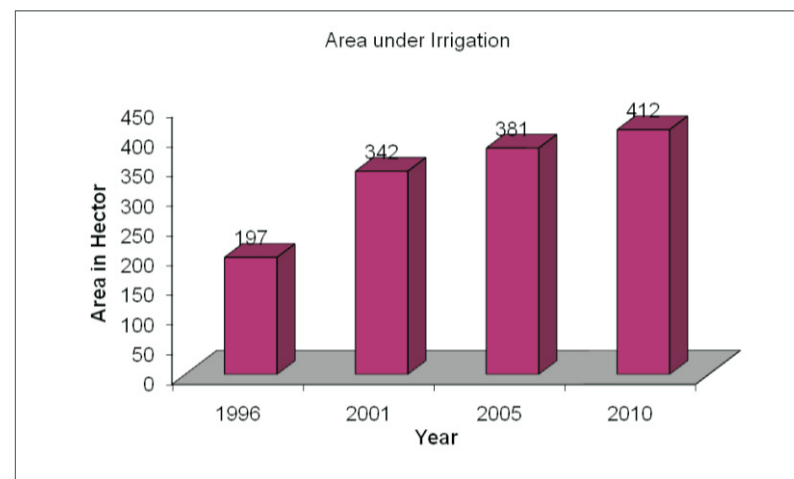
After 1996, Watershed development (WSD) was carried out by Watershed Organization Trust (WOTR) in Darewadi during the period 1996-2001. Prior to WSD, the village was depleted much of its natural resources. Even drinking water was not assured. Farmers cultivated only during the kharif season; they migrated for work at sugarcane factories or brick kilns during the rest of the year. After watershed development the picture has completely changed. There is sufficient water for drinking as well as for agriculture and distress migration has reduced substantially. WOTR introduced watershed development in the village. By starting watershed development project the water harvesting structures such as Water Absorption Trenches (WATs), Continuous Contour Trenches (CCTs), Check Dams, Gully Plugs, Earthen Plugs etc have been created. Both the WATs and the CCTs restrict the run off of water and water also accumulates in these trenches thus raising the water level of the soil. The earthen plugs and the stone plugs allow the surplus run off (which has already been slowed down) to accumulate and get stored along the entire drainage line.

On the CCTs which are suitably weathered and refilled, trees, shrubs and grasses are planted. Mainly Neem trees and a local shrub known as Seesal have been planted which reduce the soil erosion and also add organic matter to the soil. The groundwater has got recharged to such an extent that villagers have sufficient amount of drinking water. The credit behind this good performance of watershed project goes to WOTR. As a result of the watershed project in this area we find that work is available within the village and it has reduced the need for migration from the village in the post watershed era. There is also an increase in agricultural productivity. These changes are shown in table 1. by impact indicators very clearly.

Table No.1 Darewadi watershed impact indicators

Impact Indicators	Before Watershed 1996	After Watershed 2001	January 2005	January 2010
Months delivery of Drinking water by tanker	February to June	Tanker Free	Tanker Free	Tanker Free
Depth of ground water level	6.5m	3.5m	3.1m	2.9m
No. of Active wells	23	63	67	71
Water Pumps	6	52	65	81
Land Under irrigation	197Ha.	342 Ha.	381 Ha	412 Ha.

(Source: Watershed Organization Trust 2010)



After watershed development with reference to above indicators i.e. drinking water, ground water level, number of active well, motor pumps, and area under irrigation are significantly increased in study area. As well as there is check of runoff water and soil erosion depict. All above indicators are favorable for sustainable development of rural areas and due to that increase in per capita income and standard of living of the villagers. Surrounding villagers are also got awareness and importance of watershed management in rural area. Table No 2 shows that benefits of watershed restoration in Darewadi Village.

Table No.2 Darewadi watershed restoration benefits

Sr. No	Benefit	Before Watershed 1996	After Watershed 2001	January 2005	January 2010	Volume change in 15 years (1996-2010)
1	Cropped area					
A	Kharif	490Ha	616Ha.	620Ha.	623Ha.	133Ha.
B	Rabbi (Winter)	310Ha.	417Ha.	425Ha.	437Ha.	127Ha.
C	Rabbi (Summer)	0Ha.	38Ha.	40Ha.	43Ha.	43Ha
2.	Waste land	167 Ha.	17 Ha.	15 Ha.	9 Ha.	-158Ha.
3.	Livestock					
A	Cross Bred Cow	14	113	97	102	88
B	Indigenous Cow	170	101	85	72	-98
C	Sheep	1017	434	610	720	-297
D	Goats	306	132	215	310	4
4	Summer Milk production	Insignificant	788 lit/day	550lit/day	710lit/day	N.A.
5	Value of cropped land	15000 Rs/Acre	65000 Rs/Acre	65000 Rs/Acre	95000 Rs/Acre	80000 Rs/Acre
6	Value of waste land	4000 Rs/Acre	18000 Rs/Acre	20000 Rs/Acre	35000 Rs/Acre	31000 Rs/Acre

Source: WOTR 2010.

As result of watershed there is significant increase in area under cropped , especially due to increase in ground water level, area under Rabbi (summer) increased from 0 Ha.(1996) to 43 Ha. (2010). It provides employment to labor and Farmers. Simultaneously west land reduce from 167 Ha. to 9 Ha. This is really big achievement of this work.

In livestock indigenous cows and goat, sheep's reduce at large scale. But cross bred cows increased significantly to increase milk production. Due to this Economic condition of farmers become better.

Value of cropland increased from 15000 to 95000/acre, due to increase in production and income from the agriculture. And the impact of increases the value of cropland, increases the cost of surrounding wastelands i.e. from 4000 to 35000/acre.

Villagers engaged in agricultural activities throughout the year, they also taken cash crops in the agriculture land so the temporary migration becomes negligible after the watershed management.

CONCLUSIONS AND IMPLICATIONS:

Research demonstrates the importance of having threshold level of income generating capacity of watershed project to provide long term sustainability to the watershed itself. Here we have considered a case study to take care of the temporal impact of watershed development over the period of time of around 15 years in the context of sustainability of the watershed area and sustainable development of the beneficiaries.

We find that long term sustainability of the watershed program can be achieved so as to improve the income level of the beneficiaries if we assume that the project can be sustained for a finite time horizon (say fifteen years). It is possible to achieve this target if the watershed can generate a profit. This further emphasizes the importance of comprehensive approach of watershed development in Darewadi for its long term sustainability and significant impacts on the society.

Policies should be adopted by the government to provide low cost irrigation and agricultural water supply to the farmers in the rainfed areas. It is also essential to improve the quantity of water availability in these regions by adopting various mechanism like rainwater harvesting, reduced ground water pumping,

checking top soil erosion etc. This is essential for improving productivity of land in the drought prone rainfed areas and thereafter, for improving the income generation from agricultural activities.

Second, Government should ensure effective implementation of the National Rural Employment Guarantee Scheme (NREGS) especially in terms of giving threshold level of wage to the laborers.

Third, while developing the watershed projects, Government should ensure its minimum crop land area coverage within the project area which will produce the crops and other agricultural outputs. As a matter of fact, pricing of these agricultural produces is also very important in terms of achieving the minimum income generation level. Therefore, watershed linked minimum support prices for the agricultural produces are important for the long term sustainability of the region.

Finally, the government should create awareness among the villagers about the importance and necessity of sustaining the watershed projects after its completion

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