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A Study of Impact of Resource Conservation Techniques on Farmers

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Abstract

The rural livelihood mainly depends upon agriculture, forestry and livestock. Thus, the sustainability of natural resources is essential for the sustainability of rural livelihoods. This will reduce poverty, control distress migration and finally result into betterment of quality of life. This study deals with the assessment of the resource conservation techniques adopted at government and non-government levels in the villages of Surendranagar district of Gujarat. The techniques are related with conservation of water for irrigation through construction of farm ponds, tanks, check dams, anicuts, etc., conservation of soil by constructing stone wring or farm bunds, conservation of drinking water from roof rain water harvesting tanks and capacity building of beneficiaries. The study is based upon primary survey done in the villages of Limbdi and Lakhtartaluka of Surendranagar district. The survey was conducted just after the rainy season in order to check the efficacy of the schemes.

Keywords: Agriculture, Water, Farmer, development, Resources, Techniques.

Introduction

With the process of economic growth, the development practitioners, policy makers, academician and researchers all over the world are becoming concerned for the management of natural resources. These natural resources play a crucial role in the generation of sustainable livelihood especially for those who are directly dependent on agriculture. The agricultural productivity depends upon the quality of land and water resources available in the region. A scarcity or depletion of these resources result into drought, lack of soil moisture, soil erosion, low farm productivity, high cost per hectare of agricultural land, poverty, dependency on money lenders and finally distress migration.

The Migration Tables, Census of India 2001, shows that out of total rural-out migration, about 32 percent are cultivators and 30 percent are agricultural labourers. They work as casual or marginal labourers in farm and non-farm activities outside their village. This results into various types of social problems like high drop out rate of children, isolation, insecurity, extra marital affairs, weakening of social bonds, HIV/AIDS, etc.

Besides, a good health, which is considered to be an important indicator of human development index, directly depends upon the availability of potable drinking water. But due to depletion of water resources and lack of water supply in rural area, the access to safe drinking water is becoming a distant dream. It results into women drudgery due to loss of time and energy in collecting water associated with ill health, epidemic outbreaks and increase in medical expenses. A human being can become economically productive only if he or she maintains good health.

Quality of life depends upon various social, economic, geographical, cultural and political factors. In India, there is lot of diversity in the existence of these factors. As a result, some regions are highly developed, some are moderately developed and the remaining are very poorly developed. Much of the population is residing in rural areas of the country with an average population density of 284 persons per sq. km. Therefore, it is necessary to have a local development planning which should focus on different issues in an integrated manner taking into consideration the locally availablefactors. The rural population is basically characterized by agriculturally dependent, lack of awareness, lack of skill and lack of resources. Along with the conservation of natural resources, the study also addresses the issues of quality of life.

Objective of the Study

The present paper is an outcome of the experiences achieved from various researches and evaluation studies conducted during the last

five years in Gujarat. Majority of them deal with the Integrated Rural Development schemes. Besides the field based observations on the project 'Natural Resource Depletion and Rural-Urban Migration' and the 'Evaluation of Resource Conservation Techniques adopted in Surendranagar District, Gujarat' were also taken into consideration. All the pre-, mid-, and post- funding situations are examined carefully in order to find the impact of resource conservation and income generation policies at various stages.

The paper deals with the assessment of the measures adopted by government and non-government organizations for sustainability of natural resources and rural livelihoods. These measures are as follows:

1. Conservation of water for irrigation through construction of farm ponds, tanks,check dams, anicuts, etc.
2. Conservation of soil by constructing stone wring or farm bunds.
3. Conservation of drinking water from roof rain water harvesting tanks.
4. Capacity building of the beneficiaries

Study Area

Surendranagar is located between 22°7' and 23°31' north latitude and 70°57' to 72°11' east longitude. It has an area of 10489 sq. km and population of 1,515,147 (Census of India, 2001). The density of population is 145 persons per sq. km.

The district is considered to be most vulnerable in terms of resource diversity. The land is saline, which makes it unfit for agriculture thus reducing income earned from own crop produce. There is a high degree of disaster proneness (continuous drought). This decreases the ground water level and makes the land fragile and unfit for supporting vegetation. This lowers the employment generation capacity of agriculture forcing people to engage in arduous and hazardous activities.

Agriculture is the primary occupation and is primarily rain-fed. Due to unproductive land and scarcity of irrigation water, the cropping pattern among the vulnerable groups is restricted to Kharif crops only. As the crop produced is insufficient, therefore, in order to sustain a living, the villagers across a majority of districts migrate for labour activities. In normal and crisis years, the women's participation in livelihood generation is equal to nearly half of that of men. This has an adverse effect on the socio-economic life of the people. The health status decreases. The social harmony gets disturbed. There is lack of security and a high drop out rate of children.

Methodology

The study is conducted in five villages namely Nanikatechi, Fulwadi, Bhagwanpar of Limbdi block and Vadekhan and Malika of Lakhtar block. It is an evaluation of resource conservation measures implemented in the study area for poverty reduction and social equity. An integrated approach was adopted under which the beneficiaries were to be provided with 150 farm ponds, 150 farm bunds, and 150 roof rain water harvesting tanks alongwith strengthening of the female self-help groups (SHG) and farmers in terms of water conservation techniques, agricultural practices and various social issues. The main criteria was to involve female SHG members to decide the allocation of assets. This has an advantage that it builds up the confidence level and empowers the women in decision making. The regular meetings act as a catalyst.

In order to find the impact of the schemes, the information was collected from those who have got the assets. The data collection involved the interviews of the beneficiaries and the physical verification of the assets. About 15 farmer beneficiaries and 10 beneficiaries of roof rain water harvesting tanks were interviewed with the help of questionnaire. Both close and open end questions were framed in order to obtain the beneficiaries views. Purposive random sampling method was adopted. This included those beneficiaries who have got the asset before the rainy season so that the impact of the policy could be determined. It can also be assumed that due to heavy rains, some destruction could also have occurred. In order to know the impact of training programmes, 20 men and 20 women per village were considered for focussed group discussion.Besides efforts are also made to capture the views of the beneficiaries regarding the performance of schemes, the use of the assets created and their sustainability and also their impact on quality of life.The study was conducted after the rainy season so that the impact of water conservation assets that were created before the rainy season could be visible.

Socio-economic Characteristics of the Study Area

The socio-economic characteristic of the study area (as shown in table - 1) is very poor. Due to isolation, the basic amenities and infrastructural facilities like bank, potable water supply, police station and government offices are lacking in these villages. Due to high poverty, the dependency on money lender is very high. As a result, they are exploited to the maximum possible extent as they have to cultivate and pay interest as per the wish of the money lender. The nearest city Surendranagar is ata distance of 75 km. As a result, the movement of production is curtailed and thus market development becomes difficult.

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Table -1 : Socio-Economic Characteristics of the Study Area

Items	Limbdi	Lakhtar
Population	7019	2193
Area (in hectare)	2404.98	2884.80
Sex ratio	944.76	960.46
Density	261.00	363.53
Average family size	5 to 8	5 to 7
% of SC and ST to total population	70.23	40.16
Population below poverty line (%)	55.1	56.5
Literacy rate (Total)	35.78	36.10
Literacy rate (Female)	23.14	22.28
Work participation rate (Total)	43.42	54.39
Work participation rate (female)	34.15	52.13
Work force in agriculture (cultivators + ag. labourers) (in %)	Main = 26.01 Marginal = 36	Main = 46.24 Marginal = 47.89
Female Work force in agriculture (cultivators + ag. labourers) (in %)	Main = 31.95 Marginal =51.72	Main = 47.52 Marginal = 60.60
Average Rainfall Limbdi (in mm)#	699	551

It was only during September 2008 that the rainfall has increased by 122 % in Limbdi and 204% in Lakhtar. As per the official records, this has happened after 20 years.

Source : Primary Census Abstract, Census of India, 2001 and State Emergency Operation Centre (State Control Room), Director of Relief, Revenue Dept., Gandhinagar.

Agricultural Characterisitics

From the agricultural indicators (table -2), it is very clear that the sources of irrigation are very poor in the study area. About 84 percent and 100 percent of landin Limbdi and Lakhtar respectively is totally unirrigated. According to Agricultural Census, 2000-01, as a whole, wells are supporting only 4.98 percent part of irrigated area in Limbdi while it is only 0.11 percent in Lakhtar. The wells are operated through electric or diesel pump sets. The irrigation by tanks is negligible in both the districts. In Limbdi, the percent of area irrigated by canals is 0.04 percent while it is zero in Lakhtar. The area irrigated by tube wells is also zero in Lakhtar. The cost of extending the pipe to the nearby pond or river is Rs. 50/- to 150/- per hour depending upon the availability of water and its demand. This shows that practicing agriculture is a very costly affair. Due to high level of poverty and lack of skill, there is no other opportunity for the villagers except migration.

Table - 2 : Agricultural Indicators in Limbdi and Lakhtar

S.No.	Agricultural Characteristics	Limbdi	Lakhtar
1.	Total holdings	23302 (82528 hec)	14611 (57953 hec)
2.	Net sown area	80182 hec	57923 hec
3.	Area under current fallows	2301	30 hec
4.	Net cultivated area	82483	57953 hec
5.	Small holdings (1-2 hec)	26% of total holdings	21.63% of total holdings
6.	Semi-medium holdings (2-4 ha)	33% of total holdings	34.17% of total holdings
7.	Medium holdings (4-10 ha)	26% of total holdings	32.82% of total holdings
8.	Wholly irrigated area	2.44 %	0.11%
9.	Wholly unirrigated area	83.55%	99.83%
10.	Partially irrigated area	25%	0.00%
11.	Net irrigated area	5.23%	0.11%

Source: http://agcensus.nic.in

Findings

Since the population of the selected villages is very poor and unskilled, a mixed bag of findings was obtained. Lot of limitations were there in the achievement of targets. The beneficiaries especially the male beneficiaries were least interested in attending the training programme as they want to devote their time in income earning activities. Due to high tendency of migration, the construction of farm has also faced problem. Despite, the heavy rainfall in the month of September, 2008 destroyed about65 percent of the farm assets out of which 20 percent are fully destroyed. The doubts of the villagers for roof water harvesting tank was also a constraint. These doubts were - the houses with kutcha roof will get red coloured water, little space in the house and fear of falling of children or cattle in the tank if it remains open.

Despite so many ifs and buts, the study has shown certain positive results. These results are obtained from those who have acquired the assets and whose assets are safe.

Farm Assets

1. The probability of obtaining second crop has increased.
2. Thirty percent of the beneficiaries (whose farm assets are safe) haveshown positive results in terms of increased productivity of cumin.
3. The decrease in loss of top layer soil and availability of irrigation waterhas given them good quality crop due to which they have observed 50 to60 percent increase in income.
4. Since this was the first year of monsoon, the increase in employment couldnot be observed. But it is expected, that in the near future, the marginaland landless farmers will be able to get employment within the village.This will stop distress migration.
5. Dependency on money lenders has decreased by 28 percent. This ismeasured according to the number of beneficiaries who will not take loanfor the next season.
6. About 20 percent of the beneficiaries have adopted multi crop pattern.
7. As per the beneficiaries, if the climatic conditions could have been normal,their agricultural produce could have been increased by about 80 percent.If sufficient water is available, they will cultivate the wheat crop.
8. About 80 percent of the beneficiaries, whose ponds are damaged, are readyto repair it.

Roof Rain Water Harvesting Tank

1. Easy access to safe drinking water.
2. The exertion of fetching water from 3 to 4 km distance is decreased.Hundered percent of the females who have got the roof rain waterharvesting tank have stopped collecting water. As per their opinion, thewater is sweet in taste, takes less time for cooking and less fuelconsumption. Time and energy is saved. About 30 percent of the beneficiaries use their saved time in household work and 40 percent in income earning activities.
3. There is decrease in water-borne diseases like indigestion, diarrhoea, stomachache, etc. The beneficiaries have observed about 20 percent (=Rs. 300/- to Rs. 500/- per household) decrease in health expenditure during the first year of project implementation.

Capacity Building

1. The impact of capacity building is found to be very slow due to patriarchalsociety. Still it can be said that the decision making role in the allocationof assets have built confidence among females.
2. Some awareness among the farmers is found for organic farming, dryfarming, multicrop cultivation, etc.
3. The training programmes for both males and females as per their socio-economic responsibilities show that the approach is gender sensitive

Reasons for Limited Benefits of Resource Conservation Measures

All these schemes if considered in isolation were found to have partially fulfilled the objectives for which they were implemented. These schemes were found to have some drawbacks :

1. All these efforts were not made in an integrated manner. Either the waterconservation structures were created or the soil conservation structures werecreated.
2. The villagers were not found to be fully aware of the utility of roof waterharvesting structures. Rather they have taken them for granted.
3. Caste wise differences were observed in the care and maintenance of the roofrain water harvesting tanks.
4. Serious problem was found in the capacity building of the beneficiaries. Therural population is generally unaware. Due to poverty, they do not prefer todevote time for the training programmes. Besides there is high level of distressmigration. Generally the migration is for the period of eight months. As aresult, the person who attends the training programmes is different from theperson who is responsible for the created assets. It seems that only one or twotraining programme is not sufficient. It is essential that the need should arisefrom the side of villagers, otherwise the program will not be successful.

Conclusion

The study concludes that conservation of natural resources is essential for sustainable rural livelihoods. The construction of farm pond and farm bund for soil and water conservation supports the farm income and the roof rain water harvesting tank for safe drinking water improves the health status which further increases the efficiency of the person to work efficiently. Though in the present study, lots of constraints have been imposed by ignorance of the people and the natural calamity, still some positive signs were observed.

1. For the beneficiaries who have acquired the assets have reported for increasein productivity, good quality crop, adoption of multicrop farming, decrease independency on money lender, decrease in cost of irrigation, decrease in healthexpenditure and water borne diseases. This implies that if the process iscontinued, the approach will give long term benefits.
2. The water harvesting structures are based upon rural technology and they areenvironment friendly. Apart from raising the health status, the less fuelconsumption ensures forest protection.
3. The aims of resource conservation and employment generation are compatiblewith the nation's development policy and Millennium Development Goals(MDG).
4. Besides, the technique gives the ownership right to the asset holder to take hisown ecision for income generation. There are no conflicts in the use ofwater.
5. The technique is flexible, affordable and cost-efficient which ensures thesustainability of

assets. The demonstration and diffusion effects itself is astimulating agent.

The long term positive effects are decrease in poverty, decrease in children drop out rate, increase in quality of life, increase in health status, control on distress migration and environment sustainability. This study could be considered as a model for replication in other villages which are having high level of poverty, depleted natural resources, disaster proneness and seasonal migration.

Suggestions

For the effective results from resource conservation techniques in terms of sustainablelivelihoods, the following suggestions are put forth:

1. Since the rural population is poor and unskilled and live in vulnerableconditions, there is a need of all round development. Instead of adoptingone or two approaches, an integrated approach should be adopted in orderto improve the quality of life.
2. Due to the high level of ignorance and isolation of the population, regularsupervision and follow-up is essential. The training programmes should being such a manner that the villagers should themselves realize the need ofwater conservation assets. In other words, so much awareness should becreated that the demand should come from their side. Then only theywould be able to take care of the assets. The programmes should also takeinto consideration the availability of beneficiaries.
3. In order to prevent the farm ponds from disaster, some plantation shouldbe done at the boundary. This would develop a strong bonding between thesoil elements.
4. The farm ponds and farm bunds should be constructed taking intoconsideration the topography of the farm. This will reduce the impact ofnatural calamity.
5. The roof rain water harvesting tanks should be provided with a handpump.This would remove the fear of falling of children or animal. This wouldalso conserve water for longer duration as the sunlight will not enter.
6. The exposure trip is essential to clear the doubts of the villagers.
7. The villagers should be guided for care and maintenance of the assets.

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