

## **Participatory Watershed Development: A Case Study of Antisar Watershed in Gujarat State**

G. L. Bagdi<sup>1</sup> and R. S. Kurothe<sup>2</sup>

### **ABSTRACT**

The study was conducted during 1997-2003 in the Integrated Wasteland Development Project (IWDP), Antisar watershed, located in Kapadwanj Taluka of Kheda district in Gujarat state in India. The Antisar watershed was developed in participatory mode by involving local people in decision making and adoption of various soil and water conservation (SWC) interventions for sustainable development. In the participatory watershed development process, a set of suitable technologies were tested by farmers on their farm as well as community land in the watershed area with their part contribution as money or labour and under guidance of multidisciplinary team of scientists of Project Implementing Agency (PIA). Bottom-up approach was adopted in the Antisar watershed development by involving the local farmers to take decisions in planning, implementation and maintenance of SWC practices adopted for the watershed development. The participation of male and female beneficiary farmers was high in the watershed development programme. The Antisar watershed development programme was fruitful up to the satisfaction of farmers as well as scientists of PIA to mitigate the water scarcity condition in the area due to ground water recharge for sustainable agricultural production.

**Key words:** Bottom-up approach, participatory technology development, watershed development

### **INTRODUCTION**

Before and after independence, India launched several rural development programmes. These rural development programmes were fully sponsored by government to improve agricultural production in rural areas and contribution of beneficiary farmers was negligible. Several committees were constituted by government of India to evaluate the performance of rural development programmes and after their critical evaluation and suggestions, it was realized that the involvement of beneficiary farmers is must in planning, execution and evaluation of rural development programmes.

A study team was appointed under the Chairmanship of Shri Balvantrai Mehta in 1957 to examine and assess the functioning of the community development programme. The study team remarked that in order to be self-sustaining and self-generating, development has to go hand-in-hand with participation. It therefore recommended a devolution of power and a decentralization of machinery controlled and directed by popular representatives of the local area. Based on these recommendations, people's participation was institutionalized with the launch of Panchayati Raj System in India on 2<sup>nd</sup> October, 1959 (*Santhanam*, 1982).

Swaminathan (1998) said rainfed agriculture to be productive, should be based on watershed as the unit of development. Watershed is not technology but a concept, which integrates conservation, management and budgeting of rainwater through simple but discrete hydrological units. Simultaneously, a watershed supports a holistic framework, which means a combined application of technologies on soil and water conservation with improved crop varieties, farming systems and agronomic management, taking into account both arable and non-farm land.

Deutsch (1969) considered participation as a technique for setting goals, choosing priorities and deciding on the kind of resources to commit to achieve goal attainment.

Muthayya (1973) points out that the idea of participation emphasizes a process of social action in which the people of the community organize themselves for identifying their common needs and problems, plan a course of action with maximum reliance upon community resources and supplement the resources when necessary, with service and material from governmental and non-governmental agencies outside the community.

According to Yadav (1980) people's participation means "involvement of the people in the development

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<sup>1</sup>Principal Scientist, (Agricultural Extension), and <sup>2</sup>Principal Scientist & Head, Central Soil & Water Conservation Research & Training Institute, Research Centre, Vasad-388306, District- Anand, Gujarat, India,

process voluntarily and willingly. Such participation cannot be coerced". He states that people's involvement has to be understood in terms of participation in decision making, implementation of development programmes, monitoring and evaluation of such programmes and in sharing the benefits of development.

According to Banki (1981) People's participation is a dynamic group process in which all members of a group contribute to the attainment of group objectives, share the benefits from group activities, exchange information and experience of common interest, and follow the rules, regulations and other decisions made by the group.

The specific objectives of the watershed programme include promotion of soil and water conservation, optimal use of land and water resources (Singh, 1993).

### METHODOLOGY

National Watershed Development Projects for rainfed areas were launched by the Government of India under different Five Year Plans. An Integrated Wasteland Development Project (IWDP) was sanctioned by Ministry of Rural Areas and Employment, Department of Wasteland Development, New Delhi, Government of India, to Central Soil and Water Conservation Research and Training Institute, Research Centre (CS&WCR&TI, RC), Vasad, in March 1997. The scientific staff of this research centre, Vasad, decided to develop the Antisar watershed through the sanctioned Integrated Wasteland Development Project because the Antisar watershed was not adopted earlier by any other government agency to carry out soil and water conservation works for sustainable agricultural production.

The Antisar watershed is spread over 812 hectares of land. Out of that 736 hectares belong to individual farmers and 76 hectares is owned by Panchayat community/ Government. Antisar watershed is located on Dakor-Pankhiya road about 100 km north of Vasad, comes under Kapadvanj taluka of Kheda district in Gujarat state of India. The population of the study consisted of all the farmers and farm-women who possessed land in the Antisar watershed area as well as member of Antisar Watershed Development Society were considered as the respondents for the study. Therefore, all the 392 farmers comprised of 284 male farmers and 108 female farmers of Antisar watershed area were considered as the sample for the study. Hence, it was a population study.

The socio-economic traits were measured with the help of available scale of Parekh and Trivedi (1963) with modifications. A scale was developed by the investigator

to measure attitude towards soil and water conservation programme and the responses from respondents were asked on a three-point continuum as agree, neutral & disagree and consequently weight ages or scores were assigned as 3, 2 and 1, respectively for positive attitude statements and reverse scoring was done for negative statements. A detailed structured three-point continuum schedule was also developed to assess the extent of people's participation in planning, implementation and maintenance of soil and water conservation programme and responses of the respondents were recorded in the especially developed three point continuum schedule viz., great extent, some extent and least extent and scores were assigned as 3, 2 and 1 respectively. Total scores obtained by respondents towards participation during different stages in watershed development programme were calculated and respondents were grouped into different categories on the basis total scores obtained by them. The following formula was used for making different categories of respondents such as low, moderate and high on the basis of class interval.

$$\text{Class Interval} = \frac{\text{Maximum score} - \text{Minimum score}}{\text{Number of classes}}$$

### RESULTS AND DISCUSSION

#### Participatory Rural Appraisal (PRA) of watershed

A good planning for watershed development depends on the collection of adequate and useful information about watershed. CS&WCR&TI, Vasad adopted Antisar watershed for development with the grant of ₹ 31.27/- lacs sponsored by Department of Waste Land Development, Ministry of Rural Area and Employment, Govt. of India, New Delhi under Integrated Wastelands Development Programme (IWDP). The Antisar watershed is spread over an area of 812 ha and covers 7 villages. About 400 families dependent on agriculture and animal husbandry have participated in development of their watershed. Participatory Rural Appraisal (PRA) and survey exercises were conducted initially during 1997-98 to understand the local environment with local priorities, farmers' indigenous technological know-how and ensuring people's participation in planning, implementation and maintenance of the project. All the basic information pertaining to the watershed environment and data regarding farmers' age, sex, size of land holdings, education, livestock possession, farm implements, farm machinery, annual income etc. were also collected through PRA. The attitude of farmers of Antisar watershed was also measured favourable towards people's participation in SWC programme for watershed development.

### Meetings with farmers of watershed

Discussion meetings of scientists and watershed farmers were organized regularly at fixed interval in the watershed area to develop trust and relationship and also future planning for watershed development activities. More importance was given to the target group farmers, those fields were degraded and more affected by soil erosion in the watershed.

A watershed executive committee was constituted of thirteen members through election comprising of 12 members from the Antisar Watershed Development Society and 1 representative of the Project Implementing Agency (PIA) for looking after, planning, execution and implementation of all type of works carried out in the watershed. A chairman was also elected out of the executive committee members. Antisar Watershed Development Society was formed and registered with Assistant Charity Commissioner, Nadiad on 15.10.1998 (registration No. GUJ/1483/Khedda). The membership fee was kept ₹ 25/- for registration of farmers as primary members of Antisar watershed society. Antisar Watershed Development Society had enrolled 137 members of local farmers.

The active participation of the Antisar watershed executive committee members was observed in the regular meetings held to discuss and plan the SWC activities and their proper execution in the watershed. Total 37 meetings of the Antisar watershed executive committee members were held from 1998 to 2003.

### People's Participation in Planning of watershed

People's participation at the time of preparing a watershed development programme was very much needed to take decisions so that the watershed development programme should be according to the basic needs of local people. The programme should meet the basic needs of the majority of the local people like supply of drinking water, fodder for cattle and fuel for kitchen.

The data presented in Table 1 revealed that little less than two third per cent (65.2%) of male respondents had moderate participation and followed by 28.50 per cent exhibited high participation and only 6.30 per cent low participation. Whereas a majority of three fourth percent (75%) of female respondents had high level of participation, followed by only 13.8 per cent and 11.1 per cent female respondents exhibited moderate and low level of participation, respectively in planning activities for watershed development.

However, Table 1 further indicates that the overall respondents showed 51 per cent moderate level of

participation, 41.3 per cent high level of participation and only 7.6 per cent low level of participation in planning activities.

It revealed that a majority of male and female respondents exhibited moderate to high level of participation in planning of soil and water conservation programme for sustainable agricultural production. Similar findings regarding people's participation in rural development programme were also reported by Sen (1986) and Suresh (1990).

### Identification and prioritization of problem

The farmers and scientists came across the several problems prevailing in the watershed due to discussion meetings. According to the watershed condition and topography some problems were perceived more severe and some less severe. Scientists prioritized the problems with the farmers and most severe problems of the farmers in the watershed area were taken first for watershed development through the participatory technology development programme to eliminate the problem from the selected watershed.

The problems identified by the farmers and scientists were i) Scarcity of drinking water, ii) Scarcity of irrigation water, iii) Soil degradation, iv) Lack of village road, v) Unemployment, vi) Inadequate hospital facility, vii) Lack of transport facility viii) Lack of electricity.

The prioritization of the problems was done by scientists with the farmers and most severe problems of the farmers in the Antisar watershed were (i) Scarcity of water and (ii) Soil degradation.

**Table 1: Distribution of the respondents according to level of participation in planning of SWC programme.**  
n=392

Participation levels	Respondent (%)		Overall (%) (n=392)
	Male (n=284)	Female (n=108)	
Low participation	6.3	11.1	7.6
Moderate participation	65.2	13.8	51.0
High participation	28.5	75.0	41.3

Male respondents' maximum score was 30 and minimum score was 10.  
Female respondents' maximum score was 26 and minimum score was 10.

### People's Participation in Implementation of watershed

In the Antisar watershed development programme, the scientists of the PIA were conducted regular monitoring visits during implementation of SWC technologies in the watershed. The farmers were advised on site to implement the technology in their fields scientifically, accurate and suitable to the field topographic conditions by the subject matter specialists.

People's participation in implementation stage of soil and water conservation programme of Antisar watershed was grouped into three levels according to total score obtained by respondents *i.e.* less participation, moderate participation and more participation as presented in Table 2.

The data in Table 2 indicated that little more than two third per cent of the male respondents (67.9%) had high level of participation in implementation of the SWC programme. Then followed about one-fourth of them (24.6%) had moderate level of participation and about several per cent of them (7.4%) had low participation in implementation of the soil and water conservation programme. Whereas, majority of female respondents three-fourth per cent had exhibited high level of participation in the implementation. They were followed by 16.7 per cent of them had low participation level and few of them (8.3%) had moderate participation level in implementation of the SWC programme. Similar findings regarding people's participation in rural development programme were also reported by Kulkarni (1991).

However, Table 2 further revealed that more than two-third per cent of the overall respondents (69.8%) showed high level of participation, nearly one-fifth per cent of them (20.2%) having moderate participation level and only about one-tenth per cent of them (9.9%) had low participation level in implementation of the soil and water conservation practices in the Antisar watershed development programme. The SWC technologies were implemented systematically by scientists to conserve soil and moisture in the Antisar watershed. The farmers were advised on site to implement the technology in their fields scientifically, accurate and about suitability to the field topography. Various training programmes were organized annually for executive committee members and farmers of Antisar watershed to impart latest knowledge of soil and water conservation technologies for execution of development works. The various suitable soil & water conservation technologies implemented and tested on farmers' fields and community land in participatory mode in the Antisar watershed were as listed below in Table 3 Kumar *et. al.*, 2004).

**Table 2: Distribution of the respondents according to their level of participation in implementation stage of SWC programme.**

Participation levels	Respondent (%)		Overall (%) n=392
	Male (n=284)	Female (n=108)	
Low participation	7.40	16.70	9.90
Moderate participation	24.60	8.30	20.20
High participation	67.90	75.00	69.80

Male respondents maximum score was 25 and minimum score was 10.  
Female respondents maximum score was 25 and minimum score was 12.

**Table 3: Soil and water conservation technologies implemented in the Antisar watershed development programme.**

Technologies Tested & implemented	Number/ Quantity
Land leveling (ha)	142
Farm ponds (numbers)	4
Major earthen dam (numbers)	1
Check dams (numbers)	16
Well recharge (numbers)	23
Afforestation and pasture development (ha)	37
Crop demonstrations (ha)	136

### Participation in maintenance of watershed

It is seen from the Table 4 that little less than fifty per cent of the male farmers (48.2%) showed high as well as moderate level of participation and only 3.5 per cent of them showed low participation level in maintenance of the soil and water conservation programme. Further, majority of the female farmers (72.2%) had high level of participation, 22.2 per cent of them had moderate level of participation and only 5.5 per cent of them exhibited low level of participation in maintenance stage of the SWC programme.

The Table 4 further shows that more than fifty per cent of the overall respondents (54.8%) showed high level of participation in the maintenance of the SWC programme. The more than one third per cent of them (41%) showed moderate and about four per cent had low level of participation in maintenance of the soil and water conservation programme.

### Evaluation

The participation of male and female beneficiary farmers was high in planning, implementation and maintenance of the Antisar watershed development programme as perceived by scientists. The various SWC technologies transferred in the Antisar watershed in participatory mode brought drastic improvement, despite low rains. Check dam and well-recharge technologies, not only resulted in water availability in the nearby wells for irrigation but also made drinking water available. The various *kharif* crops saved through supplemental irrigation yielded higher by as much as 50 per cent. Now, the farmers of Antisar watershed were also cultivating in summer season due to ground water recharge. The Antisar watershed farmers are cultivating their land through out the year.

### Dissemination of technology

The participatory SWC technology developed with satisfactory results at farmers' fields should be disseminated to the farmers in neighboring similar topographic areas to make the participatory developed

technology as well known SWC technology for watershed development. A result demonstration technique can be used by the extension personnel to disseminate the participatory developed technology to other farmers. Under result demonstration preferably a roadside farmer's plot should be selected for easy accessibility and publicity. The participatory developed SWC technology should be implemented in the selected plot in the presence of the villagers. The extension personnel should also conduct the visits in the developed watershed along with neighboring and other interested farmers to disseminate the technology.

The participatory SWC technologies developed and tested for Antisar watershed development were very well disseminated to farmers of neighbouring areas by discussion meeting and display boards installed near road side of the watershed area. The scientists of the Research Centre, Vasad were also conducted visits to Antisar watershed for trainees, officers, farmers and out side visitors to disseminate the SWC technologies for watershed development to eliminate the problem of water scarcity by ground water recharge.

**Table 4: Distribution of the respondents according to level of participation in maintenance of SWC programme. n=392**

Participation levels	Respondent (%)		Overall (%) n=392
	Male (n=284)	Female (n=108)	
Low participation	3.5	5.5	4.1
Moderate participation	48.2	22.2	41.0
High participation	48.2	72.2	54.8

Male respondents' maximum score was 28 and minimum score was 10.  
Female respondents' maximum score was 26 and minimum score was 12

**CONCLUSION**

The Antisar watershed programme was developed in participatory mode and bottom-up approach was adopted by involving the local farmers to take decisions in planning, implementation and maintenance of SWC practices adopted for the watershed development. It was revealed that the participation of male and female beneficiary farmers was observed high level in the watershed development programme. Consequently, the Antisar watershed development programme was fruitful up to the satisfaction of farmers as well as scientists of PIA to mitigate the water scarcity condition in the area due to ground water recharge for sustainable agricultural production

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