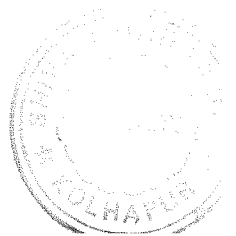


**C H A P T E R - I V**  
**IMPACT OF WATERSHED DEVELOPMENT**  
**PROJECTS**



## **CHAPTER IV**

### **IMPACT OF WATERSHED DEVELOPMENT PROJECTS**

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#### **4.0 INTRODUCTION:**

The present chapter is designed to analyse the impact of watershed development projects on the socio-economic conditions of beneficiaries and ecological conditions in the project area. The chapter is divided into two sections. The first section deals with socio-economic background characteristics of the sample beneficiaries. The second section deals with the impact of watershed development projects on the cropping pattern and socio-economic conditions of the beneficiaries and ecological conditions in the project areas with respect to the availability of water resources and vegetation.

#### **4.1 SOCIO - ECONOMIC BACKGROUND OF BENEFICIARY FARMERS**

In this section, the socio-economic background characteristics of the beneficiary farmers are described in term of select variables such as age, sex, marital status, religious background, caste/community background, type of family, land-holding pattern and average annual family income of the selected sample beneficiaries.



#### 4.1.1 AGE:

The data regarding age -wise distribution of sample beneficiaries are presented in the table-4.1

**TABLE -4.1**  
**DISTRIBUTION OF THE SAMPLE RESPONDENTS**  
**ACCORDING TO AGE**

| Sr. No. | Age Group    | Age Category  | Frequency | Percent |
|---------|--------------|---------------|-----------|---------|
| 1       | 25-45        | Young Farmers | 32        | 32.0    |
| 3       | 46-55        | Middle Aged   | 29        | 29.0    |
| 4       | 56 and above | Old Farmers   | 39        | 39.0    |
|         | Total        |               | 100       | 100.0   |

The data presented in the table 4.1 makes clear that, 39 percent farmers belong to the category of “Old Farmers” followed by those belonging to the category of “young” and “middle aged” (i.e.32 and 29 percent respectively) farmers.

#### 4.1.2 SEX:

The data regarding sex-wise distribution of sample beneficiaries are presented in the table-4.2

**TABLE -4.2**  
**DISTRIBUTION OF THE SAMPLE RESPONDENTS**  
**ACCOUNTING TO SEX**

| Sr. No. | Sex    | Frequency | Percent |
|---------|--------|-----------|---------|
| 1       | Male   | 98        | 98.0    |
| 2       | Female | 2         | 2.0     |
|         | Total  | 100       | 100.0   |

The data presented in the table 4.2 makes it clear that, an overwhelming majority (i.e., 98 percent) of the respondents were male agriculturists. Thus, as elsewhere, agricultural continues to be mainly the field of males in this region, the data suggests.

#### 4.1.3 MARITAL-STATUS:

The data with regard to marital status of the respondents revealed that, all the respondents were married with an exception of one widow.

#### 4.1.4 RELIGIOUS BACKGROUND:

The data regarding religion-wise distribution of sample beneficiaries are presented in the table-4.3

**TABLE – 4.3**

**DISTRIBUTION OF THE SAMPLE RESPONDENTS  
ACCORDING TO RELIGION**

| Sr. No. | Religion | Frequency | Percent |
|---------|----------|-----------|---------|
| 1       | Hindu    | 90        | 90.0    |
| 2       | Muslim   | 10        | 10.0    |
|         | Total    | 100       | 100.0   |

The data presented in the table-4.3 with regard to the religion-wise distribution of the respondents reveals that, an overwhelming majority (90 percent) of the respondents belong to Hindu religion, followed by those belonging to Muslim community (10 percent).

#### 4.1.5 CASTE/ COMMUNITY BACKGROUND:

The data regarding caste-wise distribution of sample beneficiaries are presented in the table-4.4

**TABLE - 4.4**

**DISTRIBUTION OF THE SAMPLE RESPONDENTS  
ACCORDING TO CASTE/COMMUNITY**

| Sr. No. | Caste/Community | Frequency | Percent |
|---------|-----------------|-----------|---------|
| 1       | Brahmin         | 2         | 2.0     |
| 2       | Maratha         | 82        | 82.0    |
| 3       | Muslim          | 11        | 11.0    |
| 4       | Mahar           | 3         | 3.0     |
| 5       | Chambhar        | 1         | 1.0     |
| 6       | Parit           | 1         | 1.0     |
|         | Total           | 100       | 100.0   |

Caste /Community background is considered as the major element that influences the opportunities in the life of the individual. The data presented in the table 4.4 makes clear that, 82 percent farmers belong to Maratha caste, the dominant caste in the region. Another 11 percent farmers belong to Muslim Community and 5 percent farmers belong to Scheduled caste and other backward communities. Thus the farmers and their families having land in the command areas of the watershed development projects, belonging to both the upper and lower caste groups in the traditional hierarchy, are getting the benefits of these projects.

#### 4.1.6 EDUCATIONAL STATUS:

The data regarding educational status-wise distribution of sample beneficiaries are presented in the table-4.5

**TABLE – 4.5**  
DISTRIBUTION OF THE SAMPLE RESPONDENTS  
ACCORDING TO THEIR EDUCATIONAL STATUS

| Sr. No. | Education status   | Frequency | Percent |
|---------|--------------------|-----------|---------|
| 1       | Illiterate         | 17        | 17.0    |
| 2       | Up To 7th Std.     | 59        | 59.0    |
| 3       | Up To 10th Std.    | 18        | 18.0    |
| 4       | Up To 11-12th Std. | 3         | 3.0     |
| 5       | Up To Graduate     | 3         | 3.0     |
|         | Total              | 100       | 100.0   |

Education is the prime factor for overall development of human beings. The farmers with reading – writing skills and higher levels of education, it is believed, possess a positive approach towards adoption of agricultural innovations. The data presented in the table - 4.5 regarding educational level attained by the respondents reveal that, an overwhelming majority of the farmers were literate. The proportion of illiterate respondents was very less (17 percent). Among literates, majority (59 percent) of the farmers were having education up to 7<sup>th</sup> std. to their credit, followed by those having their education up to 10<sup>th</sup> std. (18 percent) and those up to 11<sup>th</sup> -12<sup>th</sup> std (3 percent), and Graduation (3 percent).

#### 4.1.7 TYPE AND SIZE OF FAMILY:

The data regarding distribution of sample beneficiaries in term of their type of family are presented in the table-4.6

**TABLE- 4.6**  
**DISTRIBUTION OF THE SAMPLE RESPONDENTS**  
**ACCORDING TO TYPE OF FAMILY**

| Sr. No. | Type of Family | Frequency | Percent |
|---------|----------------|-----------|---------|
| 1       | Joint          | 55        | 55.0    |
| 2       | Nuclear        | 45        | 45.0    |
|         | Total          | 100       | 100.0   |

The data presented in the table 4.6 regarding distribution of sample respondents according to the type of their family reveals that, 55 percent of the total respondents hailed from joint families whereas remaining 45 percent respondents were having nuclear family background.

The data regarding size of family (number of family members in the family) of sample beneficiaries are presented in the table -4.7

**TABLE - 4.7**  
**DISTRIBUTION OF SAMPLE RESPONDENTS**  
**ACCORDING TO THE SIZE OF FAMILY**

| Sr. No. | No of Family Members        | Frequency | Percent |
|---------|-----------------------------|-----------|---------|
| 1       | 0-5 (Small Family)          | 42        | 42.0    |
| 2       | 6-10(Middle Size Family)    | 51        | 51.0    |
| 3       | 11 And Above (Large Family) | 7         | 7.0     |
|         | Total                       | 100       | 100.0   |

The data presented in the table 4.7 makes it clear that, 51 percent respondents belong to middle sized families, followed by 42 percent respondents who belong to small families whereas only 7 percent respondents belonged to large families.

#### **4.1.8 LAND-HOLDING PATTERN:**

Looking at the low rainfall, rainfed land, low productivity of the land in the region, farmers having land up to 5 acres are treated as 'marginal farmers', those having land between 5.1 to 10 acres are considered as 'small farmers' and those having land above 10 acres are considered as 'middle' farmers. Viewed thus, the data regarding land holdings of sample beneficiaries are presented in the table 4.8

**TABLE – 4.8**  
**DISTRIBUTION OF THE SMAPLE RESPONDENTS**  
**ACCORDING TO LAND OWNED BY THEIR FAMILIES**

| Sr. No. | Land Holding     | Category of Farmers | Frequency | Percent |
|---------|------------------|---------------------|-----------|---------|
| 1       | Up To 0-5 Acres  | Marginal farmers    | 65        | 65.0    |
| 2       | Up To 6-10 Acres | Small farmers       | 27        | 27.0    |
| 3       | 11 and above     | Middle farmers      | 8         | 8.0     |
|         | Total            |                     | 100       | 100.0   |

The data presented in the table 4.8 reveal that, the marginal farmers represent the single largest category (65 percent) among the respondents, followed by, small farmers (27 percent) and middle farmers

(8 percent). The data thus, makes it clear that the watershed projects have mostly benefited the lower sections of the village peasantry, namely the marginal and small farmers.

#### 4.1.9 ANNUAL FAMILY INCOME:

The data regarding annual family income-wise distribution of the sample beneficiaries are presented in the table 4.9

**TABLE –4.9**  
**DISTRIBUTION OF THE SAMPLE RESPONDENTS**  
**ACCORDING TO TOTAL ANNUAL FAMILY INCOME**

| Sr. No. | Annual Family Income | Frequency | Percent |
|---------|----------------------|-----------|---------|
| 1       | Up to 20000          | 0         | 0.0     |
| 2       | 20001 To 50000       | 26        | 26.0    |
| 3       | 50001 -100000        | 47        | 47.0    |
| 4       | Above 100001         | 27        | 27.0    |
|         | Total                | 100       | 100.0   |

The data presented in the table 4.9 regarding the total annual income of the families reveal that, 26 percent farmers were having annual income up to Rs. 50,000. 47 percent respondents' reported income was between Rs. 50,000 to 1,00000. 27 percent farmers were having their annual income above 1,00000 (the high income group)

If we regard families having annual income above 21000 as families falling above poverty line, then by that definition, we can say that, all the respondents have crossed the poverty line. Before the

implementation of watershed development programme all the respondents' income was low (as reported during their interviews). Now, after the implementation of watershed development projects, there is rise in annual income of beneficiary farmers. This can be attributed to the changing cropping pattern, particularly cultivation of cash crops such as sugarcane and soybean, due to assured irrigation.

## **SECTION-II: IMPACT OF WATERSHED DEVELOPMENT PROJECTS**

In this section, we shall examine the data showing the impact of watershed development projects on the beneficiaries, in the specific context of socio-economic conditions of the beneficiaries and with regard to ecological conditions. Let us now look at the empirical data.

### **Changes Occurred Due to Implementation of Watershed Development Projects:**

An attempt is made to understand the impact of watershed development projects in term of before after situation. The questions were asked to the respondents, regarding the matter in question, as to what was the situation before the implementation of watershed development projects and what is the current situation. The data regarding the availability of drinking water, irrigation, cropping pattern, annual income, use of agricultural produce, types of seeds, types of fertilizers, use of pesticides and insecticides, cropping intensity in term

of number of crops grown and inter-cropping, cultivation of vegetables and employment opportunities and dairying are analysed and presented below.

### **1. Drinking Water:**

A question was asked to the respondents that whether there was scarcity of drinking water before implementation of watershed development projects? All the respondents said “yes”! there was scarcity of drinking water. As against this, when asked about present situation, they said that now drinking water is available.

Thus, now, after implementation of watershed development projects there is no scarcity of drinking water. Similar findings have been also noted in the studies conducted by Hanumantha Rao (2000:3944), Anil Shah (2000:3944), Singh R.A (1998:91) and Amita Shah and Gani Memon (2000:3945).

### **2. Availability of Water for Agriculture:**

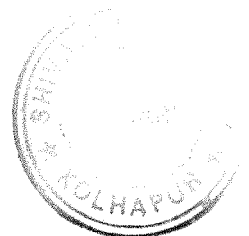
When the question was asked to the respondents regarding availability of water for agriculture before implementation of watershed development projects, 25 percent respondents said ‘yes’, well water was available to their farms. Then, the supplementary question was asked to the respondents: “If yes, for how many months? Few respondents said that water for agriculture was available for upto 7 to 8 months and water scarcity was getting pronounced in the months of February, March, April

and May. Thus, a large majority (75 percent) of the farmers were not having access to the irrigation water before the implementation of watershed development projects and those who were having access to well-water, they were also facing scarcity of water during summer.

Now, after implementation of watershed development projects all the beneficiaries have started getting water for their agriculture. An overwhelming majority (70 percent) of these respondents have also said that availability of water for agriculture now continues upto 10 to 11 months and water scarcity is felt especially in two months, April and May. At a result, some farmers have started cultivating three crops in a year. Similar findings have been noted by the scholars such as Shah and Kerr et al, 1998:3161), Amita Shah (2000:3162) Pawar C.T (2003:91) and Lakshmikanthama, S, (2000:240).

### **3. Cropping Pattern:**

A question was asked to the respondents; “which crops were being cultivated in your land before you started getting the water from watershed development projects”? The frequency distribution of the responses obtained to the above question is presented in the table 4.10.



**TABLE – 4.10**  
**CROPS CULTIVATED BEFORE WATERSHED DEVELOPMENT**  
**PROJECTS BY SAMPLE BENEFICIARIES**

| Sr. No. | Crops Cultivated Before Watershed Development Projects | Frequency | Percent |
|---------|--|-----------|---------|
| 1       | Non-cultivated area                                    | 38        | 38.0    |
| 2       | Jawar  | 30        | 30.0    |
| 3       | Bajari   | 27        | 27.0    |
| 4       | Mataki   | 34        | 34.0    |
| 5       | Tur  | 32        | 32.0    |
| 6       | Wheat  | 6         | 6.0     |
| 7       | Harabhara  | 2         | 2.0     |
| 8       | Ground-nut   | 2         | 2.0     |

The data presented in the table 4.10 regarding the crops cultivated by the sample beneficiaries in their land before they started receiving the water from watershed development projects reveals the following.

- 1) Majority (38 percent) of the farmers' land was not under cultivation before watershed development projects.
- 2) Mataki, Tur, Jawar and Bajari – these were the major crops being cultivated by the farmers before they started receiving the water from watershed development projects, the frequency distribution of the responses reveal.
- 3) Some farmers were also cultivating Wheat, Harabhara and Groundnut before watershed development projects.

Against this background it would be interesting to see which crops the farmers have now started cultivating after watershed development projects. The data on this aspect are presented below in the table 4.11.

**TABLE – 4.11**  
**CROPS CULTIVATED AFTER WATERSHED DEVELOPMENT**  
**PROJECTS BY SAMPLE BENEFICIARIES**

| Sr. No. | Crops being cultivated After Watershed Development Projects | Frequency | Percent |
|---------|---|-----------|---------|
| 1       | Sugarcane   | 46        | 46.0    |
| 2       | Harabhara   | 66        | 66.0    |
| 3       | Soyabin   | 71        | 71.0    |
| 4       | Wheat   | 74        | 74.0    |
| 5       | Jawar   | 3         | 3.0     |

The data presented in the table 4.11 regarding the crops now being cultivated by the sample beneficiaries in their land after they started receiving the water from watershed development projects reveals the following.

- 1) It is important to note that, land which was not under cultivation before the implementation of watershed development projects (in case of 38 farmers), have been brought under cultivation after watershed development projects.
- 2) Wheat, Soyabin, Harabhara and Sugarcane – these are the major crops being cultivated by the farmers after they started receiving the

water from watershed development projects, the frequency distribution of the responses reveal.

- 3) Some farmers continue to cultivate Jawar after watershed development projects.

The data reveals a remarkable change in the respective positions of crops. Among the major crops the highest decline was in Jawar (87 percent). On the other hand, crops, which recorded increase, include Sugarcane (46 percent) and Soybean (71 percent). Similar findings have been also reported by scholars such as Hanumantha Rao, (2000:3944), Amita Shah (2000:3162), Ranjitah Puskur and at al (2004:3481) Amita Shah (2001:3409) Pawar C.T (2003:89) and Lakshmikanthama (2000:240).

It may be added here that, the farmers continue to cultivate Jirayati crops such as Jawar, Bajari, Wheat, Harabhara and Groundnuts as before.

#### **4. Annual Income from Agriculture:**

It is now worthwhile to see whether there is increase in the average annual income of the beneficiary farmers after the development of watershed development programmes. The data regarding the annual income of sample beneficiaries before and after implementation of watershed development projects are presented in the table –4.12 AND 4.13.

**TABLE –4.12**  
**ANNUAL INCOME FROM AGRICULTURE BEFORE WATERSHED**  
**DEVELOPMENT PROJECTS BY SAMPLE BENEFICIARIES**

| Sr. No. | Annual Income From Agriculture Before Watershed Development Project | Frequency | Percent |
|---------|---|-----------|---------|
| 1       | Up to 20,000  | 21        | 21.0    |
| 2       | 20,001 to 50,000  | 50        | 50.0    |
| 3       | 50,001 to 1,00000   | 22        | 22.0    |
| 4       | Above 1,00001   | 7         | 7.0     |
|         | Total   | 100       | 100.0   |

The data presented in the table 4.12 regarding the annual income from agriculture reveal that, before the implementation of watershed development projects, 21 per cent respondents were having annual income up Rs. 20,000/- i.e. their families may be treated as falling below poverty line. 50 per cent respondents were having annual income from agriculture within the range of Rs. 20,000 to 50,000 and remaining 22 per cent respondents were having annual income from agriculture between Rs. 50,001 – 100000 whereas only few (7 percent) respondents were having income for more than Rs.100000 per year.

Against this background, let us now look at the average annual income of the sample beneficiaries after the development of watershed development programmes. The data on this aspect are presented in the table 4.13.

**TABLE –4.13**  
**ANNUAL INCOME FROM AGRICULTURE AFTER WATERSHED**  
**DEVELOPMENT PROJECTS BY SAMPLE BENEFICIARIES**

| Sr. No. | Annual Income From Agriculture After Watershed Development Project | Frequency | Percent |
|---------|--|-----------|---------|
| 1       | Up to 20,000   | 0         | 0.0     |
| 2       | 20,001 to 50,000   | 40        | 40.0    |
| 3       | 50,001 to 1,00000  | 40        | 40.0    |
| 4       | Above 1,00001  | 20        | 20.0    |
|         | Total  | 100       | 100.0   |

The data presented in the table 4.13 regarding the annual income from agriculture reveal that, after implementation of watershed development projects, all the respondents whose income was upto Rs. 20000 have crossed that mark. An overwhelming majority (80 per cent) of the respondents were having income between Rs.20001 and 100000. 20 per cent respondents were having annual income from agriculture above Rs. 10000.

Thus, due to implementation of watershed development projects there is increase in average annual income from agriculture in case of all the sample respondents. Similar findings have been noted scholars such as Pawar C.T (2003:92), Hanumantha Rao (2000:3944) Deshpande (2004:153) and Lakshmikanthamma, (2000:240).

### **5. Use Of Agricultural Produce:**

A question was asked to the respondents regarding the use of agricultural produce before implementation of watershed development projects and after the implementation of watershed development projects. 88 percent respondents have said that the agricultural produce was being used for domestic consumption as well as some part of it was also used to sell in the market. Now, after implementation of watershed development projects 72 percent respondents said that they are mainly cultivating for sell in the market. However, 28 percent farmers said that they are producing mainly for their domestic consumption.

### **6. Types of Seeds being Used:**

The data collected from the respondents revealed that, before implementation of watershed development projects, an overwhelming majority (68 percent) of the respondents was mainly using traditional seeds. Now, after implementation of watershed development projects, respondents are using modern seeds for better production in their farms. Thus, the data makes it clear that, after implementation of watershed development project changes have occurred in the types of seeds that farmers use and that they have turned to modern high yielding variety of seeds.



**7. Types of Fertilizers being Used:**

As the data reveal, before implementation of watershed development projects, 68 percent respondents were mainly using traditional fertilizers such as Shenkhat. Now, after implementation of watershed development projects, all the respondents have told that they are mainly using modern fertilizers in their farms. Thus, there is change in the type of fertilizers being used by the farmers.

**8. Use of Pesticides and Insecticides:**

As in the case of fertilizers, the data with regard to use of pesticides and insecticides revealed that, before implementation of watershed development projects, 93 percent respondents were not using pesticides and insecticides. Now, after implementation of watershed development projects an overwhelming majority (84 percent) of the respondents has started use of pesticides and insecticides in their farm.

**9. Number of Crops being cultivated in a Year:**

The data with regard to number of crops being cultivated in a year, before implementation of watershed development projects revealed that all the respondents were cultivating 2 crops in a year. Now, after implementation of watershed development projects many a respondents are able to cultivate 3 crops in the same piece of their land. As a result, there is a rise in their income. Similar findings have also been noted by

the scholars such as Hanumantha Rao, (2000:3944), Anil Shah (2000:3944) and Amita Shah and Gani Memon, (1999:3945).

#### **10. Inter-cropping:**

The data also made it clear that, before implementation of watershed development projects, the respondents were not cultivating inter-crops in their farms. Now, after implementation of watershed development projects, some respondents have started practicing inter-cropping in their own farms in the project areas. Because of inter-cropping farmers are getting additional money.

#### **11. Cultivation of Vegetables:**

Before implementation of watershed development projects, 73 percent respondents were not cultivating vegetables in their farms. Now, after implementation of watershed development projects an overwhelming majority (76 percent) of the respondents has reported that they are cultivating vegetables in their own farms. The vegetables are being mainly used for domestic consumption and some farmers are also selling vegetables in the daily markets and they are getting additional income from vegetables.

#### **12. Employment Generation:**

Before implementation of watershed development projects, 39 percent respondents were using hired labourers in their farm. Now, after implementation of watershed development projects 75 percent

respondents have been using hired labourers in their farms. Due to intensive cultivation there is increase in employment. The study also revealed that marginal farmers who were going as labourers on others fields have stopped going to other fields for work. This is so because due to increase in intensity of agriculture, the employment opportunities in their own farms have increased. At the result of additional employment generation, it is a general observation that the migration of the people has also been reduced in the project area. Similar findings have also been noted by the scholars such as Hanumantha Rao (2000:3944), Anil Shah, (2000:3944), Amita Shah (2001:3407), Andhra Pradesh, (1998-99:3945), Deshpande, (2004:153) and Lakshmikanthamma, (1997:242).

### **13. Promotion of Dairying as Secondary Occupation:**

Due to implementation of watershed development projects, now there is availability of green fodder for animals. As a result, there is increase in milk production. The additional income from dairying as secondary occupation has led to improvement in socio-economic conditions of the beneficiaries in the project areas. Consumption of milk and nutritious food has also increased. Also there is increase in employment especially for women. Similar findings have been noted by the scholars such as Hanumantha Rao, (2000:3944), Anil Shah,

(2000:3944) Puskur, R. J. Bouma, and C. Scott (2004:3481) Deshpande, (2004:154) and Lakshmikanthamma S (2000:242).

To summarize, due to implementation of watershed development projects the following changes have occurred:

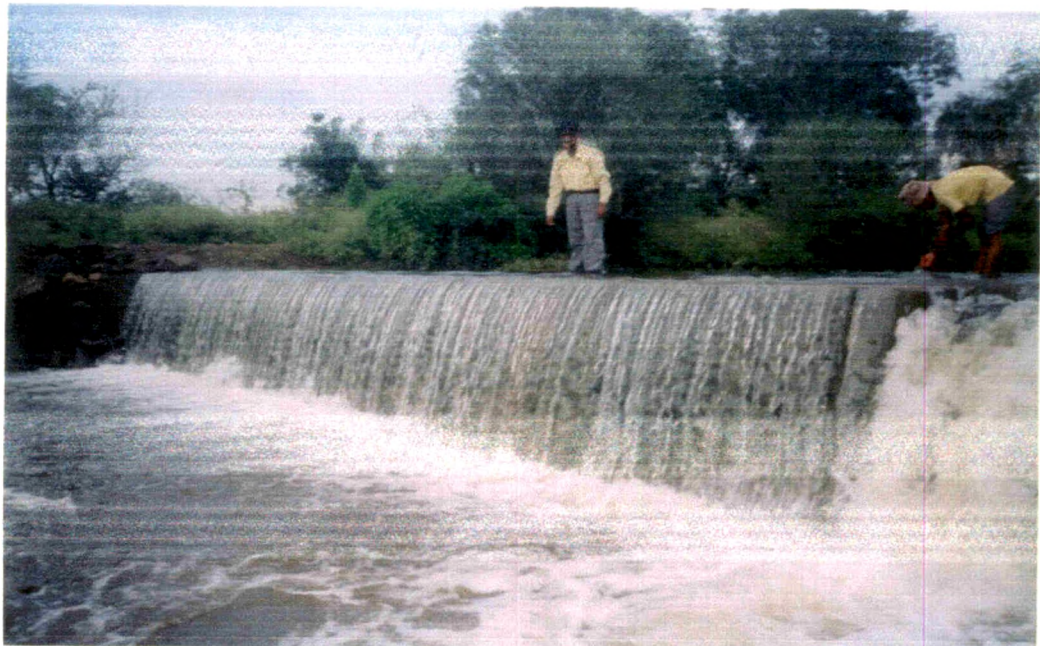
- i) Increased availability of water for drinking
- ii) Increased availability of water for agriculture
- iii) Change in cropping pattern leading to cultivation of cash crops and vegetables
- iv) Rise in average annual income of beneficiaries
- v) Increase in agricultural employment
- vi) Migration of labour has been reduced
- vii) Increase in Green fodder for milch animals
- viii) Development of dairying as secondary occupation
- ix) Construction of pucca houses.
- xi) Rise in enrolment of children in schools especially girls.

#### **4.2 IMPACT ON ECOLOGY AND ENVIRONMENT:**

In this section, changes occurred due to implementation of watershed development projects in the project area in the context of ecology and environmental protection is briefly dealt with.

### **1.Availability of Water Resources:**

The Khanapur taluka receives very less quality of rainwater. During monsoon season, this area gets water due to rains but only after few months water scarcity gets pronounced. This was the situation in the villages taken up for the study. However, now, after implementation of watershed development projects, this situation has changed. Now, there is availability of water for 10 to 11 months in a year in the study area. Water is a life supporting system for both plant and animal life. The availability of water for drinking as well as agriculture has contributed to the development of this region. Similar findings have been noted by the scholars such as Hanumantha Rao (2000:3944), Puskur, R. J. Bouma, and C. Scott (2004:3479). The following photograph shows that there is availability of water in this area.



## **2. Augmentation in Groundwater:**

Due to implementation of watershed development projects, there has been recharge in ground water in the project area. In case of dug wells, the water level has increased by 5 to 10 fts. and duration of the water in these wells has extended by 2 to 3 months i.e., till the months of April and May. The yield of the dug well has increased significantly. Due to this, farmers have been benefited from irrigation by wells and tube wells. The facts reveal that, there is significant augmentation in ground water in the reservoirs during the post construction period. As a result, water table has increased thereby making supplementary irrigation available to many farmers. Similar findings have been noted in the study of Hanumantha Rao (2000:3944), Amita Shah, (2000:3162), M.G. Chandrakanth, Bisrat Alemu, Mahadev, Bhat, (2004:1167) Singh R.A. (1998:92) Puskur, R. J. Bouma, and C. Scott (2004:3479) and C.T. Pawar, (2003:87). The photograph given on the next page shows that the water table of wells in the project area is increased.



Photograph No.2: Increase in Water Table of Wells in the project area.

### **3. Increase in Green Cover:**

As a result of availability of water, there is also increase in green cover in this areas surrounded by water sources. Now, various types of trees have grown alongside the banks of the rivulets and water reservoirs in the project command areas. Photograph No. 3 reveals the increased green cover alongside the water storage. Thus, the increase in trees can be taken as a good indicator of eco-development in this area. Similar findings have been noted in the study of Amita Shah, (2000:3156).



Photograph No.3 Green Cover alongside the rivulets

#### **4. Reduction in Soil Erosion and Moisture Stress:**

Before implementation of watershed development projects, the ecosystem in this area was experiencing soil erosion and moisture stress. After construction of check dams on the rivulets by the Yerala Projects Society, there is less soil erosion and moisture stress. As a result, the watershed development project has a great contribution towards protection of the fragile ecosystem, environment and livelihoods of the people in the project area. Similar findings have been noted by the scholars such as Singh R.A (1998:90), Hanumantha Rao (2000:3944), Puskur, R. J. Bouma, and C. Scott (2004:3479) Amita Shah, (2000:3162) and Lakshmikantamma, (2000:242).

### **5. Improved Water and Land Management:**

After implementation of watershed development projects, one can observe more improved and sustainable use of land and water resources in the project area. As a result, quality of land has improved and it has become more productive. Similar findings have been noted in the study of Singh R. A (1998:91) Amita Shah, (2000:3156) and Hanumantha Rao (2000:3944).

To conclude, the greater availability of water, augmentation of groundwater, increase in green cover, reduction in soil erosion and moisture stress and improved water and land management constitutes important positive ecological/environmental consequences of the implementation of watershed development programme.

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