

## **Chapter III**

### **Economics of Watersheds in Study Area**

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## **Chapter III**

### **Economics of Watershed in Study Area**

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#### **3.1 Introduction :**

The present study is an analysis of impact of Watershed Development on Agriculture in drought prone area of Sangli District. Three Watersheds belonging to drought and semi-drought zone were selected for studying the impact analysis. Impact analysis is categorized in two parts viz. before and after watershed development.

#### **3.2 Profile of selected Sample Watersheds :**

As the present study covers Three watersheds viz. Wadi-Bhagai(Sub-division–Shirala),Renavi(Sub-division– Vita/Khanapur) and Soni(Sub-division – Miraj) situated in the East, West, and North part of the Sangli District, experiences lack of irrigation water sources. However, effects are being made by the Government of Maharashtra to develop the irrigation facilities through various watersheds.

### A) Wadi-Bhagai :

This watershed is located in between latitudes 16° 45 & 17° 32 North and longitudes in between 73° 42 & 75° 40 East. The total area of the watershed is 1103 Ha.

#### Details of land use under agriculture

i) Area sown under Paddy	280 Ha.
ii) Area sown under Cereals	228 Ha.
iii) Area sown under Horticulture	10 Ha.
iv) Area under other crops	375 Ha.

Table No. 3.1

#### Land use Pattern of Wadi-Bhagai Watershed

Item	Area (Ha.)
Forest Land	76.00
Land Put to Non-Agri. Use	192.00
Barren and Uncultivable Land	20.00
Permanent Pastures/Grazing Lands	130.00
Land under Agriculture	276.00
Average Land Holding per Family	1.45

Source : Agriculture Department – Tal. Shirala, Dist. Sangli.

2004-2005.

Table No 3.1 shows that classification of land use pattern and classification of land under various crops.

**B) Renavi :**

This Watershed is located in the Khanapur tehsil. The total area of the watershed is 1684.53 Ha.

**Table No. 3.2**

**Land use Pattern of Renavi Watershed**

Item	Area (Ha.)
Total Geographical Area	1691.00 Ha.
Cultivable Land	1425.31 Ha.
Barren and Uncultivable Land	117.67 Ha.
Forest Land	148.00 Ha.
Average Land Holding per Family	1.60 Ha.

Source : Agriculture Department– Tal-Khanapur, Dist-Sangli.

2004-2005.

Table No 3.2 shows that classification of land use pattern. Out of Total Area 6.95% Land is Barren and remains uncultivable.

### C) Soni :

This watershed is located in the Miraj Tehsil. The total area of the watershed is 1911.79 Ha.

**Table No. 3.3**

#### **Land use pattern of Soni Watershed**

<b>Item</b>	<b>Area (Ha.)</b>
Total Geographical Area	1911.79 Ha.
Cultivable Land	1726.74 Ha.
Barren and Uncultivable Land	121.81 Ha.
Forest Land	63.24 Ha.
Average Land Holding per Family	1.65 Ha.

Source : Agriculture Department – Tal. Miraj, Dist. Sangli.  
2004-2005.

Table No 3.3 shows that classification of land use pattern. Out of Total Area 6.37% Land is Barren and remains uncultivable.

### **3.3 Expenditure on Selected Watersheds :**

Table No 3.4 shows that, expenditure on selected sample watersheds. There are 11 types of programme being implemented under the watershed development programmes. More amount of money to be spent in the Soil Nala Bunding in Wadi-Bhagai(Rs.21 lakhs) and Renavi(Rs.73.56 lakhs) watershed and in the watershed of

Table No. 3.4

Expenditure on Selected Sample Watersheds

S.N.	Type of Work	Wadi-Bhagai		Renavi		Soni	
		No.Of Unit	Expenditure	No.Of Unit	Expenditure	No.Of Unit	Expenditure
1	Live Check Dam	160	0.16	----	----	----	----
2	Brush Wood Dam	100	0.15	----	----	----	----
3	Loose Boulder	400	6.00	----	1.94	11	.22
4	Soil Nala Bunding	12	21.00	24	73.56		
5	Cement Nala Bunding	1	2.00	5	8.5	14	25.00
6	C.C.T. (Ha.)	10	0.96	----	----	10	.96
7	Terracing (Ha.)	30	9.00	----	----	7	0.21
8	K.T. Weir	----	----	----	----	1	22.00
9	Farm Pond	2	0.60	14	5.14	10	3.00
10	Compartment Bunding	----	----	----	0.60	----	----
11	Well Recharging	----	----	----	----	79	----
	<b>Total :-</b>	----	<b>39.87</b>	----	<b>89.74</b>	----	<b>51.39</b>

Source : Shirala, Khanapur & Miraj Agriculture Department, Dist – Sangli. 2005-06.

Soni there were Rs. 25 lakhs spent on Cement Nala Bunding and Rs. 22 Lakhs spent on K.T.Weir.

Table No.3.5 implies that Aggregate cost of sample watersheds. The aggregate cost of the three watersheds is Rs. 181 lakhs.

**Table No. 3.5**

**Aggregate Cost of Selected Watersheds**

<b>Watershed</b>	<b>Cost (Rs. In Lakhs)</b>
Wadi-Bhagai	39.87
Renavi	89.74
Soni	51.39
<b>Total</b>	<b>181.00</b>

The more amount of money (Rs. 89.74 lakhs) spent on watershed development of Renavi because; this watershed is located in drought zone.

**3.4 Impact of Watershed Development in Study Area :**

Economic impact of watershed development is measured through various parameters. Cropping pattern is the fundamental parameter for measuring the impact of watershed development.

Generally, Before After method is used to assess the change in cropping pattern. For measuring the impact of watershed we attempt the following parameters –

Cultivation size of land, Classification of Irrigation, Area under various crops and production of crops, Availability of water, Cost of chemical & compost fertilizers, Agricultural Income, Investment in Agriculture, Land improvement programme etc.

Table No. 3.6 shows that, classification of respondents by the size of land holding. There were 14% (21) farmers belongs to Marginal farmer category. Also 78% (66 SF + 51 SMF) belongs to 1 to 4 Hect. There were 1.4% (2) farmers have more than 10 Hect. size of land holding.

**Table No. 3.6**  
**Classification of Respondents by the Size of Land Holding**  
**(In Hect.)**

S.N.	Size of Land Holding	Respondents	Percentage
1	Up to 1 Ha. (MF)	21	14%
2	1.0 to 2 Ha. (SF)	66	44%
3	2.01 to 4 Ha. (SMF)	51	34%
4	4.01 to 10 Ha. (MF)	10	6.6%
5	Above 10 Ha. (LF)	02	1.4%
	<b>Total</b>	<b>150</b>	<b>100 %</b>



MF = Marginal Farmer

SF = Small Farmer

SMF = Semi Medium Farmer

MF = Medium Farmer

LF = Large Farmer

By classifying the overall size of holding, it is observed that, most of the samples belong to Small farmers, Semi Medium Farmers and Medium Farmers. The percentage of large farmer is only 1.4% and that of Marginal Farmer 14%.

**Table No. 3.7**

**Classification of Respondents by the Size of Land Cultivation**

**(Size in Acre)**

<b>Size of Cultivation</b>	<b>Respondents</b>	<b>Percentage</b>
Up to 2 Acre	26	17.3 %
2.01 to 4 Acre	57	38.0 %
4.01 to 6 Acre	30	20.0 %
6.01 to 8 Acre	18	12.0 %
8.01 to 10 Acre	12	8.0 %
10.01 to 12 Acre	3	2.0 %
Above 12 Acre	4	2.7 %
<b>Total</b>	<b>150</b>	<b>100 %</b>

Table No. 3.7 implies that classification of respondents by the size of land cultivation. About 75.3% (113) respondents cultivate less than 6 Acre land. There were 20% (30) respondents have cultivate size of land between 6.01 to 10 Acre and, 2.0% (3) respondents have cultivate size of land between 10.1 to 12 Acre. Only 2.7% (4) respondents cultivate more than 12 Acre land. With the above analysis we conclude that, there are more than 2/3 respondents cultivate less than 6 Acre land.

**Table No. 3.8**

**Classification of Irrigation**

Land Area (Area in Acre)	B.W.S.D		A.W.S.D	
	Farmers	Percentage	Farmers	Percentage
No Irrigation	8	5.3 %	0	0
Up to 1 Acre	73	48.7 %	24	16.0 %
1.01 to 4 Acre	45	30.7 %	66	44.0 %
4.01 to 6 Acre	17	11.3 %	34	22.7 %
More than 6 Acre	6	4.0 %	26	17.3 %
<b>Total</b>	<b>150</b>	<b>100 %</b>	<b>150</b>	<b>100 %</b>

B.W.S.D. = Before Watershed Development

A.W.S.D. = After Watershed Development

Above table No. 3.8 shows that classification of Irrigation. B.W.S.D. 5.3% (8) farmers don't have any irrigation facilities, 79.4% (119) farmers have 1 to 4 Acre irrigated land and only 4% (6) respondents have more than 6 Acre irrigated land. A.W.S.D. there was cent percent farmers have partial or complete irrigation facility available in study area. About 82.7% (124) farmers have 1 to 4 acre irrigated land. A.W.S.D. there were 17.3% (26) farmers having more than 6 acre irrigated land.

It is indicate that, A.W.S.D. there were 50% farmers have more than 4 to 6 and above 6 acre irrigated land.

**Table 3.9**

**Availability of Water for Agriculture (In Months)**

Availability of Water (In Months)	B.W.S.D.		A.W.S.D	
	Farmers	Percentage	Farmers	Percentage
1 to 4 Months	135	90 %	0	0
4 to 8 Months	15	10 %	150	100 %
<b>Total</b>	<b>150</b>	<b>100 %</b>	<b>150</b>	<b>100 %</b>

Table No. 3.9 implies that availability of water for agriculture during the before and After Watershed development. B.W.S.D. 90% (135) farmers have available water for agriculture up to 4 months and 10% (15) farmers have 8 months. A.W.S.D. there were 100% (150) farmers have available water for agriculture up to 8 months. From above analysis we conclude that, Because of watershed development 100% farmers have available water for agriculture up to 8 months.

### **3.5 Cropping Pattern**

Cropping pattern basically depends on irrigation water and climatic situation prevailing in the area. Irrigation water is typically available only for main agriculture season and its chief impact is observed on the production of traditional crops and introduction of new crops under cultivation for the benefits of the dynamic market. As intensive cultivation and diversification of crops is only possible through irrigation water.

Table No.3.10 shows that, classification of respondents by the cultivation size of various food crops.

Table No. 3.10

Classification of the Respondents by the Cultivation Size of Various Food Crops  
(Cultivation Size in Acre)

Crops Cultivation Size	Rice		Wheat		Maize		Jwari	
	B.W.S.D. (%)	A.W.S.D. (%)	B.W.S.D. (%)	A.W.S.D. (%)	B.W.S.D. (%)	A.W.S.D. (%)	B.W.S.D. (%)	A.W.S.D. (%)
No Cultivation	107 (71.3%)	95 (63.3%)	82 (54.7%)	60 (40%)	45 (30%)	88 (58.7%)	37 (24.7%)	79 (52.7%)
Less than 0.5 Acre	32 (21.3%)	25 (16.7%)	10 (6.7%)	2 (1.3%)	56 (37.3%)	17 (11.3%)	55 (36.7%)	17 (11.3%)
0.5 to 1 Acre	7 (4.7%)	14 (9.3%)	53 (35.3%)	20 (13.4%)	47 (31.3%)	38 (25.3%)	52 (34.7%)	41 (27.3%)
1 to 1.5 Acre	4 (2.7%)	16 (10.7%)	3 (2%)	30 (20%)	-----	5 (3.3%)	-----	7 (4.7%)
1.5 to 2 Acre	-----	-----	2 (1.3%)	38 (25.3%)	2 (1.3%)	2 (1.3%)	6 (4%)	4 (2.7%)
More than 2 Acre	-----	-----	-----	-----	-----	-----	-----	2 (1.3%)

( ) Shows the percentage of respondents to the total (150) respondents

The number of sample units who were not cultivated rice crop has declined from 107 respondents in B.W.S.D. to 95 in A.W.S.D. It means that 8% (12) respondent started cultivating rice crop A.W.S.D. The number of sample units cultivate range between 0.5 to 1.5 acre has gone up from 7.4% (11) to 20% (30) during the period of before and after watershed development.

The number of sample units who were not cultivated Wheat crop has declined from 82 respondents in B.W.S.D. to 60 in A.W.S.D. It means that 14.6% (22) respondent started cultivating Wheat crop A.W.S.D. The number of sample units cultivate range between 1 to 2 acre has increased from 3.3% (5) to 45.3% (68) during the period of before and after watershed development.

The number of sample units who were not cultivated Maize crop has gone up from 45 respondents in B.W.S.D. to 88 in A.W.S.D. It means that 28.7% (43) more respondents were not cultivated Maize A.W.S.D. It is due to increased interest of farmers towards cash crops.

The number of sample units who was not cultivating Jwari crop has gone up from 37 respondents in B.W.S.D. to 79 in A.W.S.D. It means that 28% (42) more respondents were not

cultivated Jwari A.W.S.D. It is because more number of farmers started cultivating cash crops.

Table No.3.11 shows that, classification of respondents by the production of various food crops.

The Number of sample units who were get production of rice range between 1 to 15 Q. has gone up from 18% (27) to 23.4% (35) during the period of before and after watershed development. Also, there were number of sample units who were get production of rice more than 16 Q. has gone up from 10.7% (16) to 13.4% (20) during the period of before and watershed development.

The Number of sample units who were get production of Wheat range between 1 to 15 Q. has declined from 44% (66) to 33.3% (50) during the period of before and after watershed development. But, there were number of sample units who were get production of Wheat more than 16 Q. has gone up from 1.3% (2) to 26.7% (40) during the period of before and watershed development.

The Number of sample units who were get production of Maize range between 1 to 15 Q. has declined from 74% (111) to

Table No. 3.11

Classification of the Respondents by the Production of Various Food Crops  
(Production in Quintal)

Crops Production (Q)	Rice		Wheat		Maize		Jwari	
	B.W.S.D.	A.W.S.D.	B.W.S.D.	A.W.S.D.	B.W.S.D.	A.W.S.D.	B.W.S.D.	A.W.S.D.
No Production	107 (71.3%)	95 (63.3%)	82 (54.7%)	60 (40%)	45 (30%)	88 (58.7%)	37 (24.7%)	79 (52.7%)
1 to 5 Q	6 (4%)	5 (3.3%)	20 (13.3%)	20 (13.4%)	52 (34.7%)	6 (4%)	57 (38%)	0
6 to 10 Q	12 (8%)	20 (13.4%)	40 (26.7%)	19 (12.6%)	23 (15.3%)	21 (14%)	50 (33.3%)	4 (2.7%)
11 to 15 Q	9 (6%)	10 (6.7%)	6 (4.0%)	11 (7.3%)	28 (18.7%)	7 (4.7%)	4 (2.7%)	52 (34.7%)
More than 16 Q	16 (10.7%)	20 (13.4%)	2 (1.3%)	40 (26.7%)	2 (1.3%)	28 (18.7%)	2 (1.3%)	8 (5.3%)

( ) Shows the percentage of respondents to the total (150) respondents



37.3% (56) during the period of before and after watershed development. But, there were number of sample units who were get production of Maize more than 16 Q. has gone up from 1.3% (2) to 5.3% (8) during the period of before and watershed development.

Table No.3.12 shows that, classification of respondents by the cultivation size of various cash crops.

The number of sample units who were not cultivated Sugarcane has declined from 62 respondents in B.W.S.D. to 46 in A.W.S.D. It means that 10.6% (16) respondent was started cultivating Sugarcane A.W.S.D.

The number of sample units who were not cultivated Grapes has declined from 107 respondents in B.W.S.D. to 80 in A.W.S.D. It means that 18% (27) more respondents were cultivated Grapes A.W.S.D.

The number of respondents not cultivating Banana Crop has declined from 122 in B.W.S.D. to 114 in A.W.S.D. It means that 5.3% (8) respondents were newly cultivated Banana A.W.S.D.

Table No. 3.12

Classification of the Respondents by the Cultivation Size of Various Cash Crops  
(Cultivation Size in Acre)

Crops Cultivation Size	Sugarcane		Grapes		Banana	
	B.W.S.D.	A.W.S.D.	B.W.S.D.	A.W.S.D.	B.W.S.D.	A.W.S.D.
No Cultivation	62 (41.3%)	46 (30.7%)	107 (71.3%)	80 (53.4%)	122 (81.3%)	114 (76%)
Less than 0.5 Acre	15 (10%)	5 (3.3%)	8 (5.3%)	17 (11.4%)	4 (2.7%)	-----
0.5 to 1 Acre	37 (24.7%)	29 (19.3%)	32 (21.3%)	10 (6.6%)	19 (12.7%)	23 (15.3%)
1 to 1.5 Acre	8 (5.3%)	18 (12%)	-----	14 (9.3%)	-----	5 (3.3%)
1.5 to 2 Acre	20 (13.3%)	34 (22.7%)	3 (2%)	16 (10.6%)	3 (2%)	5 (3.3%)
2 to 2.5 Acre	-----	5 (3.3%)	-----	12 (8%)	-----	1 (0.7%)
2.5 to 3 Acre	4 (2.7%)	4 (2.7%)	-----	-----	-----	2 (1.3%)
3 to 3.5 Acre	-----	-----	-----	-----	-----	-----
More than 3.5 Acre	4 (2.7%)	9 (6.0%)	-----	1 (0.7%)	2 (1.3%)	-----

( ) Shows the percentage of respondents to the total (150) respondents

Table No. 3.13

Classification of the Respondents by the Production of Various Cash Crops  
(Production in Ton)

Crops Production (Ton)	Sugarcane		Grapes		Banana	
	B.W.S.D.	A.W.S.D.	B.W.S.D.	A.W.S.D.	B.W.S.D.	A.W.S.D.
No Production	62 (41.3%)	46 (30.7%)	107 (71.3%)	80 (53.4%)	122 (81.3%)	114 (76%)
1 to 20 Ton	11 (7.3%)	3 (2%)	2 (1.3%)	20 (13.3%)	26 (17.4%)	29 (19.4%)
21 to 40 Ton	29 (19.3%)	25 (16.7%)	-----	43 (28.7%)	-----	-----
41 to 60 Ton	20 (13.3%)	27 (18%)	-----	7 (4.6%)	2 (1.3%)	4 (2.6%)
61 to 80 Ton	20 (13.3%)	16 (10.6%)	-----	-----	-----	3 (2%)
81 to 100 Ton	-----	18 (12%)	-----	-----	-----	-----
More than 100 Ton	8 (5.3%)	15 (10%)	-----	-----	-----	-----

( ) Shows the percentage of respondents to the total (150) respondents

Table No.3.13 shows that, classification of respondents by the production of various cash crops.

The Number of sample units who were get production of Sugarcane between the range 1 to 80 ton has declined from 53.3% (80) to 47.3% (71) during the period of before and after watershed development. But, there were number of sample units who were get production of Sugarcane more than 100 ton has gone up from 5.3% (8) to 10% (15) during the period of before and watershed development.

The Number of sample units who were gets production of Grapes between the range 1 to 60 Ton has gone up from 28.7% (43) to 45.6% (70) during the period of before and after watershed development.

The Number of sample units who were gets production of Banana between the range 1 to 80 Ton has gone up from 18.7% (28) to 24% (36) during the period of before and after watershed development.

Table No.3.14 shows that, classification of respondents by the cultivation size of various Oil seeds.

**Table No. 3.14**

**Classification of the Respondents by the Cultivation Size of Various Oil Seeds  
(Cultivation Size in Acre)**

Crops Cultivation Size	Soyabin		Groundnut	
	B.W.S.D.	A.W.S.D.	B.W.S.D.	A.W.S.D.
No Cultivation	76 (50.7%)	117 (78.7%)	65 (43.3%)	96 (64%)
Less than 0.5 Acre	34 (22.7%)	7 (4.7%)	52 (34.7%)	29 (19.3%)
0.5 to 1 Acre	32 (21.3%)	14 (9.3%)	31 (20.7%)	22 (14.7%)
1 to 1.5 Acre	-----	-----	-----	-----
1.5 to 2 Acre	8 (5.3%)	12 (8%)	2 (1.3%)	3 (2%)

( ) Shows the percentage of respondents to the total (150) respondents

The number of sample units who were not cultivating Soyabin has increased from 76 respondents in B.W.S.D. to 117 in A.W.S.D. It means that 27.3% (41) more respondents were not cultivated Soyabin A.W.S.D. It is happen, because more the people can get the cash crops A.W.S.D. and Oil Seeds have more cost of cultivation.

The number of sample units who were not cultivated Groundnut has gone up from 65 respondents in B.W.S.D. to 96 in A.W.S.D. It means that 20.6% (31) more respondents were not cultivated Groundnut A.W.S.D. It is happen, because more the people can get the cash crops A.W.S.D. and Oil Seeds have more cost of cultivation.

Table No.3.15 shows that, classification of respondents by the Production of various Oil seeds.

The Number of sample units who were get production of Soyabin range between 1 to 15 Q. has declined from 43.3% (65) to 19.3% (29) during the period of before and after watershed development.

The above changes are due to more cultivation cost for oil seeds and increased interest of farmers towards cash crops.

Table No. 3.15

Classification of the Respondents by the Production of Various Oil Seeds  
(Production in Quintal)

Crops Cultivation Size	Soyabin		Groundnut	
	B.W.S.D.	A.W.S.D.	B.W.S.D.	A.W.S.D.
No Production	76 (50.7%)	117 (78.7%)	65 (43.3%)	96 (64%)
Less than 1 Q	6 (4%)	2 (1.3%)	----	----
1 to 5 Q	25 (16.7%)	8 (5.3%)	73 (48.7%)	32 (21.3%)
6 to 10 Q	28 (18.7%)	2 (1.3%)	6 (4%)	18 (12%)
11 to 15 Q	12 (8.2%)	19 (12.7%)	----	2 (1.3%)
More than 16 Q	3 (2%)	2 (1.3%)	6 (4%)	2 (1.3%)

( ) Shows the percentage of respondents to the total (150) respondent

The Number of sample units who were get production of Groundnut range between 1 to 15 Q. has declined from 52.6% (79) to 34.6% (52) during the period of before and after watershed development.

### 3.6 Use of Chemical Fertilizers

Use of chemical fertilizer is one of the indicators of agriculture development. But it should not go beyond the limit.

**Table No. 3.16**  
**Expenditure on Chemical Fertilizers**

(Rs. Per Acre.)

Expenditure	B.W.S.D.		A.W.S.D.	
	Respondents	%	Respondents	%
No Use	1	0.7 %	0	0
Less than 1000	6	4.0 %	2	1.3 %
1001 to 2000	13	8.7 %	6	4.0 %
2001 to 3000	22	14.7 %	7	4.7 %
3001 to 4000	19	12.0 %	15	10.0 %
4001 to 5000	33	22.0 %	15	10.0 %
5001 to 6000	22	14.7 %	28	18.7 %
6001 to 7000	15	10.0 %	18	12.0 %
7001 to 8000	9	6.7 %	34	22.0 %
8001 to 9000	4	2.7 %	10	6.7 %
More than 9001	6	4.0 %	15	10.7 %
<b>Total</b>	<b>150</b>	<b>100 %</b>	<b>150</b>	<b>100 %</b>

Table No. 3.16 shows that trend of per acre expenditure on chemical fertilizers. B.W.S.D. 4% (6) farmers spent less than Rs. 1000 on chemical fertilizers. The number of sample units who were spending money on chemical fertilizers with the range between



Rs.4001 to 5000 has declined from 33 in B.W.S.D. to 15 in A.W.S.D. But, the number of sample units in the expenditure range of Rs.7001 to 8000 has gone up from 9 to 34 during the before and after watershed development.

The above analysis shows that expenditure on chemical fertilizers has forcefully increased for getting maximum crop production in irrigated land.

### **3.7 Use of Compost Fertilizers**

Use of compost fertilizers is helpful for increasing the productivity of land. Similar to chemical fertilizers, compost fertilizers play important role in the development of agriculture.

Table No. 3.17 shows that expenditure wise classification of compost fertilizers. B.W.S.D. 1.3% (2) farmers were did not use the compost fertilizers. There were 86.7% (130) farmers spent range between Rs. 500 to 15000 and only 12% (18) farmers spent between the range of Rs.15001 to 20000 and above.

A.W.S.D. all sample units spent on the compost fertilizers. There were 73.3% (100) farmers spent between the ranges of Rs.500 to 15000.

**Table No. 3.17**

**Expenditure on Compost Fertilizers**

(Expenditure In Rs.)

Expenditure	B.W.S.D.		A.W.S.D.	
	Respondents	%	Respondents	%
No Use	2	1.3 %	0	0
500 to 5000	52	34.7 %	38	25.3 %
5001 to 10000	27	18.0 %	19	12.7 %
10001 to 15000	51	34.0 %	53	35.3 %
15001 to 20000	8	5.3 %	10	6.7 %
More than 20001	10	6.7 %	30	20.0 %
<b>Total</b>	<b>150</b>	<b>100 %</b>	<b>150</b>	<b>100 %</b>

There was 26.7% (18) farmers spent range between Rs.15001 to 20000 and above.

The number of sample units who were spending money on compost fertilizers with the range between Rs.500 to 5000 has declined from 52 in B.W.S.D. to 38 in A.W.S.D. But the number of sample units in the expenditure range of Rs. more than 20001 has

increased from 10 to 30 farmers during the before and after watershed development.

Table No 3.18 shows that classification of respondents by agriculture income. B.W.S.D. there was not a single respondent having more than Rs.500000/- income. But, after the development of watershed there are 7.3% (11) respondents have more than Rs.500000 income from agriculture. It is only due to the development of watershed in the study area.

**Table No. 3.18**

**Classification of the Respondents by Agriculture Income**

Income (In Rs.)	B.W.S.D.		A.W.S.D.	
	Respondents	%	Respondents	%
10001 to 50000	48	32.0 %	17	11.3 %
50001 to 100000	52	34.7 %	44	29.4 %
100001 to 150000	9	6.0 %	26	17.4 %
150001 to 200000	13	8.7 %	17	7.3 %
200001 to 250000	7	4.7 %	6	4.0 %
250001 to 300000	8	5.3 %	9	6.0 %
300001 to 350000	2	1.3 %	5	3.3 %
350001 to 400000	7	4.7 %	11	7.3 %
400001 to 450000	2	1.3 %	3	2.0 %
450001 to 500000	2	1.3 %	7	4.7 %
More than 500001	0	0	11	7.3 %
<b>Total</b>	<b>150</b>	<b>100 %</b>	<b>150</b>	<b>100 %</b>

The number of sample units who were earned money income with the range between Rs.10001 to 100000 has declined 100 in B.W.S.D. to 61 in A.W.S.D. But, the number of sample units in the income range of Rs.350001 to 450000 has increased from 9 to 14 respondents during the before and after watershed development.

With the above analysis we conclude that due to watershed development there are most of respondents were getting maximum income from agriculture.

### **3.8 Investment in Agriculture**

Agriculture investment covers long term capital investment for enhancing the agriculture production. We have taken into account the following items of individual investment in farm activities made by the sample units on their farms or related to their farm activities.

Table No. 3.19 shows that classification of the investment made by the respondents on all items. There were 14 farmers who did not made individual investment in the agriculture. Majority of the sample units 55.4% (83) have made their individual investment on Well + EP + PL + Drip for irrigation purpose. This is the direct impact of watershed on individual Economies.

**Table No. 3.19**

**Classification of Investment in Agriculture Made by the Respondents**

<b>Type of Investment</b>	<b>No. of Respondents</b>	<b>Percentage</b>
No Investment	14	9.3 %
Well + Electric Pump	10	6.7 %
Pipe Line	8	5.3 %
Well + Pipe Line	6	4.0 %
Well + EP + PL	29	19.3 %
Well + EP + PL + Drip	83	55.4 %
<b>Total :</b>	<b>150</b>	<b>100 %</b>

Similarly investment of Well + EP (67%), Pipe Line (5.3%), Well + Pipe Line (4.0%) and Well + EP + PL (19.3%) are outcome of the impact of watershed development in the study area.

Table No. 3.20 shows that classification of respondents by investment in agriculture. About 5.3% (8) farmers spent less than

Rs.50000/- on agriculture investment. 68% (102) sample units invested in the range between Rs.50001 to 250000.

**Table No. 3.20**

**Classification of Respondents by the Amount of Investment in  
Agriculture**

<b>Investment (In Rs.)</b>	<b>No. of Respondents</b>	<b>Percentage</b>
No Investment	14	9.3 %
Less than 50000	8	5.3 %
50001 to 100000	34	22.7 %
100001 to 150000	24	16.0 %
150001 to 200000	24	16.0 %
200001 to 250000	20	13.3 %
250001 to 300000	17	11.3 %
More than 300001	9	6.0 %
<b>Total :</b>	<b>150</b>	<b>100 %</b>

About 11.3% (17) samples invested in the range between Rs.250001 to 300000. And only 6% (9) sample units invest in agriculture more than Rs.300001.

### 3.9 Land Improvement Programme

The soil and water conservation are the dominant components of the WDP's. Therefore, the direct impact of WDP is normally observed on Land use Pattern. Crop Combination, Double Cropping, Crop Intensity, Resource Intensity per unit of land are other parameter of change generally tasted in the impact analysis.

**Table No. 3.21**

**Classification of the Respondents by Land Improvement Programme**

<b>Improvement Programme</b>	<b>Respondents</b>	<b>Percentage</b>
No Improvement	47	31.3 %
Land Leveling	14	9.3 %
Plantation	56	37.4 %
Land Leveling + Plantation	30	20.0 %
LL + Bunding + Plantation	3	2.0 %
<b>Total :</b>	<b>150</b>	<b>100 %</b>

Table No 3.21 shows that there are 31.3% (47) respondents did not implementing any land improvement programme.

Land leveling, Bunding, and Plantation are the three important programmes followed at the farm level.

Land leveling activities is introduced by 9.3% (14) respondents, plantation by 37.4% (56), Land Leveling + Plantation by 20% (30) respondents. And LL+Bunding+Plantation are introduced by only 2% (3) farmers.

**Table No. 3.22**

**Classification of Respondents by the Amount of Investment on Land Improvement Programme**

<b>Investment (In Rs.)</b>	<b>No. of Respondents</b>	<b>Percentage</b>
No Investment	47	31.4 %
Less than 10000	32	21.3 %
10001 to 20000	35	23.3 %
20001 to 30000	9	6.0 %
30001 to 40000	4	2.7 %
More than 40001	23	15.3 %
<b>Total :</b>	<b>150</b>	<b>100 %</b>

Table No. 3.22 highlights amount wise classification of sample units in concern to land improvement activities in the study area.



There were 31.4% (47) farmers did not spent on land improvement programme. More than 50% (76) respondents spent Rs. up to 30000 on land improvement programme. 2.7% (4) farmers spent range between Rs.30001 to 40000 on land improvement programme. And only 15.3% (23) respondents spent more than Rs.40001 on land improvement programme.

Such type of expenses improves the soil quality and hence is a kind of investment on the land asset. This brings further returns to the investors.

### **Conclusion :**

The foregoing analysis clarify that in the study area there are highlighting changes takes place due in Cropping Pattern, Irrigation Facility, Use of Chemical and Compost Fertilizers, Investment in Agriculture and Land Improvement Programme etc. i.e. the ultimate result of Watershed Development Programme.