CHAPTER III

IMPACT OF TULASHI DAM ON AGRICULTURE LAND

CHAPTER III

3.1 INTRODUCTION

Dams play significant role in the process of development in which economic as well as social status of society particularly the population engaged in agriculture in command area increases in terms of many social aspects. Nevertheless, dams are also benefited in reduction of flood and other hydrological characteristics of the river. In the present chapter impact of irrigation development that has taken place after the construction of dam on river Tulshi has primarily analyzed with the help of intensive fieldwork done. During the fieldwork, thorough interview of the farmers have been taken in three sample villages. Distribution of agriculture land, cultivated land, irrigated land and waste land has methodically classified and the proportion of the same is analyzed. Pre and post project proportion of area under different crops have also been taken for the analysis with an account of individual village. The tables have given in annexure. With the help of graphical techniques the results are then depicted in suitable graphs.

3.2 DISTRIBUTION OF LAND HOLDINGS

The ownership and proportion of land provides valuable ground for development of agriculture in particular region. An attempt here is made to study the distribution of same of sample respondents by actual size of holdings they had and they have in pre-project period and post project period respectively.

Table:3.1-A,B,C and D have depicted that the situation of ownership holdings in sample villages as Chande, Savarde Dumala. and Saverwadi respectively (fig.3.1). It is highlighted that village Chande showing significant positive change in ownership holdings after the implementation of irrigation project. Marginal farmers were having 16.40 Ha own land, small farmer with 35.20 Ha, medium had 21 Ha.

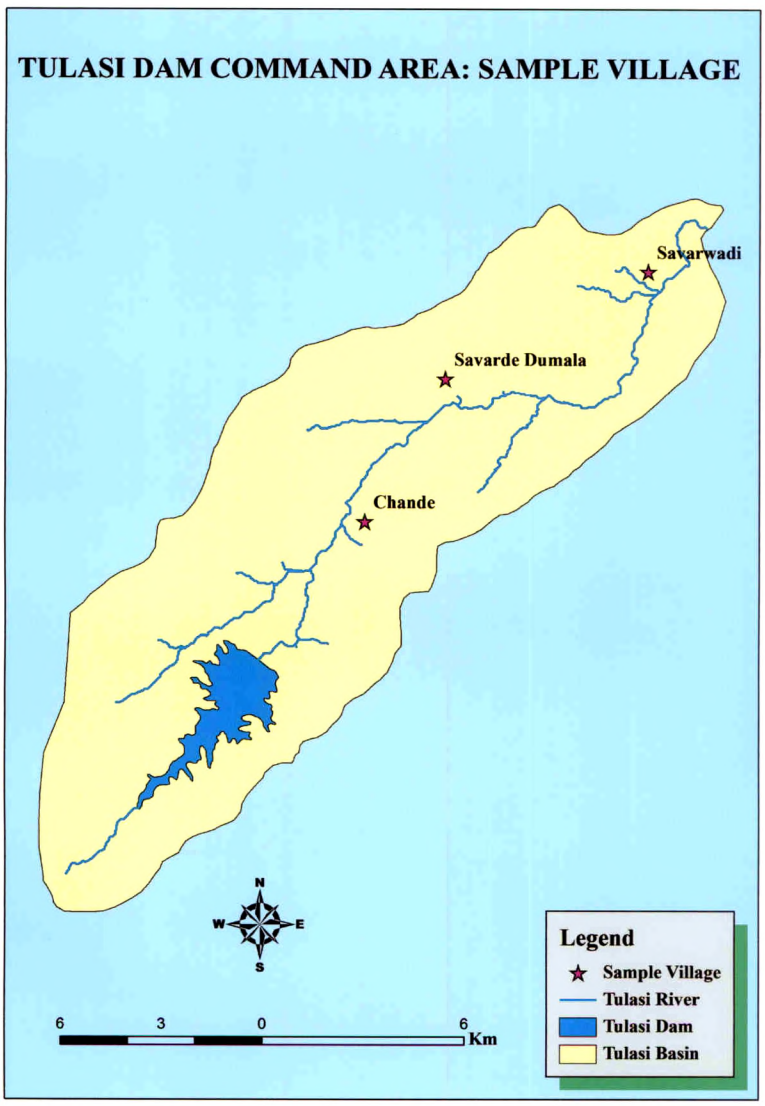


Figure: 3.1 Location Map of sample villages

and big ones was with 13.10 ha land in pre project period, but after dam scenario is being changed and ownership holding of marginal, small, medium and large farmers become 17.30 ha, 37 ha, 22.30 ha and 15.3 ha respectively. Slightly negative change is observed in the villages of Saverde-Dumala and Saverwadi. Total own land of all farmers in pre project period was 87.4 and 84.3 ha in the Saverwadi and Saverde-Dumala respectively. After project own land of Savarde-Dumala and Saverwadi has reduced by 0.57 and 1.19 respectively. It may happened due to the land transaction to next generation as well as fragmentation of own land.

The composite table 3.1- D shows that in pre project time out of total 258.10 ha own land small farmers had around 20% share i.e. 53.20 ha land and stood first. Second and third position occupied by medium and marginal farmers and they were having 58.2 ha and 53.2 ha own land respectively. Small proportion of own land were concerned to Large farmers and they had only 42.2 ha land. After the availability of water for agriculture through Tulasi project slightly positive change has occurred. The total own land of all farmers is increased by 1.66% and become 262.40 ha. Except marginal farmers all farming categories are showing positive change in their own land.

Table: 3.1 Distributions of Land Holdings.

A. (Village: Chande)

Particulars	Pre-Project		Post-Project		Changes %
	Holding (ha)	Share (%)	Holding (ha)	Share (%)	
Marginal Farmers	16.40	18.98	17.30	18.76	5.49
Small Farmers	35.20	40.74	37.40	40.56	6.25
Medium Farmers	21.70	25.12	22.30	24.19	2.76
Large Farmers	13.10	15.16	15.20	16.49	16.03
Total	86.40	100.00	92.20	100.00	6.71

B.(Village: Savarde Dumala)

Particulars	Pre-Project		Post-Project		Changes %
	Holding (ha)	Share (%)	Holding (ha)	Share (%)	
Marginal Farmers	15.20	17.39	15.20	17.49	0.00
Small Farmers	33.40	38.22	33.00	37.97	-1.20
Medium Farmers	20.10	23.00	21.30	24.51	5.97
Large Farmers	18.70	21.40	17.40	20.02	-6.95
Total	87.40	100.00	86.90	100.00	-0.57

C.(Village:-Savarwadi)

Particulars	Pre-Project		Post-Project		Changes %
	Holding (ha)	Share (%)	Holding (ha)	Share (%)	
Marginal Farmers	21.60	25.62	20.30	24.37	-6.02
Small Farmers	35.40	41.99	35.40	42.50	0.00
Medium Farmers	16.90	20.05	17.20	20.65	1.78
Large Farmers	10.40	12.34	10.40	12.48	0.00
Total	84.30	100.00	83.30	100.00	-1.19

D.(Composite)

Particulars	Pre-Project		Post-Project		Changes %
	Holding (ha)	Share (%)	Holding (ha)	Share (%)	
Marginal Farmers	53.20	20.61	52.8	29.62	-0.75
Small Farmers	104.00	40.29	105.80	35.53	1.73
Medium Farmers	58.70	22.74	60.80	20.42	3,58
Large Farmers	42.20	16.35	43.00	14.44	1.90
Total	258.10	100.00	262.40	100.00	1.66

Source: Based on field work statistics.

Distribution of Cultivated Land by Size Holdings

Cultivation practice is crucial one to maintain agricultural land under continuous cultivation. It is therefore, good cultivation practice is always helpful to take care of land asset from farm land degradation, in spite of that the process of cultivation help to increase the efficiency of land for crop production. Significant effort has taken to study the all farmers category related to their land under cultivation in pre project time and post project period.

Table: 3.2-A,B,C,and D give the detail account of cultivated land of respondents in the villages of Chande, Savarde-Dmala and Saverwadi respectively. In the pre project period out of total cultivated land near about 27 ha. Cultivated land occupied by small farmers followed by 13.64ha, 10.65ha cultivated land with medium and marginal farmers respectively in Chande. In the same village large farmers had 9.09 ha land under cultivation. After the improvement in irrigation by finishing Tulasi irrigation project, categories of all farmers have shown the increased trend in the cultivation land. As far as large farmers are concerned, land under cultivation is increased by 51%.

Situation regarding to land under cultivation among the farmers is not much different in Savarde-Dumala and Saverwadi. Small farmers were predominant concerned to cultivated land in pre project phase. Before project large farmers had 8.35ha and 5.50 ha cultivated land in Savarde-Dumala and Saverwadi respectively. In post project period it has increased up to 16.5 ha and 8.45 ha in Savarde-Dumala and Saverwadi respectively.

Table: 3.2 Distributions of Cultivated Land by Holdings.

A. (Village: Chande)

Particulars	Pre-Project		Post-Project		Changes %
	Holding (ha)	Share (%)	Holding (ha)	Share (%)	
Marginal Farmers	10.65	18.59	13.58	19.58	27.51
Small Farmers	23.90	41.72	25.95	37.41	8.58
Medium Farmers	13.64	23.81	16.09	23.20	17.96
Large Farmers	9.09	15.87	13.74	19.81	51.16
Total	**57.28**	**100.00**	**69.36**	**100.00**	21.09

B. (Village: Savarde Dumala)

Particulars	Pre-Project		Post-Project		Changes %
	Holding (ha)	Share (%)	Holding (ha)	Share (%)	
Marginal Farmers	7.98	16.65	13.04	17.57	63.41
Small Farmers	20.01	41.75	27.50	37.05	37.43
Medium Farmers	11.59	24.18	17.19	23.16	48.32
Large Farmers	8.35	17.42	16.50	22.23	97.60
Total	**47.93**	**100.00**	**74.23**	**100.00**	54.87

C. (Village: Saverwadi)

Particulars	Pre-Project		Post-Project		Changes %
	Holding (ha)	Share (%)	Holding (ha)	Share (%)	
Marginal Farmers	12.83	23.92	18.92	26.55	47.47
Small Farmers	24.30	45.31	31.40	44.06	29.22
Medium Farmers	11.00	20.51	12.50	17.54	13.64
Large Farmers	5.50	10.26	8.45	11.86	53.64
Total	**53.63**	**100.00**	**71.27**	**100.00**	**32.89**

D. (Composite)

Particulars	Pre-Project		Post-Project		Changes %
	Holding (ha)	Share (%)	Holding (ha)	Share (%)	
Marginal Farmers	31.46	19.81	45.54	21.20	44.76
Small Farmers	68.21	42.94	84.85	39.49	24.40
Medium Farmers	36.23	22.81	45.78	21.31	26.36
Large Farmers	22.94	14.44	38.69	18.01	68.66
Total	**158.84**	**100.00**	**214.86**	**100.00**	**35.27**

Source: Based on field work statistics.

Distribution of Irrigated Land by Size of Holdings

To carry out agricultural operations efficiently in the whole time of the year, controlled, assured and continuous water supply through irrigation is very essential. The significance of irrigation has been realized long ago. Realizing the importance of irrigation system, Mahatma Gandhi Observed, "Nothing can be more important than the provision of agricultural growth. In the absence of irrigation facilities, agriculture is nothing more than a gamble". Likewise, Thomas Fuller (?) observed that "we never identify the worth of water till the well is dry". In order to adopt intensive method of cultivation along with a cropping pattern, irrigation system is considered very crucial. Victory in enlarging the area under irrigation is crucial in raising agriculture production (R. D. Jainapur et al 2007). In following tables an effort has taken to highlight the distribution of irrigated land in sample villages in before and after the construction of dam.

Table: 3.3 Distribution of Irrigated land. (Chande)

Pre- project (Ha.)				
Particulars	**Seasonal**	**Share (%)**	**Perennial**	**Share (%)**
Marginal Farmers	8.20	19.41	2.45	16.30
Small Farmers	19.50	46.15	4.40	29.27
Medium Farmers	9.25	21.89	4.39	29.21
Large Farmers	5.30	12.54	3.79	25.22
Total	**42.25**	**100.00**	**15.03**	**100.00**
Post-project (Ha.)				
Marginal Farmers	3.20	17.02	10.38	20.53
Small Farmers	4.78	25.42	21.17	41.87
Medium Farmers	5.21	27.72	10.88	21.52
Large Farmers	5.61	29.84	8.13	16.08
Total	**18.80**	**100.00**	**50.56**	**100.00**

Source: Based on field work statistics.

Table:3.3, emphasizing the situation of village Chande. It is found that, in pre project time out of total 42.25 ha seasonal irrigated land small farmers were having share of 19.41% and stood first,

followed by medium, marginal and large farmers respectively. As far as perennial irrigated land is concerned small and marginal farmers had 4.4 ha and 4.39 ha respectively. The picture has changed after construction of dam, area under seasonal irrigation is reduced significantly. Only large farmers are showing slightly increment in seasonal irrigation. On the other hand in agriculture land under perennial irrigation showed more than threefold increment after the development of irrigation project. Out of total 50.56 ha perennially irrigated land, small farmers contribute 41.87%, i.e. 21.17 ha. Marginal, medium and large farmers are having 20.53%, 21.52%, and 16.08% of land respectively.

Table: 3.4 Distribution of Irrigated land. (Savarde Dumala)

Pre- project (Ha.)				
Particulars	**Seasonal**	**Share (%)**	**Perennial**	**Share (%)**
Marginal Farmers	5.90	17.15	2.08	15.37
Small Farmers	15.40	44.77	4.61	34.07
Medium Farmers	8.10	23.55	3.49	25.79
Large Farmers	5.00	14.53	3.35	24.76
Total	**34.40**	**100.00**	**13.53**	**100.00**
Post-project (Ha.)				
Marginal Farmers	3.02	22.22	10.02	16.52
Small Farmers	5.07	37.31	22.43	36.99
Medium Farmers	3.00	22.08	14.19	23.40
Large Farmers	2.50	18.40	14.00	23.09
Total	**13.59**	**100.00**	**60.64**	**100.00**

Source: Based on field work statistics.

Table:3.4 enumerating the situation of village Savarde-Dumala It is explored that practice of seasonal irrigation was predominant in pre project period. Out of total seasonal irrigated land small farmers had maximum share i.e. 15.40 ha followed by medium farmers (8.10 ha), marginal farmers (5.90 ha) and large farmers (5.00 ha) respectively. Due to the watering by Tulasi irrigation project, the area under seasonal irrigation is considerably reduced. Out of total 13.59 ha seasonal irrigated land small farmers are having 5.07 ha. i.e. maximum one,

followed by marginal, medium and large farmers respectively. Very meager amount of land was under perennial irrigation in before project period. Out of total 13.53 ha of perennial irrigated land small farmers were having 4.61ha, followed by medium farmers (3.49 ha), large farmers (3.35 ha), and at the last marginal farmers (2.08 ha) respectively. In post project era, perennial irrigated land has increased by more than 4 times and become 60.64 ha. out of total 60.64 ha share of small farmers are high i.e. 36.99%.

Table: 3.5 Distribution of Irrigated land. (Savarwadi)

Pre- project (Ha.)				
Particulars	**Seasonal**	**Share (%)**	**Perennial**	**Share (%)**
Marginal Farmers	10.20	23.61	2.63	25.22
Small Farmers	22.30	51.62	2.00	19.18
Medium Farmers	7.50	17.36	3.50	33.56
Large Farmers	3.20	7.41	2.30	22.05
Total	**43.20**	**100.00**	**10.43**	**100.00**
Post-project (Ha.)				
Marginal Farmers	3.62	24.51	15.30	27.08
Small Farmers	6.90	46.72	24.50	43.36
Medium Farmers	2.80	18.96	9.70	17.17
Large Farmers	1.45	9.82	7.00	12.39
Total	**14.77**	**100.00**	**56.50**	**100.00**

Source: Based on field work statistics.

Table: 3.5 presenting the picture of village Savarwadi, which shows that in the pre project time out of total seasonal irrigated land small farmers had 22.30 ha, marginal farmers, medium and large farmers were having 10.20 ha, 7.50 ha, and 3.20ha respectively. On the other hand there were only 10.43 ha land under perennial type of irrigation, of which medium farmers were shown the maximum share i.e. 33.56% followed by marginal (25.22%), large (22.05%) and small farmers (19.18%) respectively. After the construction of dam negative change has occurred in land under seasonal irrigation, and it has become 14.77ha. still small farmers contributes maximum share in seasonal

irrigation i.e. 6.9ha. only 1.45ha land under seasonal irrigation of large farmers. Considerable growth is observed in the perennially irrigated land in post project era. Out of total 56.50 ha perennially irrigated land, small farmers are showing highest share i.e. 43%, followed by marginal medium and large farmers.

Table: 3.6 Distribution of Irrigated land. (Composite)

Pre- project (Ha.)				
Particulars	**Seasonal**	**Share (%)**	**Perennial**	**Share (%)**
Marginal Farmers	24.30	16.80	7.16	18.36
Small Farmers	57.20	49.80	11.01	28.24
Medium Farmers	24.85	21.64	11.38	29.19
Large Farmers	13.50	11.75	9.44	24.21
Total	**119.85**	**100.00**	**38.99**	**100.00**
Post-project (Ha.)				
Marginal Farmers	9.84	20.87	35.70	21.29
Small Farmers	16.75	35.52	68.10	40.61
Medium Farmers	11.01	23.35	34.77	20.73
Large Farmers	9.56	20.27	29.13	17.37
Total	**47.16**	**100.00**	**167.70**	**100.00**

Source: Based on field work statistics.

Above tables are describing the combined situation of irrigation in concerned three villages located in the command area of Tulasi irrigation project. It is highlighted that in pre project period majority of land were come under seasonal type of irrigation in tulasi river basin. Out of total 119.85 ha 57.20 ha seasonal irrigated land was with small farmers and 24.85 ha, 24.30 ha, and 13.50 ha land were belonging to medium, marginal and large farmers respectively. There was very small proportion of land under perennial irrigation i.e. 38.99 ha of which medium farmers had above 29% followed by medium (28.24 %), large (24.21 %) and marginal (18.36 %) respectively. Construction of Tulasi irrigation project has brought revolutionary change in the irrigated land in this region. Land under perennial irrigation is increased by more than five times after project. Out of total perennially irrigated land small

farmers are having 40.61% followed by marginal, medium and large farmers respectively.

Distribution of Waste Land by Size of Holdings

Waste land is a land which is not being under cultivation since long time, even though it is having capability to produce crops. There are several factors responsible for generation of waste land, but scarcity of water for irrigation is predominant one. In this particular part attempt has made to study the distribution of waste land among the sample villages.

Table: 3.7-A,B,C, enumerating the situation of waste land among the farming categories in village Chande, Savarde-Dumala and Savarwadi respectively. In pre project period near about 29 ha land was waste land in Chande, of which small farmers were having maximum waste land i.e. 11.30ha . followed by medium, marginal and large farmers respectively. After completion of irrigation project proportion of waste land has been reduced by 20% in Chande. Out of total 23.54ha, small farmers are having 51% i.e. 12.15ha . medium, marginal and large farmers are sharing 15.80%, 26.38% and 6.20% respectively.

In Savarde-Dumala there was 39.47 ha land under the category of waste land before project, of which abut 34 % land was occupied by small farmers. Large, medium and marginal farmers were belonging to 26%, 21% and 18% respectively. It is observed that there is significant reduction occurred in waste land in post project period. Out of total12.67ha small farmers are having 5.50 ha that is maximum one. Medium and marginal farmers are occupying 4.11 ha and 2.16 ha respectively. Large farmers are having very meager amount of waste land that is 0.90 ha.

Situation was not much different in village Savarwadi concerned to waste land. There was 30.67 ha land considered as waste land in pre project era ,out of which small farmers had 36%, marginal, medium and large farmers were own 28%, 19% and 16% of waste land respectively.

Development of irrigation through construction of tulasi dam has crucially affected the growth of waste land. In post project period waste land is reached up to 12.03 ha. Of which medium farmers sharing highest proportion (39.07%) followed by small, large and marginal farmers respectively.

Table: 3.7 Distributions of Waste Land by Holdings.

A. (Village: Chande)

Particulars	Pre-Project		Post-Project		Changes %
	Holding (ha)	Share (%)	Holding (ha)	Share (%)	
Marginal Farmers	5.75	19.75	3.72	15.80	-35.30
Small Farmers	11.30	38.80	12.15	51.61	7.52
Medium Farmers	8.06	27.68	6.21	26.38	-22.95
Large Farmers	4.01	13.77	1.46	6.20	-63.59
Total	**29.12**	**100.00**	**23.54**	**100.00**	**-19.16**

B. (Village: Savarde Dumala)

Particulars	Pre-Project		Post-Project		Changes %
	Holding (ha)	Share (%)	Holding (ha)	Share (%)	
Marginal Farmers	7.22	18.29	2.16	17.05	-70.08
Small Farmers	13.39	33.92	5.50	43.41	-58.92
Medium Farmers	8.51	21.56	4.11	32.44	-51.70
Large Farmers	10.35	26.22	0.90	7.10	-91.30
Total	**39.47**	**100.00**	**12.67**	**100.00**	**-67.90**

C. (Village: Saverwadi)

Particulars	Pre-Project		Post-Project		Changes %
	Holding (ha)	Share (%)	Holding (ha)	Share (%)	
Marginal Farmers	8.77	28.59	1.38	11.47	-84.26
Small Farmers	11.10	36.19	4.00	33.25	-63.96
Medium Farmers	5.90	19.24	4.70	39.07	-20.34
Large Farmers	4.90	15.98	1.95	16.21	-60.20
Total	**30.67**	**100.00**	**12.03**	**100.00**	-60.78

D. (Composite)

Particulars	Pre-Project		Post-Project		Changes %
	Holding (ha)	Share (%)	Holding (ha)	Share (%)	
Marginal Farmers	21.74	21.90	7.26	18.69	-66.61
Small Farmers	35.79	36.06	21.65	55.74	-39.51
Medium Farmers	22.47	22.64	15.02	31.14	-33.16
Large Farmers	19.26	19.40	4.31	11.10	-77.62
Total	**99.26**	**100.00**	**48.24**	**100.00**	**-60.87**

Source: Based on field work statistics.

Table: 3.7-D is exposing the sum condition of sample villages among the farmers regarding to waste land. It is reveled that near about 99 ha land was under the category of waste land, out of which small farmers had 36 % that is maximum one, followed by medium (22.47%), marginal (21.74%) and large farmers (19.26%) receptively. After the implementation of irrigation project in Tulasi river basin scenario of waste land has changed and it has reduced by 60 %. Out of total 48.24 ha waste land, maximum share is belonging to small farmers i.e. about 55% followed by medium, small and large farmers.

Table: 3.8 Pre-Project Proportions of Changes of Land Status (Chande) (Ha.)

Particulars of Farmers	Cultivated Land	Irrigated Land (ha)		Waste Land	Total Own Land
		Seasonal	Perennial		
Marginal	10.65	8.20	2.45	5.75	16.40
	(64.94)	*(50.00)*	*(14.94)*	*(35.06)*	*(100.00)*
Small	23.90	19.50	4.40	11.30	35.20
	(67.90)	*(55.40)*	*(12.50)*	*(32.10)*	*(100.00)*
Medium	13.64	9.25	4.39	8.06	21.70
	(62.86)	*(42.63)*	*(20.23)*	*(37.14)*	*(100.00)*
Large	9.09	5.30	3.79	4.01	13.10
	(69.39)	*(40.46)*	*(28.93)*	*(30.61)*	*(100.00)*
Total	57.28	42.25	15.03	29.12	86.40
	(66.30)	*(48.90)*	*(17.40)*	*(33.70)*	*(100.00)*

Source: Based on field work statistics.

Above table 3.8 is representing the percentage of cultivated land, irrigated land and waste land to total own land among the farmers categories in pre-project period. According to this out of total own land (86.40 ha), 66.3 % land were under cultivation. Out of total cultivated land the share of seasonal irrigated land was higher i.e. 42.25 ha than perennial one. Percentage share of total waste land to total own land was about 34 % (29.12 Ha).

Among the farmers large farmers were showing the highest share of cultivated land to total own land i.e. 69.39%, lowest share of cultivated land was belonging to medium farmers i.e. 62.86 %. It is

shown that maximum percentage share of area under seasonal irrigation was concerned to small farmers that is about 55% to total own land. Large farmers were dominant regarding to share of perennial irrigated land to total own land. As far as waste land is concerned medium farmers were showing highest per cent share (37.14%) to own land.

Table: 3.9 Post-Project Proportions of Changes of Land Status (Chande) (Ha.)

Particulars of Farmers	Cultivated Land	Irrigated Land		Waste Land	Total Own Land
		Seasonal	Perennial		
Marginal	13.58	3.20	10.38	3.72	17.30
	(78.50)	*(18.50)*	*(60.00)*	*(21.50)*	*(100.00)*
Small	25.95	4.78	21.17	12.15	37.40
	(69.39)	*(12.78)*	*(56.60)*	*(32.49)*	*(100.00)*
Medium	16.09	5.21	10.88	6.21	22.30
	(72.15)	*(23.36)*	*(48.79)*	*(27.85)*	*(100.00)*
Large	13.74	5.61	8.13	1.46	15.20
	(90.39)	*(36.91)*	*(53.49)0*	*(9.63)*	*(100.00)*
Total	69.36	18.80	50.56	23.54	92.20
	(75.23)	*(20.39)*	*(54.84)*	*(25.53)*	*(100.00)*

Source: Based on field work statistics.

Table 3.9 focusing the post project scenario of cultivated land, irrigated land and waste land with respect to total own land in Chande. Large farmers are having 90% cultivated land with respect to own land i.e. maximum one. Significant reduction has occurred in seasonal irrigation due to development of irrigation. Minimum area covered by seasonal irrigation is of small farmers i.e. about 13% to total own land. Land comes under the perennial irrigation has considerably increased and small farmers are showing 60% of land under perennial irrigation concerned to total own land i.e. maximum one. It is observed that land comes under the category of waste land has profoundly reduced due to the construction of irrigation project. Large farmers are occupying 9.63% of land as a waste land with regards to total own land.

Table: 3.10 Pre-Project Proportions of Changes of Land Status (Ha.)
(Saverde Dumala)

Particulars of Farmers	Cultivated Land	Irrigated Land		Waste Land	Total Own Land
		Seasonal	Perennial		
Marginal	7.98	5.90	2.08	7.22	15.20
	(52.50)	*(38.82)*	*(13.68)*	*(47.50)*	*(100.00)*
Small	20.01	15.40	4.61	13.39	33.40
	(59.91)	*(46.11)*	*(13.80)*	*(40.09)*	*(100.00)*
Medium	11.59	8.10	3.49	8.51	20.10
	(57.66)	*(40.30)*	*(17.36)*	*(42.34)*	*(100.00)*
Large	8.35	5.00	3.35	10.35	18.70
	(44.65)	*(26.74)*	*(17.91)*	*(55.35)*	*(100.00)*
Total	47.93	34.40	13.53	39.47	87.40
	(54.84)	*(39.36)*	*(15.48)*	*(45.16)*	*(100.00)*

Source: Based on field work statistics.

Above table 3.10 is giving stress on the pre project situation of cultivated, irrigated and waste land to total won land of village Savarde-Dumala There were 54.84% land was under cultivation with respect to total own land. 39% and 15% land was under seasonal and perennial irrigation respectively. Near about 45% land was considered as waste land to total own land. As far as types of farmers are concerned, high proportion of cultivated land was belonging to small farmers and its per cent share was about 60% to total own land. It is shown that seasonal irrigation was predominant in pre project era. High proportion of land came under seasonal irrigation was 46% and belonging to small farmers. Share of perennial irrigation was insignificant and less proportion of this were concerned to marginal farmers. Large farmers were having 55% of waste land to total own land and i.e. maximum one.

Table: 3.11 Post-Project Proportions of Changes of Land Status (Ha.) (Saverde Dumala)

Particulars of Farmers	Cultivated Land	Irrigated Land		Waste Land	Total Own Land
		Seasonal	Perennial		
Marginal	13.04	3.02	10.02	2.16	15.20
	(85.79)	*(19.87)*	*(65.92)*	*(14.21)*	*(100.00)*
Small	27.50	5.07	22.43	5.50	33.00
	(83.33)	*(15.36)*	*(67.97)*	*(16.67)*	*(100.00)*
Medium	17.19	3.00	14.19	4.11	21.30
	(80.70)	*(14.08)*	*(66.62)*	*(19.30)*	*(100.00)*
Large	16.50	2.50	14.00	0.90	17.40
	(94.83)	*(14.37)*	*(80.46)*	*(5.17)*	*(100.00)*
Total	74.23	13.59	60.64	12.67	86.90
	(85.42)	*(15.64)*	*(69.78)*	*(14.58)*	*(100.00)*

Source: Based on field work statistics.

Table 3.11 putting emphasize on the distribution of cultivated, irrigated and waste land to own land among the farmers in post project period. The lands under cultivation as well as perennial irrigation have shown the positive change after the execution of irrigation project. The maximum proportion of land under cultivation to own land is observed in large farmers category i.e. about 95% followed by marginal, small and medium farmers respectively. Medium farmers are showing less proportion of land under seasonal irrigation to own land i.e. 14.37%. As far as perennial irrigation is concerned large farmers are having more than 80% land under to own land under perennial irrigation followed by medium, small and marginal farmers respectively. The negative change has observed in the proportion of waste land after dam construction. Large farmers are having less proportion of waste land to total own land i.e. 5.17%.

Table: 3.12 Pre-Project Proportions of Changes of Land Status (Ha.) (Saverwadi)

Particulars of Farmers	Cultivated Land	Irrigated Land		Waste Land	Total Own Land
		Seasonal	Perennial		
Marginal	12.83	10.20	2.63	8.77	21.60
	(59.40)	*(47.22)*	*(12.18)*	*(40.60)*	*(100.00)*
Small	24.30	22.30	2.00	11.10	35.40
	(68.64)	*(62.99)*	*(5.65)*	*(31.36)*	*(100.00)*
Medium	11.00	7.50	3.50	5.90	16.90
	(65.09)	*(44.38)*	*(20.71)*	*(34.91)*	*(100.00)*
Large	5.50	3.20	2.30	4.90	10.40
	(52.88)	*(30.77)*	*(22.12)*	*(47.12)*	*(100.00)*
Total	53.63	43.20	10.43	30.67	84.30
	(63.62)	*(51.25)*	*(12.37)*	*(36.38)*	*(100.00)*

Source: Based on field work statistics.

Above table 3.12 is narrating the situation of irrigated, cultivated and waste land to total own land in Savarwadi. Small farmers were having 68.64% cultivated land to own land i.e. maximum one fallowed by medium, marginal and large farmers respectively. Total land under seasonal irrigation was above 50% to own land. Small farmers had near about 63% of land under seasonal irrigation. Small proportion of land came under perennial irrigation. Large farmers were having maximum land under perennial irrigation i.e. 22% to own land. It is observed that over all proportion of waste land was above 30% to total own land in all farming categories, of which large farmers and marginal farmers were dominant and having 47% and 40% of land under perennial irrigation to own land. As far as total own land of respective villages are concerned, there were small farmers had 35.40 ha that is maximum one.

Table: 3.13 Post-Project Proportions of Changes of Land Status (Ha.) (Saverwadi)

Particulars of Farmers	Cultivated Land	Irrigated Land		Waste Land	Total Own Land
		Seasonal	Perennial		
Marginal	18.92	3.62	15.30	1.38	20.30
	(93.20)	*(17.83)*	*(75.37)*	*(6.80)*	*(100.00)*
Small	31.40	6.90	24.50	4.00	35.40
	(88.70)	*(19.49)*	*(69.21)*	*(11.30)*	*(100.00)*
Medium	12.50	2.80	9.70	4.70	17.20
	(72.67)	*(16.28)*	*(56.40)*	*(27.33)*	*(100.00)*
Large	8.45	1.45	7.00	1.95	10.40
	(81.25)	*(13.94)*	*(67.31)*	*(18.75)*	*(100.00)*
Total	71.27	14.77	56.50	12.03	83.30
	(85.56)	*(17.73)*	*(67.83)*	*(14.44)*	*(100.00)*

Source: Based on field work statistics.

Important changes have occurred in the cultivated, irrigated and waste land of the village Savarwadi (Table 3.13) after the construction of Tulasi dam. It is evaluated that, marginal farmers are occupying near about 93% land under cultivation to own land. Land under seasonal irrigation has reduced significantly. It is shown that only 17.73% land is under seasonal irrigation and maximum proportion of land comes under seasonal irrigation is belonging to small farmers i.e. 19% to own land. Proportion of perennial irrigation has increased, about 68% land belonging to it. Marginal farmers are showing 75.37% land comes under perennial irrigation i.e. maximum one. Near about 14.44% land to own land is considered as waste land and highest proportion of it is belonging to medium farmers i.e. 27.33% to own land. There is slight reduction has observed in total own land in Savarwadi.

Table: 3.14 Pre-Project Proportions of Changes of Land Status (Ha.) (Composite)

Particulars of Farmers	Cultivated Land	Irrigated Land		Waste Land	Total Own Land
		Seasonal	Perennial		
Marginal	31.46	24.30	7.16	21.74	53.20
	(59.14)	*(45.68)*	*(13.45)*	*(40.86)*	*(100.00)*
Small	68.21	57.20	11.10	35.79	104.00
	(65.59)	*(55.00)*	*(10.67)*	*(34.41)*	*(100.00)*
Medium	36.23	24.85	11.38	22.47	58.70
	(61.72)	*(42.33)*	*(19.39)*	*(38.28)*	*(100.00)*
Large	22.94	13.50	9.44	19.26	42.20
	(54.36)	*(31.99)*	*(22.37)*	*(45.64)*	*(100.00)*
Total	158.84	119.85	39.08	99.26	258.10
	(61.54)	*(46.44)*	*(15.14)*	*(38.46)*	*(100.00)*

Source: Based on field work statistics.

The consolidated table 3.14 is describing the sum condition of irrigated, cultivated and waste land to total own land. It reveals that, in pre project period there were 60% land to own land under cultivation in sample villages, of which above 40% was under seasonal irrigation and remaining came under perennial irrigation. Over all about 38% to own land was not in use for cultivation. Among the types f farmers in selected sample villages are concerned, small farmers were having about 65% land to own land under cultivation that is maximum one followed by medium, marginal and large farmers restively. Seasonal irrigation was overwhelmed in pre project time. Here also small farmers played crucial role and having 55% land to own land under seasonal irrigation. Very meager proportion of land had came under perennial type of irrigation. Due to the sufficient economic support large farmers were having about 22% land to own land under perennial irrigation followed by medium, marginal and small farmers. With regards to waste land, it is shown that large farmers had 45.64% land to own land under the category of waste land.

Table: 3.15 Post-Project Proportions of Changes of Land Status (Ha.) (Composite)

Particulars of Farmers	Cultivated Land	Irrigated Land		Waste Land	Total Own Land
		Seasonal	Perennial		
Marginal	45.54	9.84	35.70	7.26	52.80
	(86.25)	*(18.64)*	*(67.61)*	*(13.75)*	*(100.00)*
Small	*84.85*	*16.75*	*68.10*	*21.65*	*106.50*
	(79.67)	*(15.73)*	*(63.94)*	*(20.33)*	*(100.00)*
Medium	45.78	11.01	34.77	15.02	60.80
	(75.30)	*(18.11)*	*(57.14)*	*(24.70)*	*(100.00)*
Large	38.69	9.56	29.13	4.31	43.00
	(89.98)	*(22.23)*	*(67.74)*	*(10.02)*	*(100.00)*
Total	214.86	47.16	167.70	48.24	263.10
	(81.66)	*(17.92)*	*(63.74)*	*(18.34)*	*(100.00)*

Source: Based on field work statistics.

Above table 3.15 is describing the post project situation of cultivated, irrigated and waste land to own and of sample villages in tulsi river basin. It is found that, cultivated land and land under perennial irrigation is showing increment consequently considerable reduction has occurred in waste land and land under seasonal irrigation due to the construction of irrigation project. High proportion of cultivated land is belonging to large farmers i.e. 89.98% to own land. Less proportion of land is observed under the seasonal irrigation i.e. 18% to own land, small farmers are having 15.73% land to own under seasonal irrigation that is maximum one. Owing to the development of lift irrigation through irrigation project, perennial irrigation becomes dominant in this region. Near about 64% land to own land comes under the perennial kind of irrigation. In the view of perennial irrigation, first and second rank has occupied by large farmers and marginal farmers having 67.74% and 67.61% to own land under it. The proportion of waste land has reduced after execution of irrigation project. With respect to waste land, medium farmers are showing maximum proportion i.e. 24.70% to own land.

3.3 AREA UNDER MAIN CROPS

The major role of irrigation projects in socio-economic development of people in any region is to bring maximum possible area under irrigation as well as to inculcate modern agriculture practice in to the farmers who are getting benefit of irrigation. This leads to obtain dynamic and positive change in cropping pattern which would be helpful to support economy of people resides in the command area of particular irrigation project. Farmers are going to grow commercial crops such as sugarcane, grapes, sunflower etc and also food crops of high yielding varieties. In this regards an effort has taken to study and analyze the changing nature of area under main crops in sample villages located in the command area of Tulasi irrigation project.

Changes in Area of Kharip Paddy

Situation of land under kharip paddy in village Chande is enumerated in above table no.1. It reveals that before the development of irrigation there were 23.02 ha land under this crop, of which small farmers had maximum proportion of land (49.70%) under kharip paddy, followed by medium farmers (21.11%), marginal farmers (20.42%) and large farmers (8.77%) respectively. After the implementation of Tulasi irrigation project slight reduction has occurred in an area under kharip paddy. Out of total 15.08 ha of land under this crop, small farmers are having 50.32% followed by medium farmers, marginal farmers and large farmers respectively. In post project scenario near about 34% reduction has observed in total area of kharip paddy. Maximum reduction is concerned to large farmers i.e. about 40% to pre project area.

Kharip paddy is staple food grain of this region; basically it is used for subsistence purpose. Table 3.16 informed that attitude of farmers is going to be changed from subsistence crop grown to cash crops like as sugarcane, sunflower etc after the construction of an

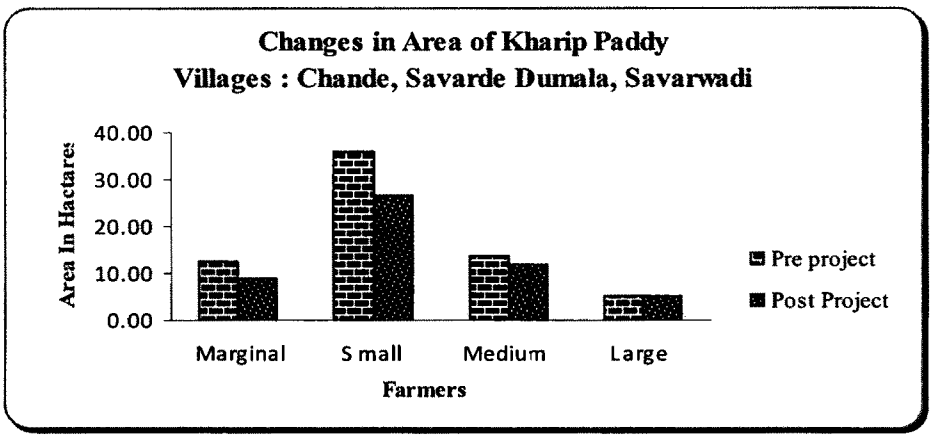
irrigation project. Information regarding to the status of area under kharip paddy in Savarde dumala in pre project period suggest that there was total 22.70 ha land under karip paddy, it is reduced by 5.73 % and become 21.40 ha in post project period. Out of total 22.70 ha, small farmers had maximum proportion of land (54.63%) under this crop. After the evolution of irrigation development, maximum reduction in an area of kharip paddy (16.13%) is concerned to small farmers. Slight growth and no change in an area under this crop are observed in large farmers and medium farmers respectively. Thus slight fluctuation is shown in the area of this crop before and after the construction of Tulasi dam in this village. It is reveals in the case of Savarwadi that in pre project time total land under kharip paddy was 21.80 ha in Savarwadi, of which small farmers stood first and had about 56% land under it followed by marginal, medium and large farmers respectively. The reduction is observed in the area of kharip paddy after the availability of irrigation facility through Tulasi dam. In post project era the total area under this crop are 16 ha, of which small farmers showing highest share i.e. 53.13%. The highest reduction in the area of this crop is belonging to marginal farmers that are 36.17%.

Table:3.16 Area Under Kharip Paddy (Composite) (Ha.)

Particulars of Farmers	Pre-Project	Percent Share	Post-Project	Percent Share	Percent Changes
Marginal	12.60	18.66	9.04	17.23	-28.25
Small	36.04	53.38	26.49	50.48	-26.50
Medium	13.66	20.23	11.74	22.37	-14.06
Large	5.22	7.73	5.21	9.93	-0.19
Total	67.52	100.00	52.48	100.00	-22.27

Source: Based on field work statistics.

Figure: 3.2 Area Under Kharip Paddy (Composite)



Source: Based on field work statistics.

In the above consolidated table is representing the sum condition of distribution of land under kharip paddy among the farmers in selected villages. It is evaluated that in pre project period, there were total 67.52 ha land under this crop of which small farmers had 53.38% land under it i.e. maximum share among the farmers followed by medium, marginal and large farmers respectively. After the execution of Tulasi irrigation project significant reduction has occurred in the area of kharip paddy in sample villages. The total area under kharip paddy is reduced by 22.27% and becomes 52.48 ha in post project period, of which small farmers are having 26.49 ha under it and stood first followed by medium, marginal and large farmers respectively. The maximum reduction in area of kharip paddy is belonging to marginal farmer's i.e.28.25% followed by small, medium and large farmers respectively.

Changes in Area of Nachani

Nachani or Raggi is also one of the important staple food grain crops with paddy of this region. Heavy rain and sloppy terrain is supporting to grow this particular crop in the upper and middle course of the Tulasi River, particularly ridge side undulating terrain is favorable to grow it. Basically Nachani is age old food grain growing in this region and used for subsistence purpose, but now a days due to the low glucose content it is used for reduction of diabetic disease. In the study pre

project and post project distribution of area under Raggi crop in village Chande reveals that, in pre project time there were 13.34 ha under Nachani, of which small farmers were having 43.55% and stood first followed by marginal, medium and large farmers respectively. After the implementation of an irrigation project the area under Nachani is reduced significantly, due to the farmers turn towards the cash crops. In post project period total area under this crop is 6.33 ha of which small farmers are occupying about 32% followed by medium farmers (28.75%), marginal farmers (23.38%) and large farmers (15.96%) respectively. Near about 52.55% area has been reduced in post project period and maximum reduction in the area of Nachani is concerned to small farmer's i.e. 65.23% to pre project.

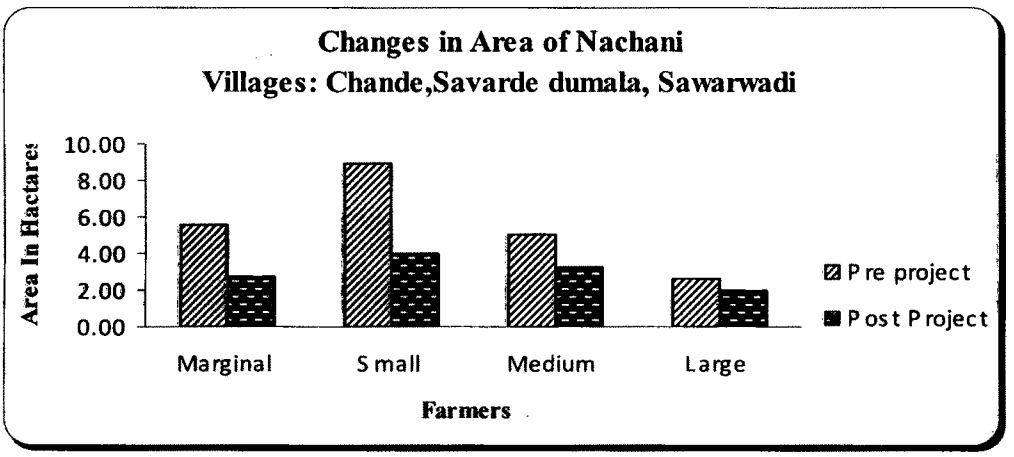
The pre project and post project scenario of area under Nachani in village Savarde-Dumala exhibits that the total area under this crop in pre project era was 22.70 ha of which maximum share had occupied by small farmers that was 54.63% followed by medium, marginal and large farmers respectively. The area under this crop has slightly reduced after the development of perennial irrigation in this region. In post project era total area under this crop is become 21.40 ha of which highest per cent share has taken by small farmers that is 48.60%. Marginal farmers are showing insignificant reduction in the area of this crop, where as meager increment has observed in large farmer's area of this crop. Medium farmers are having similar land under this crop as in pre project period. Thus, it reveals that though the overall slight reduction has occurred in the total area of Nachani but random change has shown in farmer's categories in this village.

Table:3.17 Area Under Nachani/Ragi (Composite) (Ha.)

Particulars of Farmers	Pre-Project	Percent Share	Post-Project	Percent Share	Percent Changes
Marginal	5.60	25.27	2.73	22.79	-51.25
Small	8.91	40.21	4.02	33.56	-54.88
Medium	5.03	22.70	3.22	26.88	-35.98
Large	2.62	11.82	2.01	16.78	-23.28
Total	**22.16**	**100.00**	**11.98**	**100.00**	**-45.94**

Source: Based on field work statistics.

Figure: 3.3 Area Under Nachani/Ragi (Composite)



Source: Based on field work statistics.

The above consolidated table 3.17 emphasizing the sum condition of selected villages concerned to area under Raggi crop in pre and post project period. It is noted that above table is concerned to only village Chande and Savarde-Dumala Because this crop has totally ignored in village Savarwadi in pre project and also post project period. Total area under Nachani was 22.16 ha, of which maximum area had covered by small farmers followed by marginal farmers (25.27%), medium farmers (22.70%) and large farmers (11.82%) respectively. It is profoundly elaborate that the area of Nachani is significantly reduced (45.94%) after the completion of Tulasi irrigation project in this region. Out of total 11.98 ha land under this crop, small farmers are having 4.02 ha i.e. maximum one. As far as reduction of an area is concerned, small farmers showing highest reduction that is 54.88%. Thus it may conclude

that the farmers are growing Raggi only for domestic purpose and more attention is flowing towards the cash crops.

Changes in Area under Sugarcane

Sugarcane is most important cash crop grown in this region. Sugarcane cultivation is age old practice of this region even though heavy as well as torrential rain and sloppy and undulating terrain is not favorable to flourish sugarcane in far upper and little bit middle course of the Tulasi river basin. Optimum rain and fertile soil is always supporting to enhance sugarcane cultivation in lower course of the river. In this regard an effort has taken to assess and analyze the area under sugarcane cultivation in selected sample villages situated in the command area of Tulasi irrigation project. The status of sugarcane in village Chande in pre project and post project period. Due to the less availability of perennial irrigation, the area under this crop was very less in pre project time i.e. 10.89 ha. Small farmers were having 3.89 ha of land under this crop that is maximum one, followed by large farmers (3.64 ha), medium farmers (1.82 ha) and marginal farmers (1.54 ha) respectively. After the improvement in perennial irrigation through Tulasi irrigation project, drastic change has occurred in the area under sugarcane. In post project period land under this crop is increased by more than two folds and becomes 36.82 ha, of which here also small farmers are occupying maximum share i.e. 37.78% followed by medium, large and marginal farmers respectively. Taking in to consideration of growth in the area of this crop from pre project to post project period, it is observed that the maximum growth has occurred in the area of medium farmers i.e. more than three folds.

Pre project and post project scenario of sugarcane cultivation in village Savarde-Dumala It shown that the total land under this crop was very less i.e. only 7.21 ha in before project period, the reason behind this was the inefficient irrigation facility occurred in this region. Among the

farmer's categories out of total land large farmers were had largest per cent share (34.50%) second, third and fourth rank has occupied by small farmers (31.50%), marginal farmers (17.47%) and medium farmers (16.64%) respectively. Construction of Tulasi irrigation project has brought dramatic change in the area under perennial irrigation in this region; consequently the land under perennial crop like sugarcane is magnified by more than four folds with respect to pre project. It is computed that near about 33.60 ha land is under this crop of which small farmers are occupying highest per cent share i.e. 35.68%. Large, medium and marginal farmers are occupying 2, 3 and 4th position with regards to area of sugarcane. As far as the growth in area under this crop is concerned, maximum growth is occurred in the area of medium farmers i.e. about 520% followed by small farmers (423.58%), marginal farmers (349.61%) and large farmers (236%) respectively. Thus above description highlighted that irrigation development is crucial one in the enhancement of area under sugarcane cultivation in this region.

The situation of village Savarwadi regarding to area under sugarcane cultivation is enumerated and it reveals that in the before project period, there were 13.40 ha land occupied by this crop of which largest per cent has acquired by small farmers i.e. about 44%. Marginal farmers, medium farmers and large farmers were occupying 26.12%, 22.39% and 7.46% land to total land respectively. With the introduction of perennial irrigation by establishing Tulasi dam in this region, the significant increment has done in land under this crop.

In post project scenario, it informed that the total area under sugarcane is 32.80 ha. It means that near about 145% growth is obtain in the area of this crop after the completion of project. Out of total land near about 45% land is covered by small farmers and got first rank, 2nd, 3rd and 4th position concerned to land covered by this crop has occupied by marginal (30.49%), medium 15.24%) and large farmers (9.15%) respectively. Among the farmers maximum per cent change after the

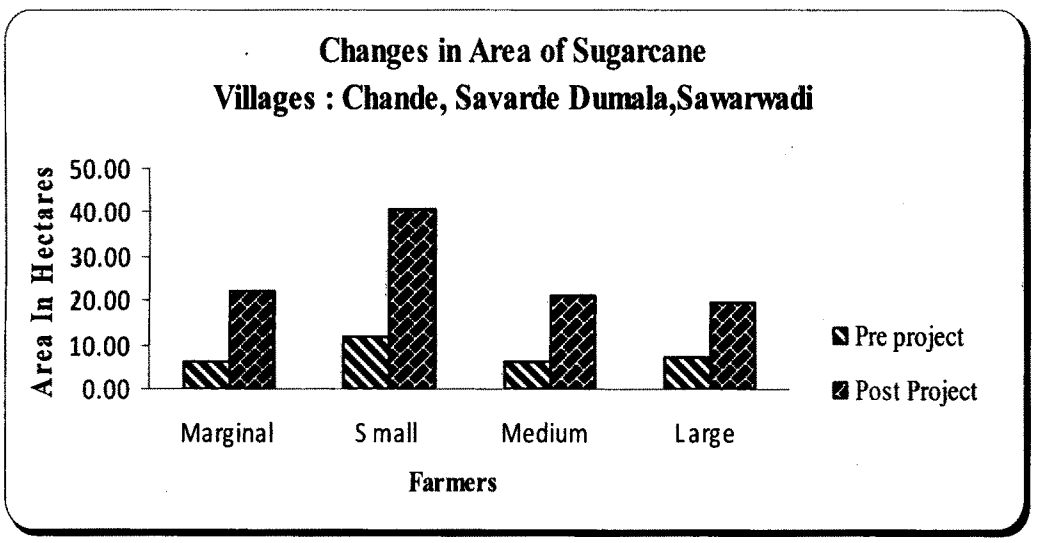
project has observed in large farmers area i.e.200%, followed by marginal farmers (185.71%), small farmers (150.85%) and medium farmers (66.67%) respectively. Thus by studying above description one may conclude that the area under sugarcane cultivation has tremendously increased after the construction of Tulasi irrigation project.

Table:3.18 Area Under Sugarcane (Composite) (Ha.)

Particulars of Farmers	Pre-Project	Percent Share	Post-Project	Percent Share	Percent Changes
Marginal	6..31	19.99	22.02	21.33	248.97
Small	12.08	38.28	40.70	39.43	236.92
Medium	6.03	19.11	21.00	20.34	248.26
Large	7.14	22.62	19.50	18.89	173.11
Total	**31.56**	**100.00**	**103.22**	**100.00**	**227.06**

Source: Based on field work statistics.

Figure: 3.4 Area Under Sugarcane (Composite)



Source: Based on field work statistics.

Table 3.18 assessing the sum total of area under sugarcane cash crop of selected sample villages located in Tulasi river basin as well as it also focus on the distribution of area among the farmers. Basically sugarcane is perennial crop and its water requirement is periodic in nature, only monsoon induced water is not sufficient to sustain the crop like sugarcane. Due to that the area under this crop was very less i.e. 31.56 ha in pre project era, of which small farmers contributing largest

per cent share (38.28%) followed by large farmers (22.62%), marginal farmers (19.99%) and medium farmers (19.11%) respectively. After the execution of Tulasi irrigation project, perennial irrigation provides ground to enhance sugarcane cultivation in this region. The area under this crop becomes 103.22 ha, out of this maximum per cent share has acquired by small farmers (39.43%), followed by marginal, medium and large farmers respectively. The column of per cent change is showing that near about 227% changes has occurred in total area of sugarcane crop after the implementation of Tulasi dam. The 1st rank has pursued by marginal farmers (248.97% changes) subsequently medium, small and large farmers got 2nd, 3rd and 4th position respectively.

Changes in Area of Rabbi Rice

Rabbi rice is also vital food grain cultivated in this region. The situation of this crop in before and after project period in village Chande highlighted that small proportion of land was under this crop i.e. 5.98 ha, of which medium farmers were having 2.63 ha area followed by small farmers (1.82 ha), large farmers (0.81 ha) and marginal farmers (0.72 ha) respectively. This crop is mainly used for subsistence purpose and water coming from natural spring as well as artificially constructed well were utilized for growing this crop. After construction of Tulasi irrigation project little changes has occurred in the area of rabbi rice. Small proportion of increment has done in total area under this crop, it becomes 6.27 ha in post project period. Out of total land large farmers are obtaining largest share i.e. 32.22% and got 1st position, small farmers are having minimum per cent share i.e. 16.11% and marginal as well as medium farmers are acquiring 25.84% land respectively. Per cent changes regarding to area from pre project to post project is concerned, only 4.85% changes has observed in total land under this crop. The maximum growth is shown in the area of large farmers i.e. about 149% followed by marginal farmers (125%). Small and medium farmers showing the little bit reduction in the area of this crop after the execution

of irrigation project. The scenario of village Savarde-Dumala regarding to area under rabbi rice in pre and post project period. In pre project period the total land under this crop were 4.86 ha of which medium farmers had 40.53% followed by small farmers (24.69%), large farmers (20.58%) and at the last marginal farmers (14.20%) respectively. After the implementation of Tulasi irrigation project, the total area of this crop has been little bit increased and become 5.53 ha of which large farmers have obtained greatest per cent share i.e. 31.65%. Small farmers contribute 18.08% land under this crop which is smallest proportion among the farmers. The per cent change regarding to the land under this crop is emphasizing that, from per project period to post project time the largest per cent change is occurred in the area of small farmers i.e. 117.39%. The small farmers and medium farmers are showing small reduction in the area of this crop. 75% changes in area is observed in the area under this crop of large farmers.

Valuable information concerned to the land covered by rabbi rice in village Savarwadi reveals that the total area under this crop were 8 ha in pre project of which small farmers had 3 ha that is largest share among the farmers. Marginal and medium farmers were having similar proportion of land i.e. 2 ha respectively. Large farmers were having only 1 ha of land under this crop. After the completion of an irrigation project, the slightly increment has observed in an area under rabbi rice. The area under this crop is become 10.10 ha of which maximum per cent share has occupied by small farmers i.e. 30.69% followed by marginal, medium and large farmers respectively. The column of per cent change is highlighted that after project period near about 26% changes has occurred in total area under this crop. The largest per cent change is belonging to large farmers i.e. 50% and minimum per cent change is observed in the area of small farmers i.e. only 3.33%. Thus, it is conclude that the area under rabbi rice has increased after the development of perennial irrigation in this region.

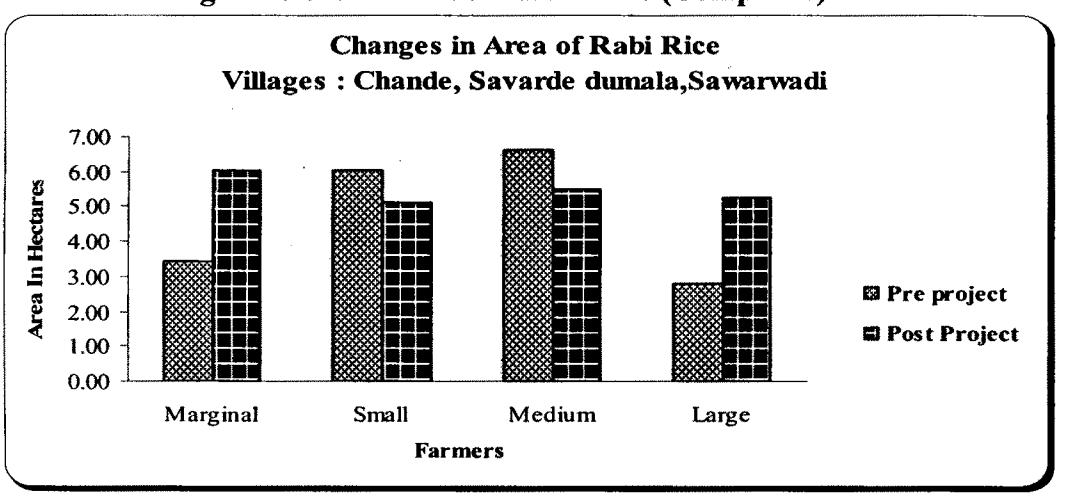
The table 3.19 given bellow analyzing the composite condition of area under rabbi rice in sample villages as well as it also enumerating the distribution of land under this crop among the categories of farmers. It is coined that in pre project era the land under this crop was 18.84 ha, seasonal irrigation practice prohibits to cultivate this crop. Out of total area medium farmers were having 35.54% of land under this crop i.e. maximum one. Small, marginal and large farmers were sharing 32.42%, 18.10% and 15.13% of land respectively.

Table:3.19 Area Under Rabbi Rice (Composite) (Ha.)

Particulars of Farmers	Pre-Project	Percent Share	Post-Project	Percent Share	Percent Changes
Marginal	3.41	18.10	6.02	27.49	76.54
Small	6.02	32.42	5.11	23.33	-15.12
Medium	6.60	35.54	5.50	25.11	-16.67
Large	2.81	15.13	5.27	24.06	87.54
Total	**18.84**	**100.00**	**21.90**	**100.00**	**16.24**

Source: Based on field work statistics.

Figure: 3.5 Area under Rabbi Rice (Composite)



Source: Based on field work statistics.

After the improvement in perennial irrigation through Tulasi irrigation project, it is desirable to accelerate the rabbi rice cultivation in this region, but due to the cash crop oriented attitude of farmers this has not been happened.

Changes in Area of Sunflower (Oil Seed)

Sunflower is newly introduced oilseed grown in this region and also known as important cash crop. In this regard an attempt has made to analyze the distribution of land under this crop among the farmers in selected sample village. The below table describes the situation of land under sunflower in village Chande. It is shown that in pre project period there were not single farmer used to cultivate this crop.

Basically this crop is grown in rabbi or hot season in this region and it required periodic water supply to efficient growth. In post project period perennial water supply is available to sustain this crop. Out of total 0.60 ha land medium farmers contributing largest per cent share i.e. 50% followed by large farmers (33.33%) and marginal farmers (16.67%) respectively. It is noted that exceptionally small farmers are not getting this crop in this village. The situation regarding to area under sunflower oil seed in Savarde dumala is enumerated that in pre project period, farmers had totally ignored this crop but after the development of irrigation facilities in this region due to the construction of Tulasi irrigation project farmers are turning towards this crop. In post project period total area of this crop is 0.69 ha of which large farmers are having maximum per cent share i.e. 43.48% followed by medium farmers (28.99%), small farmers (14.49%) and marginal farmers (13.04%) respectively.

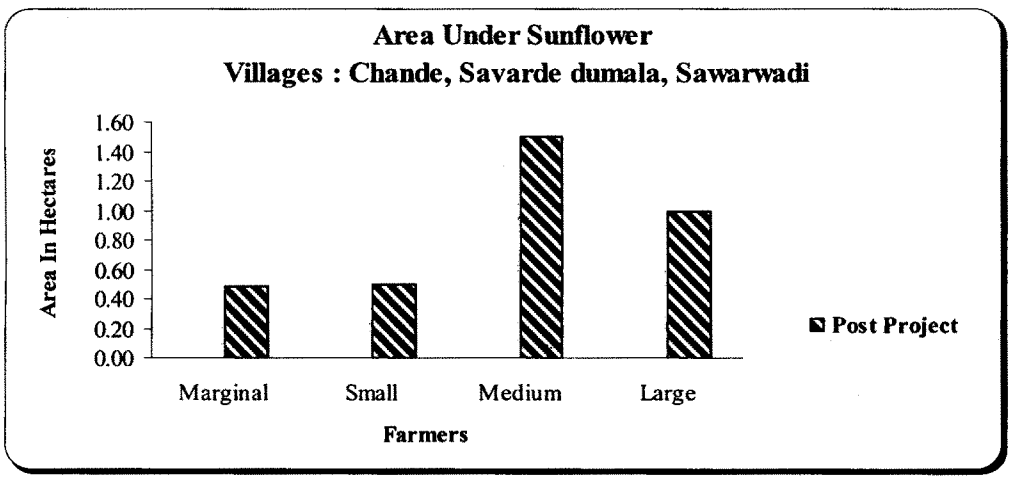
The situation of area under the sunflower oil seed in Savrwadi that farmers were ignoring this crop in pre project period. After the development of irrigation in this region farmers are trying to cultivate sunflower. Out of total 2.20 ha land under this crop 45.45% land has been covered by medium farmers that are maximum one. Large farmers, small farmers and marginal farmers are having 22.73%, 18.18% and 13.64% land to total land respectively.

Table:3.20 Area Under Sunflower (Composite) (Ha.)

Particulars of Farmers	Pre-Project	Percent Share	Post-Project	Percent Share	Percent Changes
Marginal	0.00	0.00	0.49	14.04	0.00
Small	0.00	0.00	0.50	14.33	0.00
Medium	0.00	0.00	1.50	42.98	0.00
Large	0.00	0.00	1.00	28.65	0.00
Total	**0.00**	**0.00**	**3.49**	**100.00**	**0.00**

Source: Based on field work statistics.

Figure: 3.6 Area under Sunflower (Composite)



Source: Based on field work statistics.

The consolidated table 3.20 depicts the sum condition of area under sunflower in selected sample villages situated in Tulasi river basin. It is shown that in pre project period farmers were not getting this crop. Tulasi irrigation project brought considerable change in cropping pattern in this region. The land under this crop is become 3.49 ha in post project period, out of which near about 43% land has been covered by medium farmers. The large farmers are having 28.65% share and stood on 2nd position, small and marginal farmers occupying 14.33% and 14.04% land to total land respectively. Thus, it may conclude that, the irrigation development supports to introduce new and profit oriented crops in this region.

Changes in Area of Groundnut

Groundnut is well known oil seed and also considered as cash crop grown in this region; in this regard following table is describing the situation of area under groundnut in pre and post project period in the

village Chande which is located in the upper reach of the Tulasi river basin. The land under the cultivation of groundnut was 3.95 ha in pre project period of which medium and large farmers were showing largest per cent share that is 30.38% respectively. Marginal farmers were having lowest proportion of land under this crop i.e. 15.44%. After the construction of Tulasi irrigation project the area of this crop is being increased and become 4.26 ha. Out of total 4.26 ha maximum land has owned by small farmers and having 33.33 % share. Medium farmers are obtaining lowest per cent share that is 14.32%.

Taking in to consideration of per cent changes in post project period, it is observed that in total land under groundnut about 7.85% changes has occurred. A highest per cent change in the area of this crop is concerned to marginal farmers i.e. 68.85%. All categories of farmers are showing increasing trend of land covered by ground excepting medium farmers. Unexpectedly reduction is shown in the area of this crop by medium farmers. If we see the pre and post project scenario of area under groundnut in Savarde dumala. It is noted that in pre project period there were 3.59 ha land under this crop of which highest share had occupied by large farmers i.e. 33.64%. The marginal farmers were contributing only 0.52% land to total land under this crop that was minimum one among the farmers.

The area of groundnut is increased after the development of irrigation through completion of an irrigation project in this region. The total land covered by this crop reached to 4.80 ha, out of which small farmers and large farmers are acquiring greatest per cent share i.e.27.08% respectively followed by medium farmers (25%) and marginal farmers (20.83%). It is observed that about 33.70% changes have occurred in total land of this crop from pre project to post project period. Among the categories of farmers the maximum per cent change is occurred in the area of marginal farmers that is 92.31% and minimum

per cent change is shown in the area of large farmers i.e. 8.33% from pre project to post project period.

Thus, one may conclude that the area under groundnut crop is increasing in nature. The above table is focusing on the condition of area under groundnut crop in pre and post project period in Village Savarwadi. It is mentioned that the total land under this crop was 3.33 ha in pre project period. Out of total land the greatest per cent share was covered by medium farmers i.e. 30.03% followed by large farmers (27.03%), small farmers (21.92%) and marginal farmers (21.02%) respectively. After the execution of Tulasi irrigation project in this region, the increment has occurred in the total land under this crop. Out of total 6.05 ha land; small farmers are occupying maximum per cent share i.e. 42.98% and medium farmers are occupying lowest per cent share i.e. 15.70%. With regards to per cent change from pre project to post project period it is observed that near about 81% area has been increased in total area under this crop. Small farmers are showing maximum increment in land i.e. 256%.

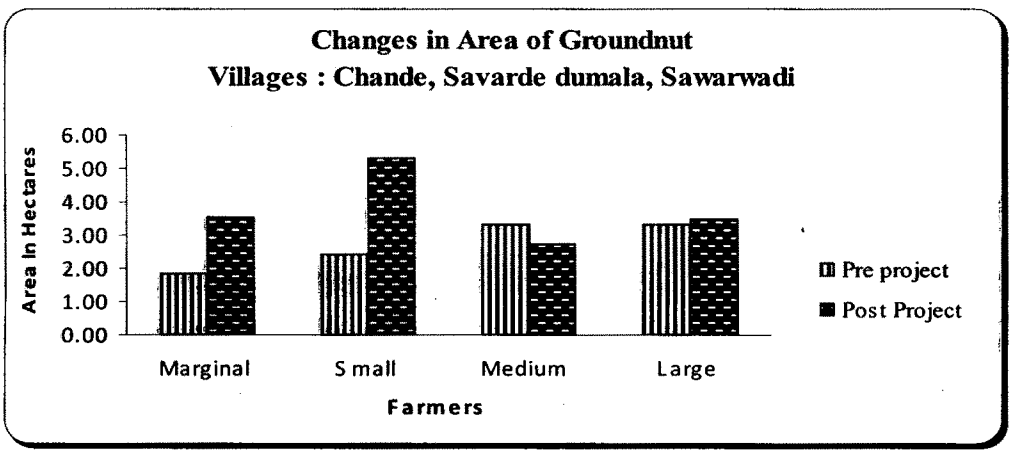
The consolidated table 3.21 stated bellow evaluates the sum situation of area under groundnut cash crop in village Chande, Savarde-Dumala and Savarwadi respectively. It also highlighted the distribution of area under this crop among the categories of farmers in selected sample villages. In pre project period there were total 10.8 ha of land was under groundnut of which large farmers and medium farmers were having largest per cent share i.e. 30.36% respectively. Small farmers occupied 3rd position and had 22.45% where as marginal farmers contributed 16.84% land to total land under this crop.

Table:3.21 Area Under Groundnut (Composite) (Ha.)

Particulars of Farmers	Pre-Project	Percent Share	Post-Project	Percent Share	Percent Changes
Marginal	1.83	16.84	3.53	23.36	92.90
Small	2.44	22.45	5.32	35.21	118.03
Medium	3.30	30.36	2.76	18.27	-16.36
Large	3.30	30.36	3.50	23.16	6.06
Total	**10.87**	**100.00**	**15.11**	**100.00**	**39.01**

Source: Based on field work statistics.

Figure: 3.7 Area Under Groundnut (Composite)



Source: Based on field work statistics.

The significant change in land under groundnut crop is shown after the completion of Tulasi irrigation project in this region. In post project period the area under this crop is reached up to 15.11 ha, of which small farmers obtaining greatest per cent share i.e. 35.21% followed by marginal farmers (23.36%), large farmers (23.16%) and medium farmers (18.27%) respectively. It is shown that the area under this crop is increasing in nature in post project period. The obtained growth in area under this crop is concerned; near about 39% land is increased in total land after project. The maximum growth in land under this crop is occurred in the land of small farmers i.e. 118% followed by marginal farmers (92.90%) and large farmers (6.06%) respectively. Medium farmers showing exceptionally reduction in the area of this crop in post project period. Thus it may conclude that in post project era the area under this crop is showing slowly increasing trend in this region.

Changes in Area of Jawar

The Jawar is food grain crop grown in this region in very small quantity, heavy rain and wet environment does no support to sustain this crop in this region especially in upper reach of the Tulashi river basin. The following table no.1 is showing the scenario of the land distribution under this crop among the farmers in village Chande. It is observed that in pre project era there were only 0.30 ha land under this crop of which medium farmers had 66.67% share and marginal farmers were having 33.33% land under it. Small and large farmers were not getting this crop. With the development of Tulasi irrigation project farmers are turned towards cash crops like sugarcane hence this crop is totally ignored in pot project period in this region.

The area under Jawar in village savarde dumala. It is stated that in pre project period the Jawar had occupied total 1.01 ha land of which large farmers were contributing largest per cent share i.e. 34.65%. Small, medium and marginal farmers were having 24.75%, 20.79% and 19.80% land to total land respectively. Mainly this crop is growing in winter season so water supply is essential to sustain it in dry spell. In post project period availability of water encourage farmers to prefer this crop; hence area under Jawar is being increased and reached up to 2.56 ha. Out of total land large farmers are contributing maximum per cent sharing i.e. 29.3% followed by small farmers (27.73%), medium farmers (23.83%) and marginal farmers (19.14%) respectively. The per cent change regarding to area under this crop from pre project to post project is shown that about 153% change is occurred in total area of this crop. The highest growth is observed in the area of medium farmer's i.e. 190% to pre project followed by small farmers (184%), marginal farmers (145%) and large farmers (114.29%) respectively. Thus, it is concluded that the area under Jawar is increased in post project period due to the irrigation availability. The situation regarding to area under Jawar in village Savarwadi is showing that the area under this crop was

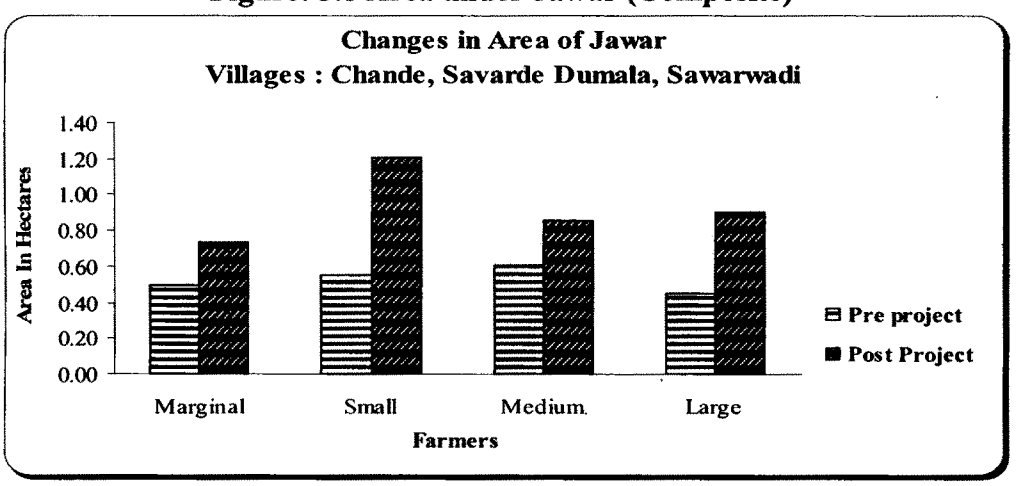
only 0.80 ha of which small farmers were having maximum share i.e. 37.50%, marginal and medium farmers were had equal amount of area under this crop i.e. 25% to total land respectively. Only 0.10 ha land was under this crop of large farmers. In between pre project and post project period the area under this crop has been increased by 43.75% and it becomes 1.15 ha. Out of this total land small farmers are occupying 43.48%.In post project period also marginal and medium farmers showing equal land i.e. 25% to total under this crop. The maximum growth in area of Jawar from pre project to post project period is observed in the area of small farmer's i.e. 66.67% followed by large farmers (50%), marginal and medium farmers (25%) respectively.

Table:3.22 Area Under Jawar (Composite) (Ha.)

Particulars of Farmers	Pre-Project	Percent Share	Post-Project	Percent Share	Percent Changes
Marginal	0.50	23.70	0.74	19.95	48.00
Small	0.55	26.07	1.21	32.61	120.00
Medium	0.61	28.91	0.86	23.18	40.98
Large	0.45	21.33	0.90	24.26	100.00
Total	**2.11**	**100.00**	**3.71**	**100.00**	**75.83**

Source: Based on field work statistics.

Figure: 3.8 Area under Jawar (Composite)



Source: Based on field work statistics.

The sum situation of sample villages concerned to area under Jawar food grains enumerated in table 3.22 shown that in pre project period there were 2.11 ha of total land was under this crop, of which greatest per cent share had occupied by medium farmers i.e. 28.91%.

Large farmers were having lowest area under it i.e. 21.33%. Irrigation development brought positive change concerned to the Jawar cultivation in this region. In post project period the total land under this crop are 3.71 ha of which small farmers are having 32.61% land followed by large farmers (24.26%), medium farmers (23.18%) and marginal farmers (19.95%) respectively. With regards to the growth in area of Jawar, it is shown that about 75.83% total area has been increased between pre projects to post project period

Changes in Area of Maize

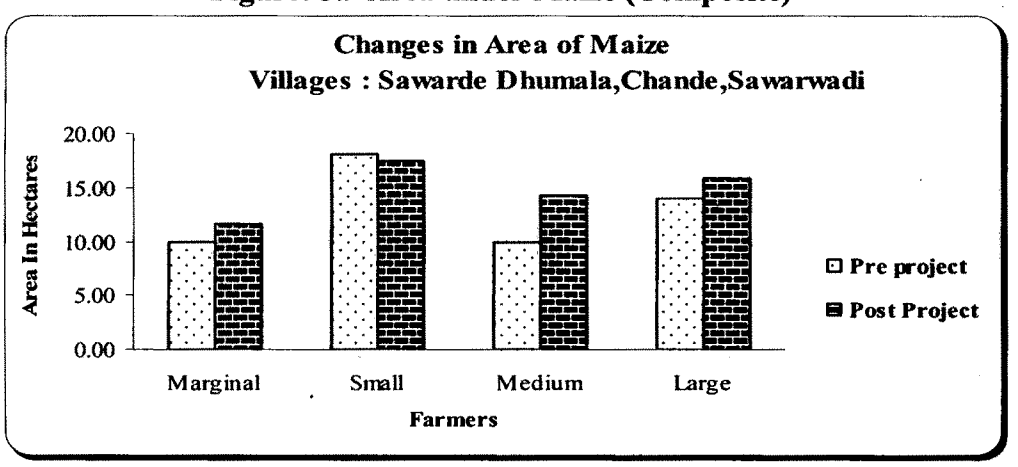
Maize is food grain crop growing in this region especially in lower reaches of Tulasi river basin. Upper and middle part of the basin has little bit undulating and sloppy terrain as well as received heavy rain in rainy season so it hammers the maize cultivation in this region. This crop is grown in village Savarwadi describes the distribution of area under it among the categories of farmers.

Table:3.23 Area Under Maize (Composite) (Ha.)

Particulars of Farmers	Pre-Project	Percent Share	Post-Project	Percent Share	Percent Changes
Marginal	1.00	18.87	0.97	19.52	-3.00
Small	1.90	35.85	1.50	30.18	-21.05
Medium	1.00	18.87	1.20	24.14	20.00
Large	1.40	26.42	1.30	26.16	-7.14
Total	**5.30**	**100.00**	**4.97**	**100.00**	-623

Source: Based on field work statistics.

Figure: 3.9 Area under Maize (Composite)



Source: Based on field work statistics.

It is shown that in pre project period the total are under this crop was 5.30 ha of which small farmers were having maximum per cent share i.e. 35.85% followed by large farmers (26.42%). Marginal and medium farmers had similar amount of land i.e.18.87% to total. After the construction Tulasi Dam the area of this crop has reduced by 6.23% and become 4.97 ha. Out of total land largest per cent share is occupied by small farmers i.e. 30%, followed by large farmers, medium and marginal farmers respectively.

In post project period the total area under this crop is slightly increased and become 21.90 ha of which marginal farmers are occupying 27.49%, land and acquired 1st position among the farmers. Medium, large and small farmers are having 25.11%, 24.06% and 23.33% land to total land under this crop respectively. As far as per cent change is concerned, only 16.24% change is occurred in total land under this crop in post project period. The greatest per cent change is observed in the area of 1\o651large farmers i.e. 87.54% followed by marginal farmers. Small and medium farmers are showing slight reduction in the area of this crop in post project period.

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