CHAPTER 5
IMPACT OF TULSHI IRRIGATION PROJECT ON THE AGRICULTURAL ECONOMY

5.1 CHANGES IN CROPPING PATTERN

The topography of Karvir and Radhanagari talukas, i.e. Tulshi sub-basin, is hilly and so has deep valleys. The lands in the Tulshi valley have greater depth of soil and would be fertile if water is available. In this area, the princial crops grown before irrigation were paddy, kharif Jowar and groundnut. But in downstream portion of the valley, limited amount of irrigation was available through the water storage from the Kolhapur-type weir at Koge which was constructed in 1950. In addition, on the banks of the Tulshi river, sugarcane crop was cultivated by forming ponds in the river. But the water in the river was not sufficient to irrigate sugarcane for its full period. Thus, there was a genuine need of assured water for sugarcane and other crops for the fulfilment of which the Tulshi project was carried out in Tulshi valley. The dam partially stored water in 1974 and full storage was made in 1978. Due to this, the erstwhile cropping pattern gave way to a new cropping pattern in the Tulshi command area. However, the actual pattern that has been developed differs from that of the Irrigation Department. Because, the official blue-print is chalked out by adopting wholistic

approach based only on the water availability and the kind of soil. As against this, cultivators make individual decisions in the light of their own requirements and financial position.

Table 5.1

Change of cropping pattern in Tulshi Project command area

Sr. No.	Crops	Cropping Pattern for irrigable area (2,800 hectares)				Modified cropping pattern for irrigable area (4,720 hectares)	
		Before irrigation		After irrigation			
		% of Area	Area (Ha.)	% of Area	Area (Ha.)	% of Area	Area (Ha.)
1.	Perennials						
	i. Sugarcane	16.42	460	66.00	1,847	33.00	1,558
2.	Kharif Seasonals						
	i. Paddy	38.60	1,080	8.00	224	50.00	2,360
	ii. Vegetables	-	-	26.00	729	5.00	236
	iii. Maize	3.63	102	-	-	-	-
	iv. Jowar	3.25	91	-	-	-	-
	v. Grass	19.86	556	-	-	-	-
	vi. Others	17.92	502	-	-	-	
	vii. Pulses	-	-	-	-	12.00	566
	Total	99.68	2,791	100.00	2,800	100.00	4,720
3.	Rabi Seasonals						
	i. Wheat	0.43	12	5.00	140	30.00	1,416
	ii. Gram	4.33	121	8.00	224	-	-
	iii. Onion	-	-	-	-	4.00	189
4.	Hot Weather Seasonals						
	i. Paddy	-	-	-	-	20.00	944
	ii. Maize	-	-	-	-	5.00	236
	Total	**104.44**	**2,924**	**113.00**	**3,164**	**159.00**	**7,505**

Source: Reports of the Tulshi Irrigation Project.

Table 5.1 shows that before irrigation, the main crop in the valley was paddy; it covered 38.60 percent of total area (1,080 hectares). Sugarcane was cultivated in 16.42 percent (460

hectares) land and the remaining 45 percent land was covered by coarse grains and grass land. After irrigation, this cropping pattern changed. In the new set up, sugarcane crop occupied 66 per cent of the total area (1,847 hectares) while the area under paddy slashed rapidly from 38.60 percent to only 8 percent. Due to sparing more land under sugarcane, the cultivators made another significant change in favour of vegetables with the result that the area under vegetables spurted to 26 percent. Farmers are growing brinjals, tomatoes, cabbage and cauliflowers on a large-scale. Importantly, the agriculturists made efforts to develop unculturable lands into culturable ones by using tractors and bulldozers so as to derive maximum possible benefit of the available water.

The area under irrigation is increased under the scope of the project from 2,800 hectares to 4,720 hectares by including additional five Kolhapur-type weirs within the compass of the project. Consequently, proposed cropping pattern also is modified. The revised plan contemplated that sugarcane would occupy only 33 percent of the total area. The percentage of paddy crop is increased from 8 to 50. The additional rabi seasonal and hot weather seasonals were proposed upto 59 per cent of irrigable area. Wheat and onion are expected to occupy 30 percent and 4 percent land, respectively. It is, however, doubtful whether in practice, the recommended cropping pattern would be realised. Chances are less. Things, as they have come out, reveal that the actual area under sugarcane has

increased to a large extent, because it is a lucrative cash crop. Moreover, a number of lift irrigation schemes have been promoted by co-operative sugar factories in the area, besides providing various facilities to the cultivators for growing of sugarcane.

5.2 CHANGE OF CROPPED LAND

Due to the construction of Tulshi Project, the cropped area under various crops has changed as shown in Table 5.2.

Table 5.2

Increase in cropped area due to Tulshi Project
(Command area - 4,720 Ha.)

Sr. No.	Crops	Area of cropped land (hectares)		% change of cropped land due to irrigation
		Before Irrigation	After Irrigation	
1.	Sugarcane	775.03	1,557.60	+100.97
2	Vegetables	-	236.00	Net crop
3	Paddy	1821.92 (kharif)	2,360.00 (HY)	+ 29.53
4	Pulses	204.37	566.440	+177.14
5	Wheat	20.30	1,416.00*	+6,975.37
6	Paddy (HW)	-	944.00*	New Crop
7	Onion	-	188.80*	New Crop
8	Maize	171.34	236.00*	+ 37.73
9	Jowar	153.40	-	-100.00
10	Food crops	845.82	-	-100.00
11	Grass	937.39	-	-100.00

Note: *Follow on crops
Source: Excess Note of Tulshi Project.

The availability of ample and timely water, the area under crops is increased by taking the crops in all seasons, such as kharif, rabi and hot weather. The area under sugarcane is increased from 775 hectares to 1,557 hectares. Vegetables required assured water, the land under vegetables (236 hectares) is newly occupied. Area under paddy increased by 29.5 per cent and covered 2,360 hectares of land. Area under pulses too increased from 204 hectares to 566 hectares. High-yielding varieties are since then being used for various crops so that the productivity of land is increased. Farmers are using package programme (HYV) for cash crops also. As a result, traditional crops like Jowar, maize, etc. have been discontinued as they were not providing adequate yield and sales proceeds even after irrigation. The extent of change in the yields of important crops due to irrigation can be observed in Table 5.3 which reveals crop yields without irrigation and with irrigation.

Table 5.3

Crop yields before and after irrigation

(Quintals per hectare)

Sr. No.	Crop	Yield before irrigation	Yield after irrigation
1	Sugarcane	650 (partial irrigation)	1,200 (full irrigation)
2	Paddy	16	50
3	Jowar	6	40
4	Maize	12.5	25
5	Wheat	5.5	20
6	Groundnut	5-10	10-20
7	Vegetables	-	250

Source: The Tulshi Irrigation Project Reports.

It can be said that the yield of the same crops with irrigation increased by about two to four times that of the yield of the crops without irrigation. For example, the yield of sugarcane with partial irrigation was 650 quintals per hectare; it increased to 1,200 quintals with full irrigation. Thus, in Tulshi command area, by providing irrigation facilities, the productivity of agriculture has increased, so also the cropping pattern.

5.3 INCREASE IN NET BENEFIT FROM AGRICULTURAL PRODUCE

The yield of the crops increased by watering and adopting high yielding varieties. Due to increase in the yield of various crops, net benefit per hectare accurable to the producer also increased manifold. Table 5.4 provides vital details about this.

Table 5.4

Increase in net benefit from agricultural crops due to Tulshi project

Sr. No.	Crop	(Net benefit per hectare(Rs.)		% increase in benefit
		Before Irrigation	After Irrigation	
1	Sugarcane	8,628 §	10,228	18.54
2	Paddy (HY)	2,324	6,906	197.16
3	Maize	1,600	2,376 (4556*)	48.50 (184.75*)
4	Wheat	954	2,261 (4556*)	137.00 (374.40*)
5	Jowar	954	2,057 (5142*)	115.62 (439.00*)
6	Pulses	1,112	2,261 (5974*)	103.33 (437.32*)
7	Onion	-	8,517	-
8	Vegetables -	-	27,768	-

Note: § Atleast one watering is essential
* High yielding varieties are used.
Source: Excess Note of Tulshi Irrigation Project.

As per contents of Table 5.4, returns from sugarcane increased by 18.54 percent registering an absolute increase per hectare from Rs.8,628 to Rs.10,228. The net benefit of paddy crop due to irrigation is 197.16 percent due to increase in per hectare income from Rs.1,600 to 2,376. In case of maize, wheat and Jowar, net benefit shot up by about 50 percent, 150 percent and 100 percent, respectively. In case of wheat, maize, Jowar and pulses, increment value is still higher wherever HYVs are used. Percentage increase in the available benefit is 374.40, 184.75, 439.00 and 103.33 percent respectively. Indeed, this has been a major breakthrough.

5.4 IMPACT ON SMALL AND MARGINAL FARMERS.

The distribution of landholding is unequal in rural population and especially among landholders. According to the distribution of land holdings, the classification of farmers is normally made as under:

(1) Marginal farmers : those having land upto 1 hectare;

(2) Small farmers : those having land above 1 hectare and upto 2 hectares;

(3) Middle farmer : those having land above 2 hectares and upto 10 hectares;

(4) Large or big farmers : those having land above 10 hectares.

In India, small and marginal farmers, who are over 70 percent of the landholders operate only 24 percent of the total land area, whereas big landholders, who are about 3 percent

of the total landholders, operate 26 percent of the total land area and remaining farmers are middle farmers. Such a pattern of distribution of landholding creates inequalities of income and wealth - because the Intensive Agricultural Strategy has helped only the large and big farmers; the small and marginal farmers suffered badly. The Union and State governments have tried to improve economic condition of the small and marginal farmers while achieving development of the agricultural sector by expanding irrigation facilities. Tulshi irrigation project is a part of this effort.

Under the Tulshi command area, 22 villages are covered. They comprised 7,084 landholders in 1986-87. Their village-wise and category-wise break up is given in Table 5.5.

In Tulshi command area, of the 7,084 landholders, 3,170 are marginal farmers (44.75 percent) and 994 are small farmers (14.03 percent); remaining 2,920 are big and middle farmers (41.22 percent). The marginal farmers occupy 2,320 hectares of total gross command area (10,000 hectares) and small farmers operate 2,700 hectares. Thus, taken together, the small and marginal farmers together hold nearly 50 percent of the gross command area; the rest 50 percent is owned by the middle and big farmers. This picture has emerged following the completion of the project. No doubt, still the situation is tilted in favour of the bigger cultivators. But, if the position before the project is taken note of, the emerging situation may be considered as a change for the better.

Table 5.5

Villagewise number of land holders under the command area of Tulshi Project (1986-87)

Sr. No.	Village	Total no of land holders	Marginal Farmers	Small Farmers	Middle & Big Farmers
1	Dhamod	469	193	66	210
		(100.00)	(41.15)	(14.07)	(44.78)
2	Chande	180	74	25	81
		(100.00)	(41.11)	(13.89)	(45.00)
3	Ghungurwadi	63	8	2	53
		(100.00)	(12.70)	(3.17)	(84.13)
4	Malsawade	293	60	38	195
		(100.00)	(20.48)	(12.97)	(66.55)
5	Kanchanwadi	233	82	67	84
		(100.00)	(35.19)	(28.75)	(36.05)
6	Sonali	151	44	19	138
		(100.00)	(23.04)	(9.95)	(67.01)
7	Paterkarwadi	137	70	17	50
		(100.00)	(51.09)	(12.41)	(36.50)
8	Bhatanwadi	276	85	44	147
		(100.00)	(30.80)	(15.94)	(53.26)
9	Bachani	614	232	110	272
		(100.00)	(37.78)	(17.92)	(44.30)
10	Are	1,009	534	60	415
		(100.00)	(52.92)	(5.95)	(41.13)
11	Kote	398	163	67	168
		(100.00)	(3.70)	(8.64)	(87.66)
12	Manjarwadi	81	3	7	71
		(100.00)	(3.70)	(8.64)	(87.66)
13	Ghanwade	168	40	37	91
		(100.00)	(75.48)	(22.58)	(1.94)
14	Arale	155	117	35	3
		(100.00)	(75.48)	(22.58)	(1.94)
15	Garjan	98	77	21	-
		(100.00)	(78.57)	(21.43)	-
16	Chapodi	148	45	29	74
		(100.00)	(30.41)	(19.59)	(50.00)
17	Mandhare	113	50	28	35
		(100.00)	(44.25)	(24.78)	(30.97)
18	Sawarde	229	159	61	9
		(100.00)	(69.43)	(26.64)	(3.93)
19	Sadoli	231	167	43	21
		(100.00)	(64.92)	(14.84)	(20.24)
20	Hirawade	239	85	14	140
		(100.00)	(35.56)	(5.86)	(58.58)
21	Shiroli (D)	667	433	103	540
		(100.00)	(64.92)	(14.84)	(20.24)
22	K.Beed	1,092	449	103	540
		(100.00)	(41.12)	(9.43)	(49.45)
	Total	**7,084**	**3,170**	**994**	**2,920**
		(100.00)	**(44.75)**	**(14.03)**	**(41.22)**

Note: Figures in parentheses are percentage to total number of land holders.

Source: Record of Irrigation Department, Kolhapur, 1987.

Before the construction of Tulshi Project, these small and marginal farmers were economically backward because of low productivity and production of their agriculture. Many of them migrated to big cities like Bombay to find out jobs. But after completion of the Tulshi Project, they developed interest in agriculture and could conspicuously improve their yield and income by quickly changing the cropping pattern and adopting modern practices of cultivation. Moreover, as most of them remained tied with their lands almost throughout the year, they had rare occasion to run to places like Kolhapur and Bombay in search of work. Not only has their intense migration been checked but also their standard of living has been improved, thus conferring a double benefit on them.

5.5 DEVELOPMENT OF SOCIAL SERVICES IN THE COMMAND AREA

Tulshi Irrigation Project has improved the economic condition of the larger section of the agricultural population in the command area. As a result, demand for various social amenities increased and efforts have been made to provide the needed amenities thereby improving the social welfare. Pre- and post-project picture of the developments is depicted in Table 5.6.

5.5.1 Educational facilities

Expenditure on education is treated as investment in human capital. In this context, the government's thrust area is primary and secondary education. In the Tulshi command

DEVELOPMENT OF SOCIAL SERVICES IN TULSHI COMMAND AREA

SR. NO.	VILLAGE	EDUCATIONAL FACILITIES		MEDICAL FACILITIES		ELECTRICITY		WATER SUPPLY		TRANSPORT		POST OFFICE		MARKET		ROADS	
		Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
1.	Dhamod	P	P,M,H, PUC	-	D,PHC	-	EA	WR	T	-	BS	-	PO	-	M	KR	PR
2.	Chande	P	P,M	-	D	-	EA	WR	WR	-	BS	-	-	-	-	KR	KR
3.	Gungarwadi	P	P,M	-	-	-	EA	WR	WR	-	-	-	-	-	-	KR	PR
4.	Malsawade	P	P,M	-	-	ED	EA	WR	WR	-	BS	PO	PO	-	-	KR	PR
5.	Kanchanwadi	P	P,M	-	D	ED	EA	WR	WR	BS	BS	PO	PO	-	-	PR	PR
6.	Sanali	P	P,M	-	-	ED	EA	WR	WR	-	BS	PO	PO	-	-	KR	PR
7.	Paterkarwadi	P	P,M	-	-	ED	EA	WR	WR	-	BS	-	-	-	-	KR	KR
8.	Bhatanwadi	P	P,M	-	-	ED	EA	WR	WR	-	BS	PO	PO	-	-	PR	PR
9.	Bachani	P	P,M	-	-	ED	EA	WR	WR	BS	BS	PO	PO	-	-	PR	PR
10.	Are	P	P,M	-	-	ED	EA	WR	T	-	BS	PO	PO	-	-	PR	PR
11.	Kote	P	P,M,H	-	D	-	EA	WR	WR	-	-	-	-	-	-	KR	KR
12.	Manjarwadi	P	P,M	-	-	-	EA	WR	WR	-	-	-	-	-	-	KR	PR
13.	Ghanwade	P	P,M	-	-	ED	EA	WR	WR	-	BS	-	PO	-	-	KR	PR
14.	Arale	P	P,M	D	D	ED	EA	WR	WR	-	BS	-	-	-	-	KR	PR
15.	Garjan	P	P,M	-	-	-	EA	WR	WR	-	-	-	-	-	-	KR	PR
16.	Chapodi	P	P,M	-	-	-	EA	WR	WR	-	BS	PO	PO	-	-	KR	PR
17.	Mandhare	P	P,M	-	-	-	EA	WR	WR	-	BS	-	-	-	-	KR	PR
18.	Savarde	P	P,M	-	-	ED	EA	WR	T	-	BS	PO	PO	-	-	KR	PR
19.	Sadoli(D)	P	P,M	D	D	ED	EA	WR	WR	-	BS	-	-	-	-	KR	PR
20.	Hirawade	P	P,M	-	-	ED	EA	WR	WR	-	BS	PO	PO	-	-	KR	PR
21.	Shiroli(D)	P,M	P,M,H	D	D,PHC	ED	EA	WR	T	-	BS	PO	PO	-	-	KR	PR
22.	K-Beed	P,M	P,M,h	D	D,RP	ED	EA	WR	T	BS	BS	PO	PO	-	M		

NOTE :
- P - Primary School
- M - Middle School
- H - Secondary School
- PUC - Jr.College
- D - Dispensary
- RP - Registered Practitioner
- PHC - Primary Health Centre
- ED - Electricity For Domastic Purpose
- EA - Electricity For All Purpose
- W - Well Water
- R - River Water
- T - Tap Water
- BS - Bus Stand
- PO - Post Office
- M - Market Centre
- KR - Kachha Road
- PR - Paka Road

S O U R C E : Kolhapur District Census, 1971 and 1981.

area comprising 22 villages, during the pre-project times, all the villages had primary schools and only two had just middle level schools. The post-project years have witnessed a growth in this facility, so that besides primary schools, now all the villlages have middle-schools, 4 villages have high-schools and 1 village has a junior college.

5.5.2 Medical facilities

Adequate and timely medical assistance helps in keeping the population healthy and improving its work efficiency, whatever be the kind of work. Villages of the Tulshi command area were almost devoid of medical assistance previous to the construction of the project as only 4 villages had dispensaries. Therefore, people were depending for their illness mostly on household first aids. Possibilities of resort to traditional methods through religious beliefs cannot be ruled out. The things have now improved, though partially; 8 villages have dispensaries, 2 villages have Primary Health Centres and a solitary viillage has a registered practitioner. Cumulatively, 8 villages possess these acilities; 14 villages are yet devoid of medical aid within their limits.

5.5.3 Supply of electricity

Availability of electric supply is treated as an important input in agricultural activity and an indispensable facility for domestic use. It is a vital catalyst working towards rural transformation. Tulshi command area has been lucky in

this respect. Before the project, 14 out of 22 villages had electricity available only for domestic use. After the project, all the villages have electricity not only for domestic use, but also for agricultural purpose. In other words, they have electricity for all purpose; electrification is cent percent. Since, the irrigation project banks entirely on lift irrigation throughout the command area, supply of electricity to all the villages, and that too for all purposes, was an integral part of the project itself. Presently, the command area has nearly 400 co-operative lift irrigation schemes. High-tension power supply to operate the electric pump-sets installed under the schemes had to be done in bulk quantity. In brief, supply of electricity to all the villages was a concomitant development of the irrigation project itself.

5.5.4 Water supply

All the villages, prior to the project, were spending for their drinking water on the local wells and the flowing river. The dam and the Kolhapur-type weirs have provided comforts to the inhabitants of atleast 6 villages by making tap water available. Labour saved in fetching water from long distances, could, therefore, be diverted to gricultural and other activities. Efforts, however, will have to be made to extend similar facility to the remaining villages.

5.5.5 Roads

The project works was a boon to road development in the command area. Before the project, only 5 villages were linked with pucca roads, and the remaining 17 villages had

kacchha roads. With the project, 15 more villages could get their kacchha roads converted into pucca raods. Still, only 2 villages have kacchha roads.

5.5.6 Transport

Transport links with neighbouring towns and cities as also with the villages in the periphery, are essential in the process of rural transformation. Before Tulshi project, such links were weak. Only 3 out of 22 villages were served by regular State Transport Bus Service. Villagers elsewhere had to find out their own mode for movement. Even the approach roads were of poor quality. Project schemes had a favourable impact on road construction activity in the region. New roads were built. It facilitated expansion of bus transport by the authorities of the State Road Transport Corporation to more villages, so that at present 18 villages are touched by the State Transport buses. Tractors, bulldozers, trolleys, trucks, jeeps, motorcycles, etc., are now common on the roads of the area.

5.5.7 Communication

Means of communication also provide opportunities for the people to establish contacts far and wide. Having a Post Office in each village can be considered as the minimum facility that must be provided in modern times. Progress of the command area in this respect is not commendable as 11 villages (50 percent) had the Post Office before the project

and later on, only two more villages could get this facility. Still, 9 villages are devoid of it. Higher order conveniences like telephone and telegraph are conspicuous by absence. Only the Tulshi dam and section offices have telephones and wireless.

5.5.8 Markets

With development of irrigation, agricultural activity becomes high-value product oriented. Subsistence farming is gradually transformed into commercial farming. Consequently, demand for agricultural inputs increases and supply of outputs flood the markets. In Tulshi command area, this kind of transformation has taken place. But, as a result, local markets within the region have not come up. Only two market centres, one at Dhamod and the other at Kasaba Beed, have been developed. It reflects that a good deal of marketable surplus is diverted elsewhere. Obviously, sugarcane goes to the sugar factories and paddy to rice mills and thereafter, to the wholesale market of Kolhapur. There is, however, some scope to boost consumer goods markets because of increased incomes with the people.

5.5.9 Allied activities

Changing cropping pattern in the Tulshi belt dams promoted development of agro-based industries like sugar factories, Khandasari mills, Gur manufacturing, rice mills and oil mills within and around the command area. Pottery, dairy and gobar gas plants are the other developments. Increased consumption of fertilizers, pesticides, agricultural machinery,

etc., has opened new markets for the producing industrial units, which, in turn, might have utilised the opportunity for higher output.

5.6 CHANGES IN THE COMPOSITION OF WORKFORCE

The aggregate population of the 22 villages covered by the command area of the Tulshi project was 30,273 as per 1971 Census, which went upto 37,124 in 1981, registering a decadal growth of 22.63 percent. It contained 950 females per 1000 males in 1971 and 954 in 1981. The nummber of inhabitant families rose from 4,651 in 1971 to 5,873 in 1981, marking an increase of 26.27 percent. Average size of family, as can be calculated from the above given figures was 6.51 persons in 1971, which decreased marginally to 6.32 persons in 1981. The number of males and females within the population marked a decadal growth of 22.40 percent and 22.90 percent respectively. All these variations in the structure of population of the region have caused some impact on the availability of labourforce. Added to this, is the impact of the tulshi project. A cumulative picture that has emerged out of the two factors regarding changes in the composition of workers in the Tulshi command area is presented in Table 5.7.

As can be seen from Table 5.7, the number of total main workers in the region hiked by 36.26 percent during 1971-81. Growth of female workers (98.76 percent) is conspicuously higher than that of the male workers (17.61 percent). Of the

Table 5.7

Changes in the composition of workers in Tulshi command area

Sr. No.	Workers	M/F	1971	1981	% Increase
1.	Total Main	M	8,425	9,909	17.61
	Workers		(77.03)	(66.49)	
		F	2,513	4,995	98.76
			(22.97)	(33.51)	
		T	10,938 (100.00)	14,904 (100.00)	36.26
2	Cultivators	M	6,192	8,410	35.82
			(73.50)	(84.87)	
		F	1,939	3,455	78.18
			(77.16)	(69.17)	
		T	8,131	11,865	45.92
			(74.34)	(79.61)	
3	Agriculture	M	1,304	789	-39.50
	Labourers		(15.48)	(7.96)	
		F	528	1,463	177.08
			(21.01)	(29.29)	
		T	1,832	2,252	77.51
			(16.75)	(15.11)	
4	Non-workers	M	7,099	7,977	12.36
			(36.61)	(43.68)	
		F	12,291	10,284	-16.32
			(63.39)	(56.32)	
		T	19,390	18,261	-5.82
			(100.00)	(100.00)	

Note: Figures in parentheses are percentages to total as under:

1. In case of 'total main workers', the percentages of male and female workers are to its total.
2. In case of 'cultivators' and 'agricultural labourers', the percentages are to the respective figures for 'total main workers'.
3. In case of 'non-workers', the percentages of male and female workers are to its total.

Source: Kolhapur District Census Reports, 1971 and 1981.

total main workers, more than three-fourths are cultivators and about 15 to 16 percent are agricultural labours. To be exact, workers of these two categories comprised 91.09 percent in 1971 and 94.72 in 1981, indicating thereby increased involvement of the labourforce in agricultural activity. Other noticeable changes over 1971-81 can be enumerated briefly as below:

(1) Proportion of male cultivators in 1981 rose to 84.87 percent from 73.50 percent.

(2) Proportion of female cultivators slashed from 77.16 percent to 69.17 percent.

(3) Opposite picture is observed in case of agricultural labourers wherein proportion of male labourers declined from 15.48 percent to 7.96 percent whereas of female workers increased from 21.01 percent to 29.29 percent.

(4) As regards non-agricultural workers, percentage of males fell from 11.02 to 7.17 and of females from 1.83 to 1.54.

All these details drive to the conclusion that due to irrigation facility, when new opportunities of better agriculture were thrown open, the pople of the region responded favourably. This is evident from larger involvement of females as workers, increased proportion of male cultivators, higher proportion of females as agricultural labourers and decline in the proportion of non-agricultural workers (overall from 8.91 percent to 5.28 percent).

5.7 CONCLUSION

The Tulshi Irrigation Project has strengthened the bonds of agriculture among the inhabitants of the command area. Besides, a variety of social amenities have facilitated the people to live a better life having greater contacts with the outside world. Nearly three-fourth of the workers engaged in agriculture are cultivators owning some land. Consequently, the fruits of labour are enjoyed by the cultivating family.

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