

SOME ASPECTS OF IRRIGATION WELLS

(A Study in Mohgaon T. D. Block of Mandla District, M. P.)



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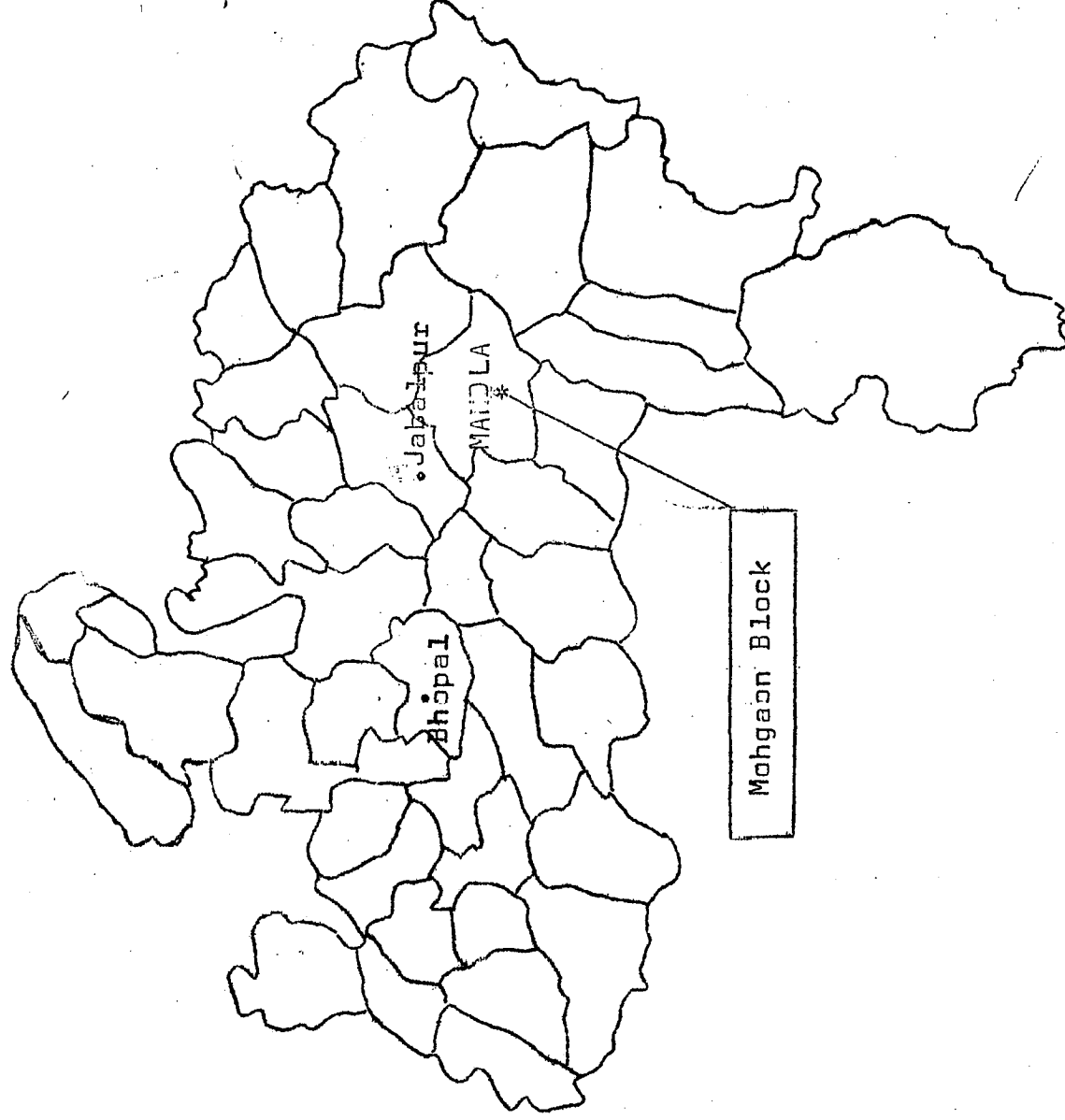
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MAP
MADHYA PRADESH
(Location of Mohgaon Block)



IN I R O D U C I I O N

The Directorate of Economics and Statistics, Ministry of Agriculture and Irrigation, Government of India, directed this Centre in March, 1978, that the Ministry needed immediately data after a quick survey of irrigation wells in a tribal block in Madhya Pradesh giving the number of total wells and those benefiting scheduled tribes and scheduled caste population. It had asked to select some nearby tribal block to collect the data on an immediate basis. The results were to be sent positively within a month's time.

Mandla was the nearest tribal district to Jabalpur. This district had 60.54 per cent tribal population and ranked third in the state in respect of proportion of the scheduled tribe population; the first and the second being Jhabua and Bastar districts with 84.71 and 68.20 per cent tribal population respectively. Mandla district had 3,082 irrigation wells and among its 16 blocks, Mohgaon block had largest number of 655 irrigation wells. Therefore, Tribal Development Block, Mohgaon was selected and a quick survey of irrigation wells was done. The results were sent to the Ministry.

In June, 1978, the Ministry finalised the design of a full fledged study and the items to be covered for the field study were decided in consultation with the Ministry of Home Affairs and the Central Ground Water Board in order to assess the extent of benefits flowing to the scheduled tribe and scheduled caste population from the irrigation wells in the block. It was felt necessary to

cover the block in its entirety. It was also felt that data should be collected from all the cultivators from the block who were having irrigation wells. The items on which the data needed to be collected were (1) Ownership of the wells i.e. (a) whether owned by a scheduled tribe, scheduled caste or non-tribal and (b) individual or joint ownership, and if joint ownership, the number of joint owners; (2) cost of construction of well; (3) dimensions of the well i.e. depth, diameter, etc. ; (4) source of financing i.e. own resources, government (subsidy/loan), other institutional sources like cooperatives, commercial banks, etc. and private moneylenders; (5) Ayacut anticipated under the well; (6) actual area irrigated under the well during the year 1977-78 (season wise); (7) extent of under utilization and reasons for the under utilization; (8) cropping pattern in the area irrigated by the well, specifying irrigated crops; (9) benefits accruing to the beneficiaries in terms of increase in the production, income, improved repaying capacity for loans etc.; and (10) assistance, if any given by government or other agencies in the case of failed wells.

With the above format of objectives the present study was conducted. All the irrigation wells numbering 655 were physically measured to know their diameter, depth, extent of water and building material used. Field work of the study was done from March to August 1979 with the reference year 1977-78. The quantitative data was collected on schedules by survey method and it was

supplemented to a great deal with the qualitative information obtained through observations and group interviews with the villagers and concerned officials.

Processing and analysis of data was done by applying simple statistical tools. First two chapters provide introductory information about the general conditions of the district, tehsil and the block. The third chapter contains information about the 59 sample villages with the irrigation wells and the fourth chapter gives a brief profile of 523 sample households owning 655 irrigation wells. Fifth chapter gives the main features of the wells. The sixth chapter deals with the utilization, under utilization and non-utilization of irrigation wells. The seventh chapter highlights the impact of well irrigation on the cropping pattern, cropping intensity and the economic gains received from the well irrigation. The eighth chapter gives some general observations made during the field work, which also provide some explanation to some of the aspects of utilization of wells. Last, the ninth chapter gives summary and the conclusions.

The data is presented firstly for the selected farmers as a whole and then on the basis of scheduled tribes and scheduled castes on the one hand and the other caste farmers on the other to provide a comparative picture of both the social groups. Wherever there has been no mention of scheduled castes in tables or discussion, they have been included with the scheduled tribes with whom their behaviour in the case of irrigation wells was not reported distinctive. They were also very few in number.

Mr. J.R. Shinde and Mr.B.S.Patel had been all along with the Research Officer to conduct the field work of the study. Both of them did the tabulation, processing and analysis of data. Mr.Shinde also prepared preliminary draft of the report. As an acknowledgement of work, their names appear on the cover page.

Irrigation wells were scattered over 59 villages not easily accessible by road. Director Research Services J.N.Agricultural University had been kind enough to provide jeep to the research team for field work. Collector, Mandla district and the Block Development Officer, Mohgaon Block had been very generous to extend necessary cooperation and help during the survey. It is gratefully acknowledged that Agricultural Extension Officer Mr.Chauhan along with his two Gramsevaks, Mr.Tripathi and Mr.Patle remained with the research team during the field work and helped the team in the physical verification of irrigation wells as well as in soliciting the information from the farmers. Concerned Patwaries, Gramsevaks, Village Patels and Surpanchs of the grampanchayts also rendered necessary help in the completion of the field work. We express our sincere thanks to all of them for their cooperation and help. We will be failing in our duties if we do not express our gratitude towards the heads of the sample households who supplied the necessary information and expressed their views generously.

(K.S.Yadav)
Research Officer

MAP

To Raipur

BILASPUR

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SEMI N

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To Jabalpur

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SECOND

10 Secord

Mohgaon Block



CHAPTER I

MANDLA DISTRICT

1.1 Location

Mandla district is one of the tribal districts of Madhya Pradesh and ranks third in the state in respect of proportion of tribal population, 60.54 per cent.

It is situated between latitude $23^{\circ}12'$ N and $23^{\circ}22'$ N and longitude $80^{\circ}18'$ E and $81^{\circ}50'$ E. It has three tehsils, namely, Mandla, Niwas and Dindori. It is bounded by Jabalpur district in the north-west, Shahdol district in north and north-east, Bilaspur district in the south-east, Rajnandgaon and Balaghat district in the south and Seoni district in the west.

1.2 Physical Features

Mandla district is full of forest clad hilly terrains and its landscape consists of a rugged high table land in the eastern portion of the Satpura hills which form the watershed of at least three river systems. The most important range of the Satpura in the district is Maikhal which provides watershed between western and eastern India. The district lies almost entirely in the catchment area of river Narmada and its tributaries. Most of the area of Mandla district comes under Deccan trap. The Narmada is the principal river and the guardian deity of the district. It rises from the Amarkantak, the highest peak of the Maikhal hills situated two miles beyond the district boundary in Pushparajgarh tehsil of Shahdol district. In its tortuous course through the district the river generally flows between high and rocky banks except for some distance near

Mandla where it flows through a rich and fertile plain as fertile as any other part of the state. Of the tributaries of Narmada, those deserving mention are the Banjar, the Halon, the Burner, the Kharmer, the Balai and the Hingna. The Banjar is the most important and its basin contains some of the best Sal forest in the district.

1.3 Forest and Wild Life

The district is predominantly endowed with the forests which cover 5,73,000 hectares, about 43.21 per cent of the total geographical area of the district and constitute nearly 4.02 per cent of the total forest area of the state. Mandla district is very rich in forests. Sal and teak trees are important timber trees. Sal forests are the most luxuriant in the sandy soils to the south of Mandla tehsil. Teak grows best in the Jugmadal hills and in the hills in the north of Mandla and Niwas tehsils. Besides these the forests of the district contain Tinsa, Dhawa, Dhamin, Bija, Dendic, Harda and Koha trees.

Mandla district is also rich in wild life, both carnivorous and herbivorous. The rich variety of its wild fauna can be seen in the Kanha and Kisli sanctuary, a reserve forest developed under the "Project Tiger" in the southern part of the district. Kanha sanctuary has attracted tourists from far and wide.

1.4 Climate and Rainfall

The climate of Mandla district is cool and humid. It is a hilly area with mild summer and with cold and frosty winter. The rainy season is very humid and unhealthy.

Rainfall is fairly heavy. The monsoon sets in from mid-June and continues till about early October. The average annual rainfall is 1,569 mm. The temperature ranges between 31.7°C in May and 17.1°C in December, the hottest and the coldest months respectively.

1.5 Population

According to census 1961 the district had 4,84,503 persons and this number increased to 8,73,577 in 1971. During the decade (1961-71) the district population increased at the rate of 27.62 per cent while state growth rate was of 28.67 per cent. Its population in 1971 comprised 50.11 per cent males and 49.89 per cent females. Mandla district is purely a rural district and its 94.40 per cent population lives in the villages.

As per census 1971, 3,82,100 persons or 43.74 per cent returned under the category of workers and the proportion of male and female workers in their total population groups was 55.51 and 31.92 per cent respectively. Among the workers, the cultivators preponderated with 65.30 per cent followed by agricultural labourers with 25.28 per cent. These two categories of workers constituted 90.58 per cent of the total workers and 87.24 per cent among the male and 96.39 per cent among the female workers. The workers engaged in other categories were very small in number in each category and together did not comprise even 10 per cent of the total workers. It gives an understanding about the backwardness of the district in the field of industrialization and modernization.

CHAPTER II

TEHSIL AND BLOCK

1. MANDLA TEHSIL

2.1 Introduction

Mandla tehsil is one of the three tehsils of the district. It is bounded in the north by Niwas tehsil, in the east by Dindori tehsil and Rajnandgaon district, in the south by Balaghat district and in the west by Seoni district.

Mandla tehsil is having an area of 3426.3 sq. km. which is inhabited by 4,11,628 persons living in 873 villages. The tehsil fully resembles with the district in the physical characteristics but it has a little upper hand in the field of agricultural development. The tehsil is divided into 6 blocks including the Mohgaon block.

2.2 Population Characteristics

As per census 1951, the tehsil had 2,55,367 persons and the number increased to 3,19,992 in 1961 and to 4,11,622 in 1971. Thus, the population of the tehsil had gone up by 61.19 per cent during last two decades. In 1971, there returned 50.23 per cent males and 49.67 per cent females with a sex-ratio of 991, slightly lower than the district sex-ratio of 996. Density of population was 114 persons per sq. km.

There returned 16.51 per cent literates in 1961 and the percentage increased to 21 in 1971. As per the census 1971, the literacy percentage for rural and urban population was 17.53 and 55.41 respectively and that for male and female population 32 and 11 respectively. Among

the tehsils, Mandla had the highest literacy percentage of about 21 while Niwas had the lowest percentage of about 14.

As per the occupational distribution of population, there returned 41.73 per cent or 1,71,752 persons as workers and among them 88.34 per cent were engaged in agriculture including 61.08 per cent as cultivators and 27.26 per cent as agricultural labourers.

2.3 Scheduled Tribes and Scheduled Castes

Scheduled tribesmen preponderated in the tehsil population with 53.80 per cent persons. The Gond and Baiga were two main tribes of the tehsil and these covered more than 90 per cent of the scheduled tribe population.

Scheduled caste persons were quite few in number being only 16,789 or 4.08 per cent. The numerically important scheduled castes were Mehra, Chamar and Dom.

2. MOHGAON BLOCK

2.4 Introduction

Mohgaon block was one of the sixteen blocks of Mandla district. It was a Tribal Development Block established on 1st April, 1961. It was situated in the south-west region of Mandla district in Mandla tehsil. Its headquarters were located on the Mandla-Dindori road at Mohgaon, about 55 km. away from Mandla town. River Burnahar divided the block into two unequal parts and the area situated on the west of the river was full of forest-clad hilly terrains and its villages were mainly populated by the scheduled tribes. The area falling on the east of

Burnahar river was comparatively less undulating and the non-tribals were in good number there.

T.D. Block Mohgaon was divided in 10 V.L.W. circles to carry out manifold developmental activities. Each V.L.W. circle was placed under a Village Level Worker to carry out the developmental activities in 6 to 11 villages. The V.L.W s were assisted by the extension officers. The Block Development Officer and the Senior Extension/ (agriculture) officer were responsible at the block headquarters for the execution of various developmental programmes in the block. The developmental activities of the block mainly pertained to the development of agriculture and irrigation, animal husbandry, education, health, housing and sanitation, panchayats and community development.

2.5 Villages and Population

The geographical area of Mohgaon Block was 32,120.06 hectares. It was having 87 villages with 45,000 persons. Out of 87 villages, 56 or 64.37 per cent were of small size with a population of less than 500 persons each. The medium size villages with 500-999 population numbered 20 or 28.74 per cent. The remaining 6 or 6.89 per cent villages had a population of more than 1,000 persons each. The population in different villages ranged between 26 to 1273 persons, the former figure returned from Jaranga and the latter from Mohgaon village. There were 31 or 35.63 per cent nuclear type villages and 56 or 64.37 per cent dispersed type villages with 2 to 6 hamlets. The Villages with 2 and 3 hamlets were more common and numbered 46.

2.6 Castes and Tribes

The scheduled tribes dominated in the population with 24,486 or 54.41 per cent persons, particularly the Gonds and Baigas. Scheduled tribesmen were returned from all the villages except one village named Jaranga which was entirely inhabited by scheduled caste persons. There were 36 villages having more than 85 per cent tribesmen and 29 villages with 50-85 per cent tribal population. Together these categories covered 65 or 75.58 per cent villages. Remaining 21 or 24.42 per cent villages had less than 50 per cent tribal population. Largest proportion of cent per cent tribal population was returned from Kanchangaon and lowest 1.74 per cent from Githar village. However, the scheduled tribe population was mainly concentrated in the hilly areas situated to the west of Burnahar river.

Scheduled caste population was very meagre with 1,590 or 3.90 per cent persons. Only 37 or 42.53 per cent villages had scheduled caste persons. Scheduled caste people returned in a smaller size from these villages except five, namely Jaranga with 100 per cent scheduled caste population, Khairi Rayatwari with 60.44 per cent, Khairi malguzari with 47.19 per cent, Deogaon with 37.87 per cent and Singarpur with 23.16 per cent scheduled caste persons. There were only 2 villages having between 10-20 per cent scheduled caste population. Remaining 30 or 81.08 per cent villages were having less than 10 per cent scheduled caste population. The scheduled castes numerically important were Basor, Chamar, Mahara or Mehra, Mehtar and Dom or Dumar.

Among other castes returned from the block were Marar, Brahmin, Dheemar, Rajak, Kurmi and Kalar, Muslim and Christian persons also returned from a few villages but in a very small number.

2.7 Literacy

Mohgaon block had a literacy percentage of 15.10 per cent which was lower than the district literacy figure of 18.34 per cent and tehsil's figure of 21 per cent. Literates returned from every village and their proportion in the population ranged from 0.36 per cent to 42.74 per cent. The former figure returned from Amjhar and the latter from Mohgaon village.

2.8 Workers

Agriculture was the main source of livelihood in the block. There returned 19,756 or 48.99 per cent workers from the block population. Agriculture engaged 13,761 or 94.97 per cent persons, of which 14,459 or 73.19 per cent were cultivators and 4,302 or 21.78 per cent agricultural labourers. Remaining 5.03 per cent workers were engaged in other trades.

2.9 Land Utilization

Forest covered 17.74 per cent, and not available for cultivation 17.10 per cent and other uncultivated land 0.02 per cent. Old fallow covered 14.57 per cent, current fallow 6.26 per cent and net area sown 44.31 per cent. Net area sown was 14,231.05 hectares, of which 35.13 per cent was double cropped and 0.98 per cent was irrigated. (Table 2.1)

Table 2.1 Land Utilisation during 77-78 in Mohgaon Block

S.No.	Particulars	Area in Hect.	Percentage
1.	Total geographical area	32,120.06	100.00
2.	Forest	5,698.05	17.74
3.	Land not available for cultivation	5,494.17	17.10
4.	Other uncultivated land	5.84	0.02
5.	Old Fallow	4,678.09	14.57
6.	Current fallow	2,012.00	6.26
7.	Net area sown	14,231.05	44.31
	(a) Double cropped area	5000.00	35.13
	(b) Irrigated area	140.00	0.98

2.10 Crops

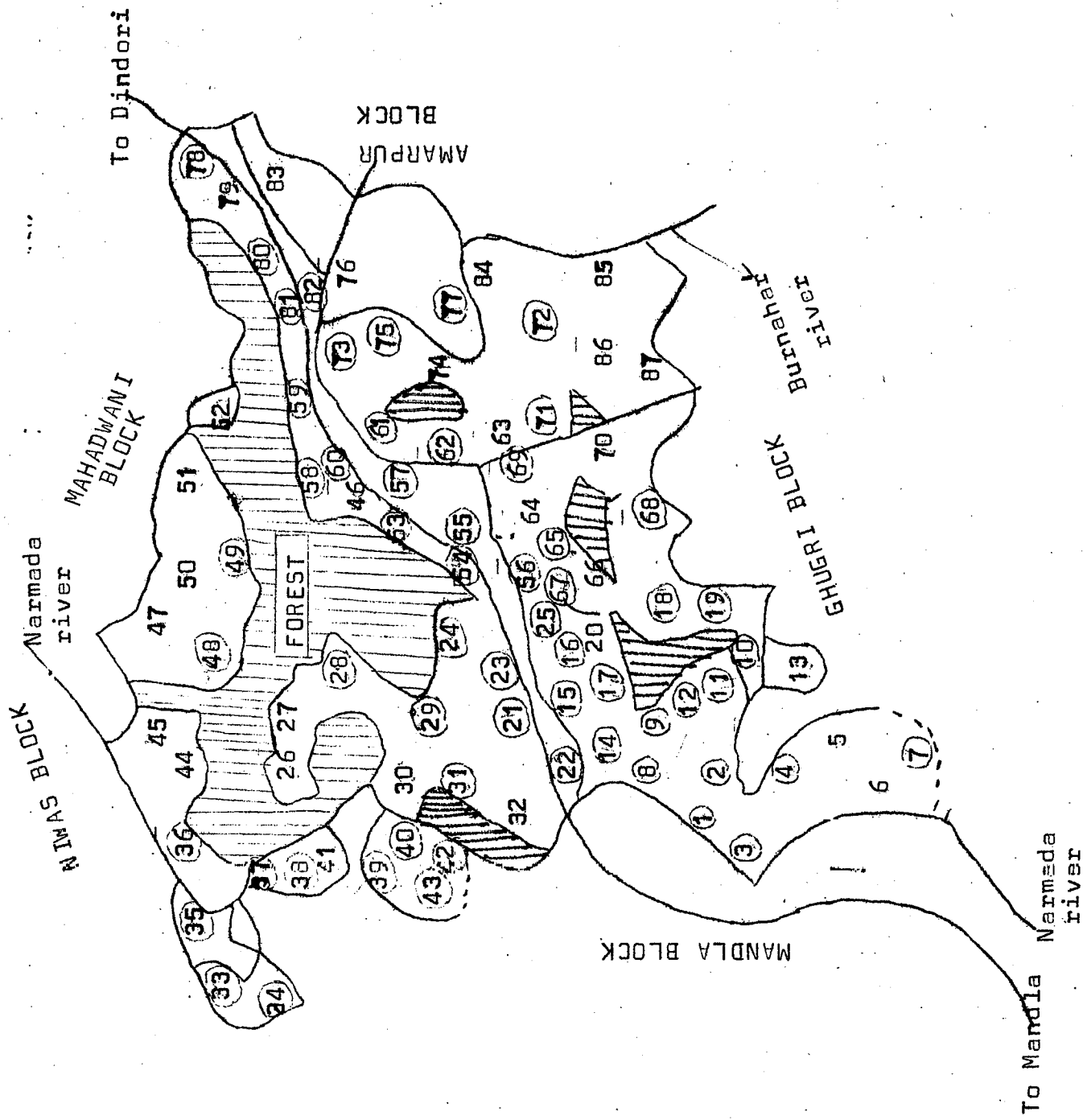
In the year 77-78, Mohgaon block had a gross cropped area of 20,363.15 hectares. Cropwise break-up had revealed that paddy was the main crop covering 30.02 per cent, ~~Madhobuti~~ appeared next with 22.70 per cent area. Other crops worth mention were, wheat 6.85 per cent and maize 5.64 per cent. Cereals and millets together covered 66.54 per cent area. Pulses covered 14.17 per cent and oilseeds 8.53 per cent. Other crops covered 10.76 per cent area. (Table 2.2)

Mohgaon block was having the largest number of irrigation wells among all the 16 blocks of Mandla district. There were 655 irrigation wells in the block and more than half of them (358) were under the ownership of scheduled tribesmen.

Table 2.2 Cropping pattern of Mohgaon Block in 1977-78

S.No.	Crops	Area in Hect.	Percentage
1.	Paddy	6,276.01	30.82
2.	Maize	1,147.40	5.64
3.	Wheat	1,394.17	6.85
4.	Kodo-Kutki	4,622.36	22.70
5.	Jowar	20.02	0.10
6.	Sawar	82.97	0.41
7.	Barley	4.00	0.02
Total cereals & Millets		13,607.01	66.54
8.	Arhar	29.63	0.14
9.	Urd	290.60	1.41
10.	Gram	702.69	3.45
11.	Pea	920.01	4.56
12.	Lentil	925.99	4.55
All Pulses		2,005.00	14.17
13.	Ramtil	331.45	1.63
14.	Til	205.24	1.01
15.	Mustard	1,102.03	5.41
16.	Linseed	97.71	0.48
Total Oil Seeds		1,737.23	8.53
17.	Other crops	2,133.01	10.76
All crops		20,363.05	100.00

MAP
MOHGAON BLOCK



Index

6 Village without Irrigation Wells

(7) Village with Irrigation Wells

(See App. Table 1 for name of the village)

CHAPTER III

SAMPLE VILLAGES

3.1 Introduction

Mohgaon block covered 87 villages and 59 of them or 67.82 per cent were having irrigation wells and formed the units for this study. These 59 villages returned from all the 10 V.L.W. circles. The largest number of villages having irrigation wells came from Manu and Bilgarha V.L.W. circles, numbering 10 villages each and the lowest number of two villages returned from Chubhawal V.L.W. circle. There were in all 655 irrigation wells and the largest number of 112 wells were situated in Bilgaon village and the lowest number of one well each was reported from 9 villages. The area falling on east of Burnahar river is mainly inhabited by the Hindu caste people. This area comprises Manu, Chandwara, Bilgaon and Mugwani V.L.W. circles which also possessed larger concentration of wells mainly owned by the Hindu caste people. Details about the selected villages are given in the Appendix Table 1.

3.2 Population

The total geographical area covered by the 59 sample villages was 54,442 hectares. There were 602 households with a population of 30,029 persons. Out of 59 villages, 34 or 57.63 per cent were of small size i.e. with a population of less than 500 persons. The medium size villages with 500-999 population numbered 20 or 33.90 per cent. The remaining 5 or 8.47 per cent villages had a population of more than 1,000 persons each. The population in different villages ranged between 79 and 1273 persons, the former figure returned from village Barwari and the

latter from Mohgaon village. These figures for the number of households were reported 17 and 265.

3.3 Castes and Tribes

The sample villages were predominantly inhabited by the scheduled tribes, particularly by the Gond and the Baiga tribes. Scheduled tribes comprised 18,860 persons or 62.80 per cent of the total population. There were 24 villages having more than 85 per cent tribesmen and 18 villages with 50-85 per cent tribal population. Together these categories covered 42 or 71.13 per cent villages. Remaining 17 or 28.82 per cent villages had less than 50 per cent tribal population. Largest proportion of 95.26 per cent tribal population returned from Sakari village and the lowest 2.42 per cent from Kasota village.

Scheduled caste population returned from 29 or 49.15 per cent villages. Scheduled caste population was 1,333 or 4.44 per cent. Scheduled caste people returned in a small number from these villages except three villages, namely, Khariri, Rayatwari, with 60.44 per cent, Khariri Malguzari with 47.19 per cent and Daogaon with 37.87 per cent scheduled caste persons. There were only 2 more villages having between 10-20 per cent scheduled caste population. Remaining 24 or 82.76 per cent villages were having less than 10 per cent scheduled caste population.

3.4 Literacy

The sample villages lagged far behind in the field of literacy attainment as compared to the tehsil and the district as a whole. As compared to the literacy

figure of 21 per cent for the tehsil, the sample villages had only 16.73 per cent literates. There were 13 or 22.03 per cent villages with higher percentage of literates than the tehsil figure while 46 or 77.97 per cent villages had lower percentage. The highest literacy percentage of 42.14 was returned from the village Bangali and the lowest 3.92 per cent from village Banjdih.

Education facilities up to higher secondary level were available within the jurisdiction of the block at Chabi and Mohgaon. For college and technical education, the people had to go to Mandla, the district town and for still higher studies to Jabalpur, the nearest town where all types of educational facilities were available.

3.5 Workers

There returned 14,636 or 48.74 per cent workers from the selected villages. Among the total workers, 94.93 per cent were engaged in agriculture including 71.62 per cent as cultivators and 23.31 per cent as agricultural labourers. The proportion of working population in different villages varied between 23.08 and 71.43 per cent, the former figure returned from Kasota and the latter from Pipardarra. Cultivation was the main occupation in all the villages followed by labour and other such activities.

The marketing facilities available in the area were very poor. There was no regulated market and marketing facilities were available only at weekly market centres which were generally at road side places like Mohgaon, Chabi and Ramnagar. At these market centres, items of daily necessities were available and for other things people were required to go to Mandla. Industries did not exist in the block at all.

CHAPTER IV

PROFILE OF SAMPLE HOUSEHOLDS

4.1 Introduction

As mentioned earlier 59 villages had irrigation wells. These wells belonged to 523 households with 4465 persons owning 655 irrigation wells. Village wise details of these households are given in Appendix table -2.

4.2 Caste/Tribe and Households

The sample households were dominated by scheduled tribes which covering 334 or 63.87 per cent households and 2,648 or 59.31 per cent persons. While scheduled castes comprised very meagre proportion with 6 households (1.14 per cent) and 65 persons (1.46 per cent). Other castes returned next to scheduled tribes and covered 183 households, 34.99 per cent, and 1,752 persons, 39.23 per cent. Average size of a household was of more than 8 persons. It was largest in scheduled castes with 10 persons and smallest in scheduled tribes with 7 persons. In other castes group the average size of household was of 9 persons.

The Gond and Baiga were the only two tribes returned from the scheduled tribes. Gonds were in majority with 277 or 52.97 per cent households. The Baigas had 57 or 10.90 per cent households. These two tribes had 2,274 and 374 persons and covered 50.93 and 8.38 per cent of the total population respectively.

Among other castes, Marars were in largest number with 138 or 26.38 per cent households and 1,335 persons or 29.86 per cent of population. Remaining castes included Brahmins 18 households, Dheemer 13 households;

Dhobi 4 households, Kurmi 3 households, Kachhi and Kalar one household each with a population of 169, 134, 35, 31, 5 and 13 persons respectively. There were 4 Muslim and one Christian household and the se had 30 and 2 persons respectively. (Table 4.1)

Table 4.1 Caste and Tribe wise Households and Population

Caste/Tribe	Households	Population					
		Male			Female		
	No.	%	No.	%	No.	%	Both
							No.
Gond	277	52.97	1159	50.74	1115	51.12	2274
Baiga	57	10.90	186	8.14	188	8.62	374
Total S.T.	334	63.87	1345	58.88	1303	59.74	2648
							59.31
Mehra	3	0.57	14	0.61	15	0.69	29
Duliya	1	0.19	10	0.45	5	0.22	15
Jhariya	2	0.38	13	0.56	8	0.37	21
Total S.C.	6	1.14	37	1.62	28	1.28	65
							1.46
Marar	138	26.38	690	30.57	635	29.12	1333
Brahmin	10	3.45	82	3.59	87	3.99	169
Dheemar	13	2.50	66	2.91	68	3.12	134
Rajak	4	0.76	15	0.65	20	0.91	35
Kurmi	3	0.57	10	0.73	13	0.61	31
Kachhi	1	0.19	2	0.08	3	0.13	5
Kalar	1	0.19	6	0.25	7	0.32	13
Muslim	4	0.76	14	0.61	16	0.74	30
Christian	1	0.19	1	0.04	1	0.04	2
							0.04
Total O.C.	183	34.99	902	39.50	850	30.90	1752
All	523	100.00	2284	100.00	2101	100.00	4465
							100.00

Scheduled castes included Mehra 3, Jhariya 2, and one Duliya household and were having 29, 21, and 15 persons respectively.

4.3 Literacy

There were 644 or 14.42 per cent literates. Literacy figures for males and females were 556 or 24.34 per cent and 88 or 4.03 per cent respectively. Out of 556 literate males, 19 or 3.41 per cent had completed higher secondary education and 24 or 4.32 per cent graduation. Out of 88 literate females, 6 or 6.82 per cent had completed higher secondary and 1 or 1.14 per cent graduation. Remaining literate persons were either able to read and write or received schooling below tenth standard.

Among the literates, there were 292 scheduled tribe, 20 scheduled caste and 332 other caste literates and comprised 11.02, 30.77 and 18.95 per cent literacy in their respective groups. Among the scheduled tribes, the literacy figures for males and females were 20.07 and 1.69 per cent respectively. Out of the 270 tribal male literates, 8 or 2.96 per cent had completed higher secondary and 6 or 2.22 per cent graduation. Except one graduate tribal female, none of the female literates was educated upto the higher secondary level.

Literacy for male and female among scheduled caste population was 48.65 and 7.14 per cent respectively. Out of the 18 literate males, one had completed higher secondary and another graduation. There were only two female literates who were educated upto primary level. In the other castes group literacy for male and female was reported 29.82 and 7.41 per cent respectively. Out of 269 literate males, 11 or 4.00 per cent had completed

higher secondary and 17 or 6.32 per cent graduation. Out of 63 literate females, 5 or 7.94 per cent had completed higher secondary. (Table 4.2)

4.4 Age and Sex

The population of the selected households included 2,204 males and 2,101 females. This means a sex-ratio of 955. Scheduled tribes had a higher sex - ratio of 969 while other castes had little lower sex - ratio of 942 and the scheduled castes the lowest of 756.

The total population of 4,465 persons included 146 or 3.27 per cent aged, above 59 years of age and 1,380 or 30.91 per cent children, below 14 years. Both of these non-working categories comprised 34.10 per cent. The productive age-group of 15-59 years covered 2939 or 65.02 per cent persons, the largest group.

4.5 Households and Size of farm

There were 523 households with the total land of 1,674.79 hectares. More than half or 58.13 per cent were small farmers having less than 4 hectares of land and occupying 38.62 per cent of the total land. Marginal farmers with less than 1 hectare numbered 77 or 14.72 per cent and occupied 50.50 hectares or 3.01 per cent land. Both these categories covered 72.85 per cent households but owned 41.63 per cent land. The medium size farmers possessing 4 to 10 hectares numbered 126 or 24.09 per cent and occupied 42.53 per cent area. There were 16 or 3.06 per cent large size farmers who possessed 15.01 per cent area.

On an average a marginal farm had an area of 0.66 hectare, a small size farm 2.13 hectares, a medium size farm 5.65 hectares and a large size farm 16.56 hectares (Table 4.3)

4.6 Size of Farm and the wells

Maximum number of 392 or 59.85 per cent irrigation wells returned from small farmers and minimum number of 10 wells or 2.75 per cent from the large size farmers. Medium size farmers owned 154 or 23.51 per cent wells and marginal farmers 91 or 13.89 per cent wells.

The average area per well on marginal farms was 0.56 hectare and small farms 1.65 hectares, medium size farms 4.62 hectares and large size farms 14.72 hectares. (Table 4.3)

4.7 Land Utilisation

Sample farmers had 1,674.79 hectares of land, of which 137.37 hectares or 8.20 per cent was fallow during 1977-78. Net sown area was 1,537.42 hectares or 91.80 per cent. Of this, 932.78 hectares or 60.09 per cent was sown more than once. Only 101.37 hectares or 6.59 per cent of the net area sown was irrigated. (table 4.4)

Caste and tribe wise analysis indicated that farmers from the other castes had larger proportion of double cropped area and irrigated area which was 85.15 per cent and 16.04 per cent respectively. Whereas these figures were much lower for the scheduled tribe and scheduled caste farmers.

Table 4.3 Households and size of holdings.

Size of holding (hectares)	Households			Average size of land per H.H.			Average size of land per well ()	
	No.	%	Hect.	%	Hect.	No.	%	Hect.
Marginal (71.00)	77	14.72	50.50	3.01	0.66	91	13.09	0.56
Small (1-4)	304	58.13	647.03	38.62	2.13	392	59.05	1.65
Medium (4-10)	126	24.09	712.34	42.53	5.65	154	23.51	4.62
Large (10 & Above)	16	3.06	264.92	15.81	16.56	18	2.75	14.72
All	523	100.00	1674.79	100.00	3.20	655	100.00	2.56

Table 4.4 Caste/Tribe wise Land Utilization of the sample Farms (1977-78)

S.No. Particulars	Scheduled Tribes		Scheduled Castes		Other Castes		All	
	Hect.	%	Hect.	%	Hect.	%	Hect.	%
1. Total holdings	1174.08	100.00	36.83	100.00	463.88	100.00	1674.79	100.00
2. Fallow land	115.20	9.81	0.61	1.66	21.56	4.65	137.37	8.20
3. Net area sown	1058.88	90.19	36.22	98.34	442.32	95.35	1537.42	91.80
4. Double cropped area	530.70	50.12	16.43	45.36	376.65	85.15	923.78	60.09
5. Net irrigated area	28.91	2.73	1.52	4.20	70.94	16.04	101.37	6.59
6. Gross-cropped area	1589.58	150.12	52.65	145.36	818.97	185.15	2461.20	160.09
7. Gross irrigated area	33.81	2.13	1.56	2.96	72.55	8.86	107.92	4.38

Note : Percentage for 4, 5 and 6 are taken from Net area sown and for 7 from 6 gross-cropped area.

Table 4.5 Land Utilization and the size of farm.

: 32 :

S. Particulars	No.	Size groups of the Farm in Hect.						All Farms		
		7 - 1	1-4	4 - 10	10 - +	Area	%	Area	%	
1. Total Holdings	50.50	100.00	647.03	100.00	712.34	100.00	264.92	100.00	1674.79	100.00
2. Fallow Land	0.19	0.38	20.97	4.48	73.89	10.37	34.32	12.96	137.37	8.20
3. Net area sown	50.31	99.62	618.06	95.52	638.45	89.63	230.60	87.04	1537.42	91.80
4. Double cropped area	42.80	85.07	418.94	67.78	334.22	52.35	127.82	55.43	923.78	60.09
5. Net Irrigated area	12.00	24.01	59.13	9.57	25.29	3.96	4.87	2.11	101.37	6.59
6. Gross-cropped area	93.11	185.07	1037.00	167.78	972.67	152.35	358.42	155.43	2461.20	160.09
7. Gross Irrigated area	12.16	13.06	62.46	6.02	28.03	2.88	5.27	1.47	107.92	4.38

The sample farmers had the cropping intensity of 160 per cent but it was noted that marginal and small farms had more intensive use of land as compared to medium and large size farms (Table 4.5)

Tribal cultivators were generally returned from forest-clad-hills and their fields were mainly located on the slopes of hill ranges. Their fields were undulating, Soils were shallow and poor. Tribals also did not cultivation in their traditional way. Whereas other caste people were comparatively residing in the plain areas and had their fields in a better position in respect of landscape and soils. Particularly Marar caste cultivators were most laborious vegetable growers. Their concentration was mainly in Chandwara and Bilgaon villages. Marars were specialised in growing vegetables. Almost every Marar farmer had his own irrigation well so as to get maximum production. They had small holdings which were intensively cultivated. All these differences in the field of agricultural activities had direct relationship with the utilization of irrigation wells.

per cent by the other castes. Among scheduled tribes there was an irrigation well on every 3.28 hectares, among scheduled castes on every 5.26 hectares and among other castes on every 1.60 hectares. On an average there was an irrigation well on every 2.56 hectares of land in Mohgaon block.

5.3 Ownership of Irrigation Wells

Out of 655 irrigation wells, 558 or 85.19 per cent were under individual ownership and 97 or 14.81 per cent under joint ownership. Among the wells owned jointly, 28 wells had two co-owners, 55 wells had three co-owners, 7 wells had 4 co-owners and remaining 7 wells had five co-owners each. (Table 5.2)

Table 5.2 Individual and Joint Ownership of the Wells

Caste/ Tribe	Individual		Joint		Total	
	No.	%	No.	%	No.	%
Scheduled Tribes	354	54.05	4	0.61	358	54.66
Scheduled Castes	7	1.07	-	-	7	1.07
Other Castes	197	30.07	93	14.20	290	44.27
All	558	85.19	97	14.81	655	100.00

Joint and individual ownerships of irrigation wells were having direct relation to the subsidy, development schemes and the caste and tribe of an individual farmer. Construction of well was a costly affair and an average farmer could hardly undergo such expenses. Therefore, among other castes which were not allowed subsidy, average or poor farmers had no option but to

construct irrigation well under co-ownership. Out of 97 co-ownership wells, 93 wells belonged to other caste people, particularly the Marars, the vegetable growers' caste, who possessed small holdings and generally grew onion under well irrigation. The scheduled tribesmen were bound to construct well under individual ownership to avail the subsidy and loans. Consequently, there were only 4 joint-ownership wells, out of 358 wells among them whereas, these figures among other caste people were 93 out of 290 wells. Among scheduled castes all the 7 wells were reported under individual ownership.

5.4 Building Material and the Wells

There were three types of wells on the basis of building material and were named as Katcha, mixed and pucca wells. The Katcha wells numbered 12 or 1.03 per cent. In these wells no building material was used and were under individual ownership. There were 63 or 9.62 per cent mixed wells and these were also reported under individual ownership. In this type of wells upper or bottom portion had stone or brick casing. Pucca wells were either made of bricks or stones. There were 580 or 88.55 per cent pucca wells and most of them, numbering 499, were made of bricks. The brick wells were reported very common among all the castes and tribes. (Table 5.3)

Cement was sparsely used in the construction of wells. It was generally used for outer plastering in pucca wells while for other works mud was used. Therefore, many wells did not hold long but dilapidated after sometime.

Table 5.3 Distribution of wells according to the building material used

Caste/Tribe	Unit	Katchka-Mixed	Pucca		All		
			Stone	Bricks - Total			
Scheduled Tribes	No. %	8 1.22	61 9.31	84 12.03	205 31.30	289 44.13	358 54.66
Scheduled Castes	No. %	2 0.31	- -	- -	5 0.76	5 0.76	7 1.07
Other Castes	No. %	2 0.31	2 0.31	2 0.31	204 43.34	206 43.65	290 44.27
All	No. %	12 1.83	63 9.62	86 13.13	494 75.42	580 88.55	655 100.00

5.5 Cost of Construction of the Wells

Cost of wells varied on the basis of the year of construction, the material used, the soil structure and the depth of the well. Average cost of a well was Rs. 1,804.98. It was Rs. 1,325.79 for the wells constructed till the end of 1965-66, Rs. 1,929.89 for the wells which came up during annual plans 1966-69, Rs. 1,952.05 for the wells constructed under fourth plan 1969-74, and Rs. 2,141.55 for the wells under Fifth Plan 1974-77. Similarly a katcha well was constructed at an expense of Rs. 1,354.16, a mixed well for Rs. 1843.06, a pucca stone well for Rs. 2,175.23 and a pucca-brick well for Rs. 1,746.61. It was noted that 358 or 54.96 per cent wells were in the cost range of Rs. 1000-2000, 253 or 38.62 per cent wells between Rs. 2000-3000, and 44 or 6.42 per cent wells required more than Rs. 3000.

The minimum cost of a katcha well was Rs. 500 and a maximum Rs. 3500. These figures for mixed wells were

Rs. 800 and Rs. 3200 and for pucca wells Rs. 1,000 and Rs. 4,000 and for pucca brick wells Rs. 400 and Rs. 0,000 respectively. These costs did not include the value of family labour (Table 5.4)

Table 5.4 Distribution of wells as per building material and cost

Cost	Katchha Mixed			Pucca			All		
				Stone Bricks			Total		
Rs.	No.	No.	No.	No.	No.	No.	No.	%	Rs.
< 1000	2	4	-	31	31	37	5.65		732.43
1000 - 1500	7	18	9	160	169	194	29.62		1062.63
1500 - 2000	1	11	15	100	115	127	19.39		1583.96
2000 - 2500	-	8	25	70	95	103	15.72		2097.59
2500 - 3000	1	18	28	103	131	150	22.90		2214.33
3000 - 4000	1	4	8	22	30	35	5.35		3132.94
4000 - 5000	-	-	1	3	4	4	0.61		4000.00
5000 - +	-	-	-	5	5	5	0.76		5800.00
All	12	63	86	494	580	655	100.00		1004.98
Av. Cost Rs.	1354.16	2175.23		1810.17					
	1043.06	1746.61		1004.98					

Sub-structure of earth in Mohgaon block was quite hard, full of rocks and such other material. Therefore, digging of well was a hard task. It required hard labour and a large amount only for digging the well pit. After 25 feet depth generally the rocky structure started and made it difficult to penetrate further. It also affected flow of water very badly. Generally due to hard rocks further efforts were to be discontinued in the absence of blasting aids. Practically most of the amount was spent

only for digging a well and sometimes no amount was left for casing of the pit with stone or brick made wall. At times it was done partly at the bottom or mouth-head of the pit. Casing with bricks and stones was done with the help of mud, and cement was used only for outer plastering. Thus, the cost of the well in Mohgaon block mainly depended on the sub-structure of the earth at a particular place as diameter of the wells did not vary much but was kept as per the prescribed standards.

5.6 Sources of Finance

The 655 irrigation wells cost Rs.1,18,262 and 57.86 per cent of this amount was met from own funds, 37.63 per cent as subsidy and remaining 4.51 per cent by taking loans from the government, cooperatives and commercial banks. These figures varied depending upon the year of construction and caste/tribe of the farmer. Own funds and government subsidy had been main sources of finance. Till the end of the third plan, 92.95 per cent expenditure was met from own funds and this proportion came down to 59.19 per cent during annual plans, to 47.12 per cent during fourth plan period and to 15.20 per cent during fifth plan period. As against this, the proportion of subsidy increased from 3.87 per cent to 37.14 per cent during annual plans, 49.05 per cent during fourth plan and 47.36 per cent during fifth plan period.

Among scheduled tribesmen 59.60 per cent amount was received as subsidy from the Tribal Development Block under different schemes and 36.35 per cent amount

was managed from own resources. They also received 4.05 per cent amount as institutional finance. As against this, other caste people met 94.47 per cent amount from own funds and 5.24 per cent as loan. Scheduled caste people managed 57.74 per cent of the cost from own funds, 36.31 per cent as subsidy and 5.95 per cent as loans. (Table 5.5.)

Table 5.5 Cost of wells and sources of Finance

Caste/Tribe Construction Year	Wells No.	Cost of Wells Rs.	Finance in percentage by source			
			Own fund	Subsidy	Govt. Coop.	Total
<u>Sch. Tribes</u>						
Up to III Plan	26	43850	66.60	22.23	6.61	4.56
Annual Plans	51	107900	48.10	47.82	0.46	3.62
IV Plan	194	398843	34.81	62.86	0.50	1.83
V Plan	87	183619	25.60	68.35	3.46	2.59
<u>Total</u>	358	734212	36.35	59.60	1.60	1.45
<u>Sch. Castes</u>						
Up to III Plan	2	6000	100.00	-	-	-
Annual Plans	-	-	-	-	-	-
IV Plan	2	4000	55.00	45.00	-	-
V Plan	3	6800	22.06	63.23	14.71	14.71
<u>Total</u>	7	16800	57.74	36.31	5.95	5.95
<u>Other Castes</u>						
Up to III Plan	162	202050	98.47	-	0.44	1.09
Annual Plans	21	31050	97.75	-	2.25	2.25
IV Plan	69	114450	89.74	1.09	9.17	9.17
V Plan	38	83700	90.08	-	9.92	9.92
<u>Total</u>	290	431250	94.47	0.29	4.73	0.51
<u>All Groups</u>						
Up to III Plan	190	251900	92.95	3.87	1.51	1.67
Annual Plans	72	138950	59.19	37.14	0.86	2.81
IV Plan	265	517293	47.12	49.05	2.42	1.41
V Plan	128	274119	45.20	47.36	5.71	1.73
<u>Total</u>	655	1182262	57.86	37.63	2.80	1.71
						4.51

Distribution of wells on the basis of sources of finance had indicated that out of 655 irrigation wells, 313 or 47.79 per cent were constructed exclusively from own funds, 56 or 8.55 per cent from 100 per cent subsidy, 244 or 37.25 per cent from own funds and subsidy, 8 or 1.22 per cent from subsidy and loans, 24 or 3.66 per cent from own funds and loans, and 11 or 1.68 per cent wells from all the three sources. Among other caste people who owned 290 wells, most of the wells, numbering 270 or 95.86 per cent, were constructed from own funds and only 12 or 4.14 per cent wells were constructed from loans along with own funds. While among scheduled tribes out of 358 wells, only 33 or 9.22 per cent were sunk entirely from own funds.

Scheduled tribesmen were allowed subsidy under different schemes by the Tribal Development Block, Mohgaon. The rate of subsidy ranged from 25 per cent to cent per cent. In the case of 55 or 15.36 per cent wells cent per cent subsidy was allowed and in 258 or 72.07 per cent wells 25 to 50 per cent subsidy was given. In these cases 50 per cent subsidy of the sanctioned amount was generally allowed, which varied between Rs. 2000 and 2500. In the case of 240 or 67.04 per cent wells the cost was met from own funds and subsidy, in 7 or 1.96 per cent cases from subsidy and loans and in 11 or 3.07 per cent cases from own funds, loans and subsidy. If the tribal farmer was not in a position to meet his share he was arranged government tacavi or loan from the cooperatives. In this group 12 or 3.35 per cent wells were also constructed from own funds and loans. Among scheduled

castes 2 wells were constructed out of own funds, one well by subsidy alone, 3 wells with the own funds and subsidy and another one well from subsidy and loan.

Thus among scheduled tribes in 87.43 per cent cases wells were constructed under the provisions of subsidy allowed to them by the Tribal Development Block under different developmental schemes while among other caste people most of the wells, 95.86 per cent were sunk from own funds. (Table 5.6)

Table 5.6 Distribution of Wells by sources of Finance

Sources	Sch. Tribe		Sch. Caste		Other Caste		All	
	No.	%	No.	%	No.	%	No.	%
Own funds	33	9.22	2	28.57	278	95.86	313	47.79
Own funds+Loan	12	3.35	-	-	12	4.14	24	3.66
Subsidy	55	15.36	1	14.28	-	-	56	8.55
Own funds + Subsidy	240	67.04	3	42.87	-	-	243	37.10
Subsidy + Loans	7	1.96	1	14.28	-	-	8	1.22
Own funds + Loans + Subsidy	11	3.07	-	-	-	-	11	1.68
All	358	100.00	7	100.00	290	100.00	655	100.00

5.7 Depth of the Wells

Depth of the wells in Mohgaon block depended on the level of water table which differed from place to place. Moreover water table in the area falling towards east of Burnahar river was comparatively lower between 6 and 9 metres as compared to the villages situated towards the west of this river where it was at the depth of 5 to 7

metres . There were 154 or 23.52 per cent wells having depth below 5 metres, 264 or 40.30 per cent wells between 5 and 7 metres, 162 or 24.73 per cent wells between 7 and 9 metres, 64 or 9.77 per cent wells between 9 and 11 metres and 11 or 1.68 per cent wells had depth more than 11 metres. Among scheduled tribesmen largest number of wells numbering 283 or 79.05 per cent had depth less than 7 metres while majority of wells numbering 218 or 75.17 per cent among other caste people were having depth between 5 and 9 metres. There were very few wells among both the groups which were more than 11 metres deep.

(Table 5.7)

Table 5.7 Distribution of wells according to Depth

Caste/Tribe	Depth of the well in Metres				
	Unit	4-5	5-7	7-9	9-11 11-17 All
Scheduled Tribes	No.	130	153	52	17 6 358
	%	36.31	42.74	14.52	4.75 1.68 100.00
Scheduled Castes	No.	3	-	3	- 1 7
	%	42.86	-	42.66	- 14.28 100.00
Other Castes	No.	21	111	107	47 4 290
	%	7.24	38.27	36.90	16.21 1.38 100.00
All	No.	154	264	162	64 11 655
	%	23.52	40.30	24.73	9.77 1.68 100.00

5.8 Diameter of Wells

As there was a paucity of water supply, the diameter of the wells was kept wider. It was done with a view to store more water. In the case of wells constructed by taking subsidy or loans or both from the Govt. and banks, the diameter was to be kept more than three metres while in the case of own funds it depended on the farmer.

Out of 655 wells, 19 or 290 per cent were having diameter between 1-2 metres, 265 or 40.46 per cent wells between 2-3 metres, 216 or 32.98 per cent wells between 3-4 metres, 105 or 16.03 per cent wells between 4-5 metres and 50 or 7.63 per cent wells more than 5 metres. Both scheduled tribes and other caste people considered diameter between 2-4 metres as an ideal one and this range covered most of the wells in both the groups. (Table 5.8 and 5.9)

Table 5.8 Distribution of Wells by Diameter

Caste/Tribe	Unit	Diameter in Metres				
		1-2	2-3	3-4	4-5	5- + All
Scheduled Tribes	No.	7	83	129	95	44
	%	1.96	23.18	36.04	26.53	12.29
Scheduled Castes	No.	-	4	1	-	2
	%	-	57.14	14.29	-	28.57
Other Castes	No.	12	178	86	10	4
	%	4.14	61.38	29.66	3.45	1.37
All	No.	19	265	216	105	50
	%	2.90	40.46	32.98	16.03	7.63

Table 5.9 Distribution of wells on the basis of depth and diameter

Depth Metres	Diameter in Metres				
	1-2	2-3	3-4	4-5	5- + All
1 - 5	3	39	54	44	14
5 - 7	10	104	82	38	28
7 - 9	2	93	46	17	8
9 - 11	2	26	29	6	1
11 - +	-	5	4	-	-
All	17	267	215	105	51

5.9 Ayacut of Wells

Ayacut of irrigation wells ranged from 0.81 to 2.02 hectares depending upon the device used for lifting water. Majority of the wells numbering 406 or 61.99 per cent were having 1.21 hectares ayacut. Wells with 0.81 hectares ayacut numbered 129 or 19.69 per cent. Wells with 1.01 hectares ayacut were 73 or 11.14 per cent and there were only 47 or 7.18 per cent wells which had ayacut of 2.02 hectares, the largest size. Devices of lifting water played an important role and the wells having dhenkali, mhote or persian wheel were reported having ayacut between 0.81 - 1.21 hectares and those fitted with pumps 2.02 hectares. (Table 5.10)

Table 5.10 Distribution of wells according to Ayacut

Caste/Tribe	Unit	0.01	1.01	1.21	Ayacut	(Hect.)
					2.02	All
Scheduled Tribes						
No.	115	68	142	33	358	
%	32.13	18.99	39.66	9.22	100.00	
Ayacut Hectares	93.04	68.75	172.39	66.69	400.87	
Scheduled Castes						
No.	4	-	-	3	7	
%	57.14	-	-	42.86	100.00	
Ayacut Hectares	3.24	-	-	6.06	9.30	
Other Castes						
No.	10	5	264	11	290	
%	3.45	1.72	91.03	3.79	100.00	
Ayacut Hectares	8.09	5.05	320.50	22.23	355.87	
All						
No.	129	73	406	47	655	
%	19.69	11.14	61.99	7.18	100.00	
Total Ayacut Hect.	104.41	73.86	492.92	95.10	766.30	

Total ayacut area was reported to be 766.30 hectares which means an average ayacut of 1.17 hectares per well. Total expected ayacut was 104.41 hectares for the wells with 0.81 hectare ayacut, 73.86 hectares for the

wells with 1.01 hectares ayacut, 492.92 hectares for the wells with 1.21 hectares ayacut and 95.10 hectares for the wells having 2.02 hectares ayacut.

5.10 Water column in the Wells

Water column in the month of May was measured for every well and the distribution as per the water column had indicated that 100 or 15.26 per cent wells, were dry, 167 or 25.50 per cent had water column of less than 1 metre 229 or 34.96 per cent wells had water column between 1-2 metres, 111 or 16.95 per cent wells had between 2-3 metres and 48 or 7.33 per cent wells between 3-4 metres. It was reported that the wells having less than 3 metres water column were not suitable for irrigation in the summer months. (Table 5.11)

Table 5.11 Distribution of wells according to water column

Caste/Tribe	Unit	Water column (Metres)						
		Dry	1 -	1 -	2 -	3 -	4 -	All
Scheduled Tribes	No.	90	120	110	31	7	358	
	%	25.14	33.52	30.73	8.66	1.95	100.00	
Scheduled Castes	No.	2	2	1	1	1	7	
	%	28.58	28.58	14.28	14.28	14.28	100.00	
Other Castes	No.	8	45	118	79	40	290	
	%	2.76	15.52	40.69	27.24	13.79	100.00	
All	No.	100	167	229	111	48	655	
	%	15.26	25.50	34.96	16.95	7.33	100.00	

5.11 Water lifting Devices

of

There were four types/water lifting equipments which included Dhenkali, Mhot, Rahat (Persian wheel) and pump (both diesel and electric) and these valued on an average Rs.50, Rs.250, Rs.800 and Rs.4,141 respectively. (Table 5.12)

Table 5.12 Distribution of wells according to the water lifting equipments

Caste/Tribe	Unit	Devices/Lifting water			
		Nil Dhenkali	Mhot	Rahat Pump	All
Scheduled Tribes	No. 176	87	62	10	23
	% 49.16	24.30	17.32	2.79	6.43
					100.00
Scheduled Castes	No. 5	1	-	-	1
	% 71.42	14.29	-	-	14.29
					100.00
Other Castes	No. 12	9	258	-	11
	% 4.14	3.10	88.97	-	3.79
					100.00
Total	No. 193	97	320	10	35
	% 29.47	14.81	48.85	1.53	5.34
					100.00
Total Cost	Rs. -	4800	80000	8000	144950
Average Cost	Rs. -	50	250	800	4141

There were 193 or 29.47 per cent wells having no device to lift the water, 97 or 14.81 per cent were fitted with Dhenkali, 320 or 48.85 per cent with Mhot and 10 or 1.53 per cent with Persian wheel. There were only 35 or 5.34 per cent wells on which diesel or electric pumps of 3 to 5 H.P. were installed.

CHAPTER VI

UTILIZATION OF IRRIGATION WELLS

6.1 The Condition of Wells

Physical observations of the wells during the survey revealed that out of 655 wells, 591 or 90.23 per cent were in good working condition and 64 or 9.77 per cent were non-working wells. Among the non-working wells, 44 wells had collapsed, 9 failed and 11 wells were incomplete. (Table 6.1)

Table 6.1 Present condition of wells

Condition of wells Sch.Tribes Sch.Castes Other Castes All								
	No.	%	No.	%	No.	%	No.	%
1. Working	297	45.35	5	0.76	289	44.12	591	90.23
2. Non-working	61	9.31	2	0.31	1	0.15	64	9.77
(i) Collapsed	43	6.57	-	-	1	0.15	44	6.72
(ii) Failed	9	1.37	-	-	-	-	9	1.37
(iii) Incomplete	9	1.37	2	0.31	-	-	11	1.68
All	358	54.66	7	1.07	290	44.27	655	100.00

Distribution of non-working wells by caste and tribe indicated that 61 non-working wells belonged to scheduled tribes, 2 wells to scheduled castes and one well to other castes. All the non-working wells belonging to the scheduled tribes and scheduled castes were dug under the provisions of subsidy. When the well owners could not undertake the casing work, 44 wells collapsed in the rainy season and these were not renovated. Due to hard rocks 9 wells were abandoned and 11 wells were left incomplete. The amount advanced for the construction

of these wells was treated as subsidy and no recoveries were made.

6.2 Utilization of Working Wells

Among the working wells, 421 or 71.24 per cent were used for irrigation and the remaining 170 or 28.76 per cent were left unutilized during 1977-78. The scheduled tribe and scheduled caste people who were given financial support of subsidy and easy loans, did not utilize most of the wells. Among scheduled tribes, out of 297 working wells, 156 or 52.52 per cent were not used. Among scheduled castes 3 out of 5 wells, were left unused. Whereas other caste people utilized 278 or 96.19 per cent out of 289 wells, (Table 6.2)

Table 6.2 Utilization of working wells

Caste/Tribe	Utilized		Not-utilized		All	
	No.	%	No.	%	No	%
Scheduled Tribes	141	47.48	156	52.52	297	100.00
Scheduled Castes	2	40.00	3	60.00	5	100.00
Other Castes	278	96.19	11	3.81	289	100.00
All	421	71.24	170	28.76	591	100.00

6.3 Classification of Non-Utilized Wells

Distribution of non-utilized wells by ayacut, depth, and diameter had indicated that the maximum number of 113 or 66.47 per cent wells had 0.81 hectare ayacut. According to depth, 135 wells or 80 per cent

were having depth less than 7 metres, and 105 or 61.76 per cent wells had diameter between 3-5 metres.

Moreover, on account of the non-utilization of these wells an ayacut of 164.06 hectares was lost. This loss of irrigation per un-utilized well was 0.95 hectare which in 156 cases was suffered by the tribal non-utilizers. (Table 6.3)

6.4 Factors responsible for Non-utilization of Irrigation Wells

Basically, many of the tribal farmers were not interested in the irrigation wells due to the rocky substructure and poor discharge of water in the wells already sunk in the area. But they could not refuse the development workers who motivated them to go in for the wells under the attractive provisions of subsidy. Moreover, in the case of 97 or 57.06 per cent wells there were no equipments for lifting the water. On account of very low discharge of water the irrigation was abandoned in 36 or 21.18 per cent wells. In the case of 10 or 5.88 per cent wells devices of lifting the water i.e. dhankali, mhot, persian wheel or pump were out of order and were not repaired for one reason or the other. The absence of bullock power was the reason in the cases of 8 or 4.71 per cent wells which were fitted with mhot or persian wheel. Lack of human labour was responsible in the case of 12 or 7.06 per cent wells. To the utter surprise 7 or 4.11 per cent wells remained unused for lack of interest in irrigation. (Table 6.4)

Table 6.4 Factors responsible for Non-Utilization

Reasons	Scheduled Tribes		Scheduled Castes		Other Castes		All	
	No.	%	No.	%	No.	%	No.	%
1. Lifting water equipment out of order	10	6.41	-	-	-	-	10	5.08
2. Lack of bull-ock power	8	5.13	-	-	-	-	8	4.24
3. Lack of working hands	7	4.49	1	33.33	4	36.36	12	7.06
4. Low discharge of water	32	20.51	2	66.67	2	18.18	36	23.18
5. No source of lifting water	94	60.25	-	-	3	27.28	97	57.06
6. For no reason	5	3.21	-	-	2	18.18	7	4.11
7. All	156	100.00	3	100.00	11	100.00	170	100.00

6.5 Utilization of Wells in Use

There were 421 wells actually used for irrigation. These wells had an ayacut of 523.43 hectares but an area of 101.26 hectares or only 19.34 per cent, nearly one fifth was irrigated. Maximum utilization was found to the extent of 46.34 per cent in the largest size group of ayacut of 2.02 hectares. Lowest utilization of 9.08 per cent was in the ayacut size of 1.01 hectares. (Table 6.5)

When viewed by social groups, the other caste group had upper hand of 5.65 per cent over the scheduled tribes and scheduled castes ^{who} used 143 irrigation wells which were having an ayacut of 180.28 hectares and out of this, 30.32 hectares or 15.32 per cent area was actually irrigated. They utilized to the maximum of 33.66 per cent in the ayacut group of 2.02 hectares and to

Table 6.5 Distribution of wells actually used for Irrigation according to Aycut, Depth and Diameter

Ayacut (Hect.)		Unit		Depth in Metres		Diameter in Metres		Ayacut (Hect.)	
7-5		7-5		7-9		9-11		11-11+	
1-2		1-2		2-3		3-4		4-5	
5-6		5-6		5-6		5-6		5-6	
6-7		6-7		6-7		6-7		6-7	
8-9		8-9		8-9		8-9		8-9	
10-11		10-11		10-11		10-11		10-11	
12-13		12-13		12-13		12-13		12-13	
14-15		14-15		14-15		14-15		14-15	
16-17		16-17		16-17		16-17		16-17	
18-19		18-19		18-19		18-19		18-19	
20-21		20-21		20-21		20-21		20-21	
22-23		22-23		22-23		22-23		22-23	
24-25		24-25		24-25		24-25		24-25	
26-27		26-27		26-27		26-27		26-27	
28-29		28-29		28-29		28-29		28-29	
30-31		30-31		30-31		30-31		30-31	
32-33		32-33		32-33		32-33		32-33	
34-35		34-35		34-35		34-35		34-35	
36-37		36-37		36-37		36-37		36-37	
38-39		38-39		38-39		38-39		38-39	
40-41		40-41		40-41		40-41		40-41	
42-43		42-43		42-43		42-43		42-43	
44-45		44-45		44-45		44-45		44-45	
46-47		46-47		46-47		46-47		46-47	
48-49		48-49		48-49		48-49		48-49	
50-51		50-51		50-51		50-51		50-51	
52-53		52-53		52-53		52-53		52-53	
54-55		54-55		54-55		54-55		54-55	
56-57		56-57		56-57		56-57		56-57	
58-59		58-59		58-59		58-59		58-59	
60-61		60-61		60-61		60-61		60-61	
62-63		62-63		62-63		62-63		62-63	
64-65		64-65		64-65		64-65		64-65	
66-67		66-67		66-67		66-67		66-67	
68-69		68-69		68-69		68-69		68-69	
70-71		70-71		70-71		70-71		70-71	
72-73		72-73		72-73		72-73		72-73	
74-75		74-75		74-75		74-75		74-75	
76-77		76-77		76-77		76-77		76-77	
78-79		78-79		78-79		78-79		78-79	
80-81		80-81		80-81		80-81		80-81	
82-83		82-83		82-83		82-83		82-83	
84-85		84-85		84-85		84-85		84-85	
86-87		86-87		86-87		86-87		86-87	
88-89		88-89		88-89		88-89		88-89	
90-91		90-91		90-91		90-91		90-91	
92-93		92-93		92-93		92-93		92-93	
94-95		94-95		94-95		94-95		94-95	
96-97		96-97		96-97		96-97		96-97	
98-99		98-99		98-99		98-99		98-99	
100-101		100-101		100-101		100-101		100-101	
102-103		102-103		102-103		102-103		102-103	
104-105		104-105		104-105		104-105		104-105	
106-107		106-107		106-107		106-107		106-107	
108-109		108-109		108-109		108-109		108-109	
110-111		110-111		110-111		110-111		110-111	
112-113		112-113		112-113		112-113		112-113	
114-115		114-115		114-115		114-115		114-115	
116-117		116-117		116-117		116-117		116-117	
118-119		118-119		118-119		118-119		118-119	
120-121		120-121		120-121		120-121		120-121	
122-123		122-123		122-123		122-123		122-123	
124-125		124-125		124-125		124-125		124-125	
126-127		126-127		126-127		126-127		126-127	
128-129		128-129		128-129		128-129		128-129	
130-131		130-131		130-131		130-131		130-131	
132-133		132-133		132-133		132-133		132-133	
134-135		134-135		134-135		134-135		134-135	
136-137		136-137		136-137		136-137		136-137	
138-139		138-139		138-139		138-139		138-139	
140-141		140-141		140-141		140-141		140-141	
142-143		142-143		142-143		142-143		142-143	
144-145		144-145		144-145		144-145		144-145	
146-147		146-147		146-147		146-147		146-147	
148-149		148-149		148-149		148-149		148-149	
150-151		150-151		150-151		150-151		150-151	
152-153		152-153		152-153		152-153		152-153	
154-155		154-155		154-155		154-155		154-155	
156-157		156-157		156-157		156-157		156-157	
158-159		158-159		158-159		158-159		158-159	
160-161		160-161		160-161		160-161		160-161	
162-163		162-163		162-163		162-163		162-163	
164-165		164-165		164-165		164-165		164-165	
166-167		166-167		166-167		166-167		166-167	
168-169		168-169		168-169		168-169		168-169	
170-171		170-171		170-171		170-171		170-171	
172-173		172-173		172-173		172-173		172-173	
174-175		174-175		174-175		174-175		174-175	
176-177		176-177		176-177		176-177		176-177	
178-179		178-179		178-179		178-179		178-179	
180-181		180-181		180-181		180-181		180-181	
182-183		182-183		182-183		182-183		182-183	
184-185		184-185		184-185		184-185		184-185	
186-187		186-187		186-187		186-187		186-187	
188-189		188-189		188-189		188-189		188-189	
190-191		190-191		190-191		190-191		190-191	
192-193		192-193		192-193		192-193		192-193	
194-195		194-195		194-195		194-195		194-195	
196-197		196-197		196-197		196-197		196-197	
198-199		198-199		198-199		198-199		198-199	
200-201		200-201		200-201		200-201		200-201	
202-203		202-203		202-203		202-203		202-203	
204-205		204-205		204-205		204-205		204-205	
206-207		206-207		206-207		206-207		206-207	
208-209		208-209		208-209		208-209		208-209	
210-211		210-211		210-211		210-211		210-211	
212-213		212-213		212-213		212-213		212-213	
214-215		214-215		214-215		214-215		214-215	
216-217		216-217		216-217		216-217		216-217	
218-219		218-219		218-219		218-219		218-219	
220-221		220-221		220-221		220-221		220-221	
222-223		222-223		222-223		222-223		222-223	
224-225		224-225		224-225		224-225		224-225	
226-227		226-227		226-227		226-227		226-227	
228-229		228-229		228-229		228-229		228-229	
230-231		230-231		230-231		230-231		230-231	
232-233		232-233		232-233		232-233		232-233	
234-235		234-235		234-235		234-235		234-235	
236-237		236-237		236-237		236-237		236-237	
238-239		238-239		238-239		238-239		238-239	
240-241		240-241		240-241		240-241		240-241	
242-243		242-243		242-243		242-243		242-243	
244-245		244-245		244-245		244-245		244-245	
246-247		246-247		246-247		246-247		246-247	
248-249		248-249		248-249		248-249		248-249	
250-251		250-251		250-251		250-251		250-251	
252-253		252-253		252-253		252-253		252-253	
254-255		254-255		254-255		254-255		254-255	
256-257		256-257		256-257		256-257		256-257	
258-259		258-259		258-259		258-259		258-259	
260-261		260-261		260-261		260-261		260-261	
262-263		262-263		262-263		262-263		262-263	
264-265		264-265		264-265		264-265		264-265	
266-267		266-267		266-267		266-267		266-267	
268-269		268-269		268-269		268-269		268-269	
270-271		270-271		270-271		270-271		270-271	
272-273		272-273		272-273		272-273		272-273	
274-275		274-275		274-275		274-275		274-275	
276-277		276-277		276-277		276-277		276-277	
278-279		278-279		278-279		278-279		278-279	
280-281		280-281		280-281		280-281		280-281	
282-283		282-283		282-283		282-283		282-283	
284-285		284-285		284-285		284-285		284-285	
286-287		286-287		286-287		286-287		286-287	
288-289		288-289		288-289		288-289		288-289	
290-291		290-291		290-291		290-291		290-291	
292-293		292-293		292-293		292-293		292-293	
294-295		294-295		294-295		294-295		294-295	
296-297		296-297		296-297		296-297		296-297	
298-299		298-299		298-299		298-299		298-299	
300-301		300-301		300-301		300-301		300-301	
302-303		302-303		302-303		302-303		302-303	
304-305		304-305		304-305		304-305		304-305	
306-307		306-307		306-307		306-307		306-307	
308-309		308-309		308-309		308-309		308-309	
310-311		310-311		310-311		310-311		310-311	
312-313		312-313		312-313		312-313		312-313	
314-315		314-315		314-315		314-315		314-315	
316-317		316-317		316-317		316-317		316-317	
318-319		318-319		318-319		318-319		318-319	
320-321		320-321		320-321		320-321		320-321	
322-323		322-323		322-323		322-323		322-323	
324-325		324-325		324-325		324-325			

the minimum of 8.91 per cent in the ayacut group of 1.01 hectares. As against this, among same groups of ayacut, the other caste people utilized wells to the maximum of 70.30 per cent and to the minimum of 16.83 per cent respectively. They used 278 wells for irrigation and irrigated 70.94 hectares area or 20.97 per cent area out of total ayacut of 343.15 hectares. (Table 6.6)

Maximum depth had the maximum utilization of wells to the extent of 48.65 per cent and the minimum depth of less than 5 metres faced the minimum extent of utilization of 17.10 per cent (Table 6.7). Similar tale was reported when these wells were viewed according to the size of diameter. The maximum utilization of 40 per cent had been in the largest diameter of more than 5 metres and the minimum utilization of 13.46 per/cent in the lowest diameter group of 1-2 metres. (Table 6.8)

According to the devices used for lifting water for irrigation, the maximum utilization of 51.24 per cent was achieved with the help of electric pump followed by 28.64 per cent with persian wheel and 26.52 per cent with diesel pump. Minimum utilization of 10.45 per cent was reported in the cases where dhenkalis were used. (Table 6.9)

It is worth mentioning that the wells in the largest group of ayacut, depth and diameter were fitted with the electric or diesel pumps and the same wells were returned with the maximum utilization which varied from 40 to 51.24 per cent. As against this, the wells falling in the lowest size group of ayacut, depth and diameter

Ayacut	No. of Wells	Irrigated (Hect.)	Area actually	Scheduled Other Tribes	Scheduled Other Tribes	Both	Extent of utilization per well (hect.)	Scheduled Other Tribes	Scheduled Other Tribes	Both	Extent of under utilization per well (hect)
(Hect.)				Castes	Castes			Castes	Castes		

Note :- Figures in brackets shows the percentage of irrigated area from the ayacut of the respective group.

Table 6.7 Utilization of used wells by depth

Depth (Metres)	No. of Wells	(Area in Hect.)				
		Total Ayacut Area	Total irrig. Area	Under utili- zation	Average per well Ayacut Area	Under utili- zation
1.	2.	3.	4.	5.	6.	7.
4 - 5	58	67.77 (17.10)	11.74 (17.10)	56.03 (82.90)	1.17	0.20
5 - 7	167	212.45 (20.47)	42.82 (20.47)	169.63 (79.53)	1.27	0.26
7 - 9	134	167.33 (19.20)	32.06 (19.20)	135.27 (80.80)	1.25	0.24
9 - 11	56	66.97 (15.00)	10.31 (15.00)	56.66 (85.00)	1.20	0.18
11 - +	6	8.90 (48.65)	4.33 (48.65)	4.57 (51.35)	1.48	0.72
All	421	532.43 (19.36)	101.26 (19.36)	422.17 (80.64)	1.24	0.24
					1.00	1.00

Table 6.8 Extent of utilization of used wells by diameter

Diameter	1.	2.	3.	4.	5.	6.	7.
1 - 2	12	12.54	1.74 (13.46)	10.80 (86.54)	1.04	0.14	0.90
2 - 3	222	271.12	45.22 (16.39)	225.70 (83.61)	1.22	0.20	1.02
3 - 4	137	169.96	37.06 (21.78)	132.90 (78.22)	1.24	0.27	0.97
4 - 5	38	48.76	8.63 (17.97)	40.13 (82.03)	1.28	0.23	1.05
5 - +	12	21.05	3.40 (40.00)	12.65 (60.00)	1.75	0.70	1.05
All	421	523.43	101.26 (19.36)	422.17 (80.64)	1.24	0.24	1.00

Table 6.9 Utilization of used wells by Devices of lifting water

Devices	1.	2.	3.	4.	5.	6.	7.
Dhankali	75	80.91	8.46 (10.45)	72.45 (89.55)	1.08	0.11	0.97
Mhot	311	378.97	65.71 (17.34)	313.71 (82.66)	1.22	0.21	1.01
Rahat	9	10.93	3.13 (28.64)	7.79 (71.36)	1.22	0.35	0.87
Electric Pump	20	40.48	20.74 (51.24)	19.74 (48.76)	2.02	1.04	0.98
Diesel Pump	6	12.14	3.22 (26.52)	8.92 (73.48)	2.02	0.54	1.48
All	421	523.43	101.26 (19.36)	422.17 (80.64)	1.24	0.24	1.00

Note:- In brackets shows the percentages from the ayacut.

had returned with the lowest extent of utilization and these wells had dhenkalis or mholes for lifting water.

6.6 Extent of Under Utilization

There were only 5 wells including 4 with pump and 1 with persian wheel which fully covered their ayacut.

Utilization of wells was viewed for all the wells as well as for the wells actually used for irrigation during the reference year. It was found that average ayacut for all the wells was reported 1.17 hectares and average irrigated area was 0.15 hectare which means an under utilization of 87.18 per cent while this proportion among the wells actually utilized was reported 80.64 per cent.

Among scheduled castes and tribes average ayacut for all the wells was reported 1.12 hectares and area irrigated was 0.08 hectares which means 92.86 per cent ^{under} utilization for all wells and 83.33 per cent under utilization for the well used for irrigation.

The other caste people reported better position. Average ayacut per well among their group was 1.23 hectares and average area irrigated was 0.24 hectare for all the wells which resulted in the under utilization to the extent of 80.49 per cent. This figure for utilized wells was 79.03 per cent.

To sum up, the under utilization varied between 80-93 per cent and scheduled tribes returned with miserable position as compared to the other castes.

(Table 6.10)

Table 6.10 Extent of Utilization and under utilization per well
(Area in Hectares)

Caste/Tribe	Average area per well		
	Ayacut	Area Irrigated	Under utilization %
<u>Scheduled Tribes</u>			
(i) All Wells	1.12	0.08	1.04 92.86
(ii) Used Wells	1.26	0.21	1.05 83.33
<u>Other Castes</u>			
(i) All Wells	1.23	0.24	0.99 80.49
(ii) Used Wells	1.24	0.26	0.98 79.03
<u>All Groups</u>			
(i) All Wells	1.17	0.15	1.02 87.18
(ii) Used Wells	1.24	0.24	1.00 80.64

6.7 Factors Responsible for Under Utilization

Low discharge of water caused under utilization in the case of 294 or 70.67 per cent wells. Hard rocks at the bottom did not allow the sufficient flow of water in these wells. In the case of 69 or 16.59 per cent wells, ayacut was insufficient and their utilization was conditioned to the extent of land located near the well. (Table 6.11)

Table 6.11 Factors responsible for under utilization

Factors	Scheduled Tribes		Other Castes		All	
	No.	%	No.	%	No.	%
Low discharge of water	102	71.82	192	70.07	294	70.67
Devices of water lifting did not do well	18	12.68	2	0.73	20	4.81
Lack of human/bullock labour	18	12.68	15	5.47	33	7.93
Insufficient land at the well	4	2.22	65	23.73	69	16.59
All	142	100.00	274	100.00	416	100.00

: 60 :

The water lifting equipments also frequently went out of order and caused under utilization^{in the}/case of 20 or 4.81 per cent wells. Shortage of human or bullock labour was responsible for under utilization of 33 or 7.93 per cent wells. All these factors weighed more or less similarly among the different social groups.

CHAPTER VII

IMPACT OF WELL IRRIGATION

7.1 Farmers Using Wells for Irrigation

The wells used for irrigation numbered 421 and were owned by 301 farmers. Distribution of the well owners according to the size of farm indicated that 19.93 per cent were marginal farmers (having less than 1 hectare), 58.81 per cent small farmers (1-4 hectares), 19.27 per cent medium size farmers (4-10 hectares) and about 2 per cent large farmers owning more than 10 hectares. The small farmers preponderated in all the social groups and covered 51.57 per cent farmers among scheduled castes and tribes and 64.16 per cent among other castes. The next large group was that of the marginal farmers with 26.01 per cent among other castes and that medium size farmers among scheduled castes and tribes. Large farmers returned very few from all the groups. (Table 7.1)

Table 7.1 Distribution of farms using irrigation wells

Size of Farm	Scheduled Tribes	Other Castes		Both		Average size of Farm		Hect.	
	No.	%	No.	%	No.	%	S.T.	O.C.	Both
1	15	14.73	45	26.01	60	19.93	0.73	0.60	0.63
1-4	66	51.57	111	64.16	177	58.81	2.27	1.93	2.06
4-10	43	33.59	15	8.67	58	19.27	5.67	5.65	5.67
10+ +	4	3.12	2	1.16	6	1.99	13.71	23.68	17.03
All	128	100.00	173	100.00	301	100.00	3.59	2.16	2.77

7.2 Land Utilization

On an average a farmer with irrigation well owned 2.77 hectares and this figure for a tribal farmer was larger, 3.59 hectares as compared to other caste farmer owning 2.16 hectares. Except the large farmers group, the other caste farmers had average size of land a little smaller than scheduled tribe farmers. Among large farmers, scheduled tribe farmers had much smaller size of farm as compared to the other caste farmers; the figures being 13.71 and 23.68 hectares respectively. Since the well was the only source the ~~farm~~ irrigated area in the subsequent discussion means area irrigated by well.

The intensive use of land was associated with the size of the farm and it decreased slowly with the increase in the size of farm. Among marginal farmers almost entire land was cultivated while among large farmers this area was 71.80 per cent of the land owned. Situation was more or less identical among both the social groups of scheduled tribes and other castes. Double cropped and irrigated area also gave the same type of indication with the size of the farms.

Among marginal farmers the proportion of area sown more than once was 82.34 per cent which was 37.72 per cent among the large farmers. Scheduled tribes reported the ~~similar~~ trend while among other castes this proportion remained more than 84 per cent except in the group of large farmers who had 34.10 per cent double cropped area.

Proportion of irrigated area was largest, 31.80 per cent among marginal farmers and it decreased from one size group to another and finally came down to 4.74 per cent among the large farmers. According to the caste and tribe, the proportion of irrigated area for marginal farmers was 21.22 per cent among scheduled tribes and 36.07 per cent among other castes and it reduced among large farmers to the level of 2.92 per cent in the case of former and 6.84 per cent in the case of latter group.

In short, these farmers had 64.71 per cent double cropped area and it was reported slightly less (52.47 per cent among the scheduled tribe farmers and a little higher 79.78 per cent among other caste farmers. Proportion of area irrigated was reported 12.19 per cent and it was nearly half, 6.58 per cent on the scheduled tribe farms and much larger, 20.19 per cent on the other caste farms. (Table 7.2)

7.3 Cropping Intensity

As indicated earlier more than 50 per cent of the cultivated area was sown more than once. Accordingly, the overall cropping intensity was 170.07 per cent. Among schedule tribes it was 157.52 per cent and among other castes 184.40 per cent. On the unirrigated area intensity of cropping was 163.88 and this figure was 153.33 per cent on scheduled tribe farms and 178.33 per cent on other caste farms. In the case of the irrigated area it was 210.79 per cent. On the scheduled tribes farms it was 216.46 per cent and on other caste farms

Table 72 Land utilization of farms using irrigation wells

Size of farm (Hect.)	Scheduled Tribes					Other Castes					Both				
	Area owned	Area culti- sown	Double cropped area	Net irrigated area	Area owned	Area culti- sown	Double cropped area	Net irrigated area	Area owned	Area culti- sown	Double cropped area	Net irrigated area	Area owned	Area culti- sown	Double cropped area
7 - 1.00 Hect.	10.93	10.93	10.93	8.29	2.32	27.00	26.92	22.94	9.74	37.93	37.85	37.85	37.85	31.23	12.06
%	100.00	100.00	100.00	75.85	21.22	100.00	99.70	84.96	36.07	100.00	99.79	99.79	82.34	41.30	
1 - 4 Hect.	150.00	143.30	143.30	96.31	16.94	214.61	209.79	183.51	43.67	364.62	353.09	353.09	279.81	60.61	
%	100.00	95.53	95.53	64.21	11.29	100.00	97.75	85.51	20.35	100.00	96.84	96.84	76.74	16.62	
4 - 10 Hect.	243.96	223.49	223.49	9.41	9.41	84.80	81.97	71.89	14.69	328.76	305.46	305.46	189.80	24.10	
%	100.00	91.61	91.61	48.34	3.86	100.00	96.66	84.78	17.32	100.00	92.91	92.91	57.73	7.33	
10 - + Hect.	54.83	38.76	38.76	1.60	1.60	47.35	34.60	19.83	3.24	102.17	73.36	73.36	38.54	4.84	
%	100.00	70.69	70.69	34.10	2.92	100.00	73.07	41.88	6.84	100.00	71.80	71.80	37.72	4.74	
All Hect.	459.72	416.48	416.48	30.27	6.58	373.76	353.28	298.17	71.34	833.48	769.76	769.76	539.38	101.61	
%	100.00	90.59	90.59	52.47	6.58	100.00	94.52	79.78	20.19	100.00	92.35	92.35	64.71	12.19	

208.33 per cent on irrigated area. According to the size of the farm, cropping intensity on irrigated area was 202.24 per cent on the smallest size of farm (Marginal) and highest of 217.56 per cent on the largest size of farm. Increase in the cropping intensity with the increasing size of land was also observed among the other caste farms while situation was somewhat different on the scheduled tribe farms, where lowest cropping intensity of 200 per cent was returned from the largest size of farms and highest intensity of 225.43 per cent from the small farm. The marginal farms had a cropping intensity of 202.67 per cent and that of medium farms 206.51 per cent.

According to the size of land the cropping intensity was reported decreasing with the increasing size of land. It means that the marginal farmers had higher intensity of cropping as compared to the large farmers. Cropping intensity increased to a considerable extent with the help of irrigation.

Thus the well irrigation has given a boost to the cropping intensity on the irrigated area as compared to the unirrigated area. It increased the intensity of cropping by 63.13 per cent on irrigated area on the farms of scheduled tribes and by 30.05 per cent on the farms of other castes. Thus there had been over all cropping intensity to the extent of 170.07 per cent and it was 157.52 per cent on scheduled tribes farms and 184.40 per cent on other caste farms. (Table 7.3)

Table 7.3 Cropping intensity by size of farm and caste/tribe

Schedulcd Tribes										
Other Castes										
Both										
Size of farm : Un-irrig - Irrigated All farms										
(Hect.)										
ated										
ated										
7	1	168.62	202.67	175.86	175.67	202.05	185.22	173.35	202.24	182.51
1-4		159.40	225.43	167.20	182.57	206.13	187.47	172.55	211.48	179.25
4-10		150.40	206.51	152.76	181.67	215.32	187.70	157.88	211.95	162.14
10- +		146.02	200.00	148.25	150.20	226.18	157.31	147.94	217.56	152.51
All		153.33	216.46	157.52	178.33	208.38	184.40	163.88	210.79	170.07

7.4 Crops Grown

Crops grown by the selected farmers included cereals, millets, pulses, oilseeds, vegetables, fruits, sugarcane and fibre crops. Both kharif and rabi crops were raised and a few summer vegetables were also grown. Paddy was most important followed by wheat. Maize, kodo/kutki, pea, lentil and vegetables were other important crops grown on a considerable area. Remaining crops like urad, arhar, til, jagani, linseed, sunhemp, sugarcane and orchards covered less than 6.00 hectares. Gram and mustard covered 10.64 and 11.43 hectares respectively. (Table 7.4)

7.5 Irrigated Crops

The irrigated crops were raised on an area of 106.17 hectares which included 32.86 hectares or 30.95 per cent on tribal farms and 73.31 hectares or 69.05 per cent on the other caste farms.

Area under different irrigated crops has given to understand that vegetables were mostly grown irrigated. Onion, winter vegetables and summer vegetables covered 72.53 hectares or 68.32 per cent of the gross irrigated area of 106.17 hectares. Onion was sown on 63.11 hectares or 59.44 per cent of the irrigated area. As per the usual practice after the paddy harvest, the farmers preferred to grow winter vegetables in the fields attached to the irrigation wells. This area is well known for growing onion. Other vegetable crops included brinjal, cabbage, cauliflower, radish and potato. Summer vegetables were not popular as the wells usually became

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Table 7.4 Crops sown by the farmers using irrigation wells (Area in Hect.)

Crops	Scheduled Tribes			Other Castes			All		
	Un-irrigated	Irrigated	Total	Un-irrigated	Irrigated	Total	Un-irrigated	Irrigated	Total
Maize	18.07	-	18.07	0.62	-	0.62	18.69	-	18.69
Kodo	49.61	-	49.61	8.08	-	8.08	57.69	-	57.69
Kutki	23.26	-	23.26	-	-	-	23.26	-	23.26
Urad	1.36	-	1.36	2.73	-	2.73	2.73	-	2.73
Arhar	0.24	-	0.24	0.38	-	0.38	0.38	-	0.38
Til	0.40	-	0.40	1.21	-	1.21	1.21	-	1.21
Jagani	1.66	-	1.66	3.68	-	3.68	3.68	-	3.68
Sunhemp	0.87	-	0.87	0.87	-	0.87	0.87	-	0.87
Sugarcane	-	2.39	2.39	3.60	-	3.60	5.99	-	5.99
Rabi	121.75	12.00	133.75	184.83	12.73	197.56	293.85	24.73	318.58
Wheat	9.87	-	9.87	0.77	-	0.77	10.64	-	10.64
Gram	20.61	0.36	20.97	33.11	-	33.11	53.72	0.36	54.08
Pea	20.86	0.20	21.06	30.38	-	30.38	51.24	0.20	51.44
Lentil	7.52	-	7.52	0.34	-	0.34	7.86	-	7.86
Rai	3.40	-	3.40	0.17	-	0.17	3.57	-	3.57
Mustard	0.91	-	0.91	0.87	-	0.87	1.78	-	1.78
Alsi	-	13.23	13.23	49.88	-	49.88	63.11	-	63.11
Onion	-	2.09	2.09	4.33	-	4.33	6.42	-	6.42
Winter veg.	-	0.63	0.63	2.37	-	2.37	3.00	-	3.00
Summer veg.	-	-	-	0.40	-	0.40	0.40	-	0.40
Orchards	-	-	-	-	-	-	-	-	-
All	520.72	32.86	553.58	634.81	73.31	708.12	106.17	1188.39	1294.56

dry in these days. Moreover summer lady's finger was grown over an area of 3.00 hectares.

Vegetable growing was more popular among the other castes particularly the Marar caste (vegetable grower's caste) and these farmers raised vegetables on an area of 56.50 hectares as against tribal farmers who raised vegetables only on 15.90 hectares.

Wheat was another important crop sown on 24.73 hectares as irrigated crop and it was more or less equally shared by both the scheduled tribe and other caste farms. Sugarcane was also sown by both the groups and it covered 5.99 hectares. Paddy on 1.96 hectares, pea on 0.36 hectare and lentil on 0.20 hectare were reported only from scheduled tribe farms while orchards on 0.40 hectare returned from other caste farms.

Thus the utilization of irrigation wells was mainly done for raising vegetable crops by the both scheduled tribe and the other caste farmers to the extent of 68.32 per cent of the irrigated area. Wheat crop was next and it covered 23.29 per cent of irrigated area.

7.6 Per hectare Yield, Cost and Return of Irrigated and Unirrigated Crops

Cost does not include the value of family labour and owned bullock labour and farm yard manure. Return equals main product and excludes value of by products.

Yields obtained for unirrigated and irrigated crops have revealed that the other caste farmers received much higher yields, more than double for certain crops as

compared to the tribal farmers who achieved little higher yields as against the farmers in the case of unirrigated crops maize, mustard and linseed and irrigated crops of onion and sugarcane.

Wheat and paddy were the crops which were sown both under irrigated and unirrigated conditions. Average yield of paddy per hectare for irrigated area was 2,312 kg. and for unirrigated area 1,270 kg.; a little less than double. In the case of wheat these figures were 1,655 kg. for irrigated and 703 kg. for unirrigated. Thus irrigated crops of wheat and paddy provided more ^{double} than/returns as compared to the return received from the unirrigated farms.

Per hectare yields received from irrigated crops by the other caste people were much higher as compared to the tribal farmers in the case of wheat, winter and summer vegetables excluding onion which reported higher yields on the farms of the latter group. Other caste farmer received 2,034 kg. wheat per hectare while a tribal farmer 1,232 kg. Similar gap in terms of yield existed in the case of vegetables.

Onion was grown as irrigated crop and a tribal farmer produced 5,982 kg. per hectare while other caste farmer 5,170 kg. In the case of sugarcane tribal farmers obtained output worth Rs. 3019 per hectare while the other caste farmer Rs. 2,807. (Table 7.5 and 7.6)

Table 7.5 Per hectare yield, cost and return for un-irrigated crops

Crops	Scheduled Tribes			Other Castes			Both			
	Yield	Cost	Return	Yield	Cost	Return	Yield	Cost	Return	
	Kg.	Rs.	Rs.	Kg.	Rs.	Rs.	Kg.	Rs.	Rs.	
Paddy	97	750.00	301.00	1505	973.00	321.00	1270	876.00	312.00	564.00
Maize	422	431.00	93.00	339.	339.00	97.00	419	428.00	93.00	335.00
Kodo	353	182.00	32.00	624	317.00	64.00	391	201.00	37.00	164.00
Kutki	259	140.00	31.00	-	-	-	259	140.00	31.00	109.00
Urad	195	669.00	132.00	328	748.00	146.00	262	709.00	139.00	570.00
Arhar	104	208.00	41.00	357	714.00	71.00	197	395.00	53.00	342.00
Jagant	72	145.00	36.00	205	515.00	67.00	145	348.00	53.00	295.00
Wheat	682	812.00	229.00	718	860.00	237.00	703	840.00	234.00	606.00
Gram	121	204.00	146.00	260	390.00	176.00	131	217.00	148.00	69.00
Pea	43	63.00	117.00	120	167.00	143.00	91	127.00	133.00	(-) 6.00
Lentil	15	40.00	130.00	30	69.00	159.00	24	58.00	147.00	(-) 89.00
Rai	428	1098.00	62.00	118	309.00	50.00	415	1064.00	62.00	1002.00
Mustard	183	431.00	70.00	176	471.00	58.00	183	433.00	69.00	364.00
Alsi	132	374.00	94.00	109	310.00	115.00	121	343.00	104.00	235.00

Table 7.6 Per hectare yield, cost and return for irrigated crops

Crops	Scheduled Tribes				Other Castes				Both			
	Yield	Cost	Return	Rs.	Yield	Cost	Return	Rs.	Yield	Cost	Return	
	kg.	Rs.	Rs.	Rs.	kg.	Rs.	Rs.	Rs.	kg.	Rs.	Rs.	
Paddy	2312	1697.00	387.00	1310.00	-	-	-	-	2312	1697.00	387.00	1310.00
Wheat	1232	1493.00	422.00	1071.00	2024	2451.00	760.00	1691.00	1655	1998.00	599.00	1399.00
Pea	277	416.00	222.00	194.00	-	-	-	-	277	416.00	222.00	194.00
Onion	5982	2991.00	408.00	2583.00	5170	2585.00	435.00	2150.00	5341	2670.00	429.00	2241.00
Winter veg.	-	2904.00	325.00	2579.00	-	7021.00	1202.00	5819.00	-	6118.00	992.00	5126.00
Summer veg.	-	1833.00	102.00	1731.00	-	2868.00	394.00	2474.00	-	2651.00	333.00	2318.00
Sugarcane	-	3019.00	557.00	2462.00	-	2807.00	510.00	2297.00	-	2891.00	528.00	2363.00
Orchard	-	-	-	-	-	8750.00	3750.00	5000.00	-	8750.00	3750.00	5000.00

7.7 Per hectare Yearly return from the Irrigated and Unirrigated area

On an average a farmer produced crops worth Rs. 2,040.04 per hectare during the year on the irrigated area while he received production worth Rs. 686.96 on the unirrigated area. He spent Rs. 430.32 per hectare on irrigated area and Rs. 228.84 on unirrigated area. This allowed him the return of Rs. 1609.72/hectare from irrigated area and Rs. 458.12 from unirrigated area. Irrigated and unirrigated area had the ratio of 3:1 in the case of production, 2:1 in the costs and 3.5:1 in the case of returns. An average farmer earned Rs. 1151.60 per hectare more from the irrigated area as compared to the unirrigated area. (Table 7.7)

A scheduled tribe farmer raised production valued Rs. 1,847.95 per hectare on the irrigated area during the year and that from the unirrigated area Rs. 595.18. He incurred Rs. 394.06 per hectare on irrigated area and Rs. 207.87 on unirrigated area. Per hectare return for irrigated area was Rs. 1,453.89 and that for unirrigated area Rs. 387.31. Thus he received Rs. 1,066.58 per hectare more from the irrigated area.

As compared to the scheduled tribe farmer, another caste farmer returned with a better position. He got production worth Rs. 2,120.55 per hectare from the irrigated area and worth Rs. 775.42 from unirrigated area. For this he invested Rs. 445.51 per hectare on irrigated and Rs. 249.06 on unirrigated area. His return from irrigated area was Rs. 1675.04 per hectare and Rs. 526.36 from unirrigated area. This means that he

Table 7.7 Per hectare yearly production, cost and return in terms of rupees received from the irrigated and/or gas by the farmers using irrigation wells

Size group (Hect)		On irrigated area				On un-irrigated area			
		Production		Cost		Production		Cost	
		Return	Cost	Return	Cost	Return	Cost		
1. On the Scheduled Tribe Farms									
7.1		1957.70	389.42	1568.28	747.39	214.10	533.29		
1-4		1582.97	349.47	1233.50	600.15	223.41	376.74		
4-10		2431.04	510.44	1920.60	593.67	198.38	395.29		
10- +		2066.25	366.25	1700.00	526.31	192.11	334.20		
All		1847.95	394.06	1453.89	595.18	207.87	387.31		
2. On the other caste Farms									
7.1		2049.97	371.73	1678.24	926.07	239.01	687.06		
1-4		2245.33	454.43	1790.90	817.95	264.26	553.69		
4-10		1791.78	426.40	1365.38	662.95	244.22	418.73		
10- +		2329.22	332.27	1696.95	696.11	169.82	526.29		
All		2120.55	445.51	1675.04	775.42	249.06	526.36		
3. On the All Farms									
7.1		2031.37	374.98	1656.39	868.76	231.00	637.76		
1-4		2040.50	421.97	1618.53	735.51	248.80	486.71		
4-10		1997.20	453.36	1543.84	616.70	213.62	403.08		
10- +		2261.21	563.57	1697.74	618.20	180.05	438.15		
All		2040.04	430.32	1609.72	686.96	228.84	458.12		

earned Rs. 1148.68 additional as compared to the per hectare returns received from the unirrigated area during the year.

Size of holding had relationship in the case of the production and return per hectare. The figures for production and return were highest on the farms of marginal farmers and these decreased marginally with the increase of size of holding and the lowest figure returned from the largest size group of holdings. But in the case of irrigated area, the situation was conditioned by the devices of water lifting used by the farmers. The farmers who used electric or diesel pumps for water lifting obtained higher production as compared to those who used dhenkali, mhothe and persian wheel. The concentration of farmers with pump sets in a particular size group augmented the production figures in that group as compared to other groups. In the case of combined figures both the social group, these farmers appeared in the larger number in the largest size group of above 10 hectares and boosted up the figures for production, costs and returns on the irrigated area in the group and left the other farmers much behind. Among scheduled tribes they appeared in the size group of 4-10 hectares and also from the group of above 10 hectares. Among other caste farmers, they were mainly confined to the largest size group of above 10 hectares and a few of them also returned from the group of small farmers. Likewise, the figures for production and return were reported higher in the group referred to as compared to the other size groups where the farmers did not use pump sets for irrigation.

CHAPTER VIII

SOME OBSERVATIONS

Present chapter deals with the observations made by the research team as well as the views expressed by the beneficiaries and the concerned officials about the different aspects which were conditioning the utilization of the irrigation wells in the Mohgaon block.

1. Absence of Ground Water Survey

Ground water survey of Mohgaon block was never conducted and no valid information about the water table was available. Information about the rock formation and availability of water was also not known and the well construction programme was carried out without necessary information. From the view point of favourable water table the wells in the non-tribal belt of the block were comparatively more successful but the wells under different tribal irrigation schemes were mainly constructed in the tribal belt where wells were not successful due to hard rocks and paucity of water.

2. Target and Subsidy Oriented Schemes

Without giving due thought that whether the well construction was feasible from the view point of irrigation, well irrigation programmes were carried out in the block with full swing under different tribal development schemes to achieve the given targets. Tribal farmers were well aware about the efficiency of wells for irrigation on the basis of the experience gathered from the wells constructed in the past. Therefore, they were reluctant to construct the wells for irrigation,

Concerned officials approached the farmers again and again and motivated them on the grounds of subsidy and liberal loans. Since the officials had obliged them in many ways, the tribal farmers did not think it proper to annoy them but helplessly agreed to construct wells to help them in the fulfilment of the targets. The tribal people generally constructed wells carelessly and many of them did not complete them properly and if completed they did not provide proper maintenance. So as to minimise the investment of their own funds, they tried all the ways and means to complete the wells from the amount of subsidy. Some of them stopped construction as and when these funds were exhausted. Some tribal farmers told that they had constructed the wells just to please the officials with the help of subsidy.

3. Insufficient Funds

Digging of well was a hard and costly affair in the area. Rocks were hard and water table was low, therefore digging operations needed much expenses which the farmers were not in a position to meet from their own resources. As against this the loan permissible was Rs. 2,500 per well and was hardly sufficient to complete the digging operation and left no margin for other construction works. Therefore, many of the wells remained without casing wall, mouth head and plastering. Absence of these did not allow the wells to live long. People did not like to invest their own funds to a larger extent as the wells had very low potential for irrigation purposes.

4. Absence of Water Lifting Equipments

Prior to 1975-76 the composite cases for both well and water lifting equipments were not sanctioned. Farmers were aided for the construction of well and it was hoped that water lifting equipment will be purchased by the farmer. Farmers did not have funds to purchase these equipments and they also did not try to do so due to the meagre irrigation capacity of the wells. Even after 1975-76 farmers did not insist on the purchase of water lifting equipment just because of this reason. And if the equipment was supplied they did not care to install it and waited for the concerned officials to do it. Thus a considerable number of wells remained without water lifting equipment and such wells were left uncared.

5. Absence of Equipment Repairing Facilities

Repairing services needed for the water lifting equipments like persian wheel and pump were not available. Once an equipment went out of order it remained so far ever. In Umerdih village a good number of wells were constructed under the Tribal Model Village Scheme and these were fitted with persian wheels. This scheme provided cent per cent subsidy for survey. In these both survey all these persian wells and the persian wheels. At the time of wheels were found out of order and their parts were lying here and there for want of repairing. Diesel and electric pumps also remained out of work in the absence of repairs. Repairing services were available at Mandla and Jabalpur with the private workshops which these people could not obtain as they needed service at their door steps.

Eventually, the absence of repairing services provided a sound excuse to the disinterested farmers for not doing well irrigation.

6. Absence of Maintenance

The farmers particularly the tribal farmers, did not provide cleaning and repairing services to the wells and water lifting equipments even once during the year. Most of the wells were without plaster and had no head gear wall. Therefore, falling was a common process. Rain water was running in to the well. The wells silted to a large extent and did not allow proper water discharge. During rains wells without plaster collapsed. Thus the lack of maintenance was responsible for the collapse of many wells. The wells did not serve well and did not live long. The water lifting equipments went out of order very early because of no maintenance services.

7. Rural Electrification Programme

The Rural Electrification Programme was also carried out in full swing in the block. To obtain the required number, the well cases were sanctioned very liberally along with electric motor pumps. Both electrification and construction of wells were carried out simultaneously in the block and even if the wells were not complete the consent of the farmers was taken by obtaining thumb impressions on necessary papers. Since the farmers were aware of the water discharge rate of the wells, **they** constructed wells unwillingly and many of them did not complete them. Even if the electric

poles were erected and electric pumps were supplied to them, the wells were not there. In some cases there was a small pit in the name of a well. Even if the well was there, there was no water. There were very few cases which may be counted on fingers having water to run the 3 H.P. pump for half an hour. Therefore, there were 118 unconnected pumps in the block and their owners were regularly served with minimum charges bill by the M.P. Electricity Board since last three years. Now the question of payment of these bills was posing threat to all concerned. Farmers were determined not to pay the bills and they were openly saying that this electrification programme had been undertaken by befooling them. Practically the electrification programme had created reluctance and unwillingness among the farmers about the sinking of wells for irrigation purpose.

8. Traditionalism of Tribals

Above all, the traditional characteristics of tribal way of life had been playing important role in conditioning the well irrigation in the block. Tribal people in general were not cesirous to add anything new to the present lot of economic activities like irrigation which required additional labour and investment. They were the most carefree people having no aspiration for a better life. They were most happy with their present lot. Therefore they were not willing to construct the wells for irrigation and they ~~were~~ further reluctant to do it as the wells were not

successful for irrigation purposes. At the same time it was also against their tradition to displease a person who was beneficial to them in many ways. Just because of this many of them agreed to construct the well just to please the particular development worker who was extending many other facilities to them under different developmental schemes. Higher rates of subsidy had been another important motivating factor for the construction of wells. To protect their interests, the tribal farmers always tried to complete the wells within the subsidy amount and only contributed his family labour. Thus, had there been no subsidy and liberal loan, the tribal farmers would not have constructed the irrigation wells and would not have obliged the officials in the achievements of the targets of irrigation wells.

CHAPTER IX

SUMMARY AND CONCLUSIONS

9.1 Introduction

The present study was originated from a communication from the Ministry of Agriculture and Irrigation, Government of India, asking immediately data after a quick survey of irrigation wells in a tribal block in Madhya Pradesh giving the number of total wells and those benefiting the tribal and scheduled caste people. Some nearby tribal block was to be selected and collection of data was to be done on an immediate basis. The results were required within a month. A quick survey was, therefore, conducted in Mohgaon Tribal Development Block of Mandla district, the nearest tribal district to Jabalpur and the results were communicated accordingly. In its next communication the Ministry desired a detailed study designed in consultation with the Ministry of Home Affairs and the Central Ground Water Board.

9.2 Objectives of the Study

In order to assess the extent of benefits flowing to the scheduled tribe and scheduled caste population from the irrigation wells in the block, it was felt necessary to cover the block in its entirety. It was also felt that data should be collected from all the cultivators in the block who were having irrigation wells. The items on which data needed to be collected were :- (1) Ownership of the well i.e. (a) Whether owned by a scheduled tribe, scheduled caste or non-tribal and (b) individual or joint ownership

and if joint ownership, the number of joint owners;

(2) Cost of construction of well; (3) dimensions of the well i.e. depth, diameter etc.; (4) Sources of finance i.e. own resources, Government (subsidy/loan), other institutional sources like cooperatives, Commercial banks, etc. and private moneylenders; (5) anticipated ayacut under the well; (6) actual extent of irrigation under the well during the year 1977-78 (season-wise); (7) extent of under utilization and seasons for the under utilization of the wells; (8) Cropping pattern in the area irrigated by the well, specifying irrigated crops; (9) benefits accruing to the beneficiaries in terms of increase in production, income, improved repaying capacity for loans, etc. ; and (10) assistance, if any, given by government or other agencies in the case of failed wells."

9.3 Methodology

Tribal Development Block Mohgaon was selected for the quick survey on irrigation ^{wells} /. Mandla was the nearest tribal district to Jabalpur and among its 16 blocks, Mohgaon block possessed largest number of 655 out of 3082 irrigation wells. These wells were located in 59 out of 87 villages of the block. As envisaged in the design of the study and the items to be covered for the field study supplied by the Ministry, all the 655 irrigation wells owned by the 523 households living in 59 villages were studied. Every well was visited to take its dimensions and the required information was obtained from every well owner by survey method on the schedules. Data for detailed study

was collected between March to August, 1979 with the reference year 1977-78. Simple statistical tools were applied.

9.4 General Findings

9.4.1 Main Features of the Block

Mandla district is situated in the central part of Madhya Pradesh. It is a tribal district having 60.54 per cent scheduled tribesmen. For development purposes, the district is divided into 16 Development Blocks and among these, Mohgaon block had the largest number of irrigation wells. It was a Tribal Development Block with 54.41 per cent population of scheduled tribesmen in its total population. Landscape of the block was full of forest-clad-hilly terrains. There were 87 villages and 59 or 67.82 per cent of them had irrigation wells. There were 523 households possessing 655 irrigation wells.

9.4.2 Main Characteristics of the Irrigation Wells

Chronologically, the irrigation wells were introduced in the Mohgaon block with the initiation of the five year plans in the country. There were in all 655 irrigation wells and 262 or 40 per cent of them were constructed by the end of 1968-69 and remaining 393 or 60 per cent by the end of 1976-77. Tribal farmers constructed most of their wells numbering 281 or 78.49 per cent out of 358 wells during fourth and fifth plan periods under different development schemes specifically meant for them.

The scheduled tribesmen owned the largest proportion of 358 or 54.66 per cent wells followed by other caste people who owned 290 or 44.27 per cent wells. The scheduled caste people had only 7 or 1.07 per cent wells as against their population proportion of 3.90 per cent in the block population. Further, 558 or 85.19 per cent wells were under individual ownership and 97 or 14.81 per cent wells under joint ownership with the number of owners varying between 2 to 5. Among scheduled castes and scheduled tribes all wells except 4, were reported under individual ownership while among other castes, 93 out of 290 or 32.07 per cent were under joint ownership.

As regards source of finance, the tribal people constructed wells under different development schemes and availed subsidy varied from 25 per cent to 100 per cent with an average of about 60 per cent. The own contribution amounted to 36.35 per cent and the remaining expenditure was met by loans taken as taccavi or from the Cooperatives. Among other castes about 95 per cent finance come from own resources.

As regards material used, 580 or 88.55 per cent were pucca wells (made of stones or bricks), only 12 or 1.83 per cent were katchha and 63 or 9.62 per cent were mixed wells (partly katchha and partly pucca). Average cost of a pucca well was Rs. 1,810.17 and that katchha well Rs. 1,354.16.

Depth of the wells depended on the water table but in most of the cases it was more than 5 metres. Diameter of the wells also varied and it was generally

between 2-5 metres among scheduled tribes and between 2-4 metres among the other castes. Moreover, the diameter range of 2-4 metres was more common and covered 73.44 per cent of the total wells. Ayacut varied from 0.81 hectare to 2 hectares and 1.21 hectares ayacut was more common and it covered about 62 per cent wells. Ayacut in the case of self financed wells depended on the depth, diameter, water discharge rate and the equipment of water lifting. But in the wells constructed under subsidy schemes or loans, the ayacut was kept according to the prescribed diameter and the water lifting equipment. Among the total wells, about 30 per cent were having no means of lifting water. Mhote was very common and it was reported on 49 per cent wells, followed by dhenkali covering about 15 per cent wells. Pumps and persian wheels were very few, 35 or 5.34 per cent and 10 or 1.53 per cent respectively.

During May-June, 100 or 15.26 per cent wells went dry, 396 or 60.46 per cent wells had water column of less than 2 metres and the remaining 159 or 24.28 per cent wells had water column between 2-4 metres. This water column when pumped out would take next 24 hours to fill. Thus more than 75 per cent wells were not useful for irrigation in summer.

9.4.3 Utilization of Irrigation Wells

At the time of the survey, 64 or 9.77 per cent wells were out of order for want of repairs and renovation and out of them, 61 wells belonged to the scheduled tribes and were constructed under subsidy schemes. There were 591 wells including 289 or 48.90

per cent owned by other castes and 302 or 51.10 per cent by the scheduled tribes were found in working order.

Among the working wells, 421 or 71.24 per cent were used for irrigation. Remaining 170 or 28.76 per cent were left unused and most of these wells, numbering 156 belonged to the scheduled tribes. The scheduled tribesmen who were given much financial support by way of subsidy and loans, constructed wells in a disinterested manner just to oblige the development workers and generally did not use them for irrigation but left them uncared. Out of 297 working wells, 156 or 52.52 per cent wells were not at all used for irrigation purpose. However, the immediate reason given for the non-utilization of the working wells were the absence of water lifting equipment in 60.25 per cent cases and low discharge of water in 20.50 per cent wells. Lack of bullock power or working hands and faulty water lifting equipments were other reasons for non-utilization of wells.

The wells actually used for irrigation numbered 421 and among these 143 or 33.97 per cent belonged to scheduled tribes and 278 or 66.03 per cent to the other castes. These wells had a total ayacut of 532.43 hectares, of which an area of 101.26 hectares or 19.36 per cent was actually irrigated. This means an under utilization to the extent of 80.64 per cent. Scheduled tribe wells had an ayacut of 180.28 hectares, of which 30.32 hectares or 15.32 per cent was irrigated.

Among other castes the ayacut was 343.57 hectares and 70.94 hectares or 20.97 per cent area was actually irrigated. This shows that other caste people had 5 per cent higher utilization over the scheduled tribesmen. Analysis made by ayacut, depth, diameter and equipment used for lifting water indicated that the wells falling in the range of maximum ayacut, depth and diameter and fitted with pumps had maximum utilization as compared to wells from other categories.

Such wells were utilized to the extent of 46.34 per cent as a whole and to the extent of 70.30 per cent by other caste people and 33.66 per cent by the scheduled tribesmen. Over all under utilization had been to the extent of 87.18 per cent and in the case of used wells it was 80.64 per cent. These figures were much higher among scheduled tribes i.e. 92.86 per cent for total wells and 83.33 per cent for the used wells. Among other castes position was somewhat better, the figures being 80.49 per cent for all wells and 79.03 per cent for used wells. Paucity of water supply in the wells was a common reason in 294 or 70.67 per cent cases for under utilization. Shortage of bullock power and malfunctioning of water lifting equipment were other reasons.

All the wells numbering 655 had total ayacut of 766.30 hectares and of this, 242.88 hectares or 31.70 per cent was under the wells reported out of order. And an area of 422.17 hectares or 57.70 per cent was not irrigated due to under utilization. It indicated that an area of 101.26 hectares was irrigated with the

total investment of Rs. 14,20,012 including Rs. 11,02,262 on construction of wells and Rs. 2,37,750 on water lifting equipments. This means that one hectare area was irrigated at an investment of Rs. 14,023.42. This figure for scheduled tribesmen was Rs. 28,966.23 about four times that of other caste people (7636.02). Due thought is needed to consider whether such a huge investment should be continued to irrigate 0.15 hectare per well against the 1.17 hectares ayacut in general while these figures for scheduled tribesmen were 0.08 hectare against the ayacut of 1.12 hectares and among other caste people 0.24 hectare per well as against the ayacut of 1.23 hectares.

9.4.4 Impact of Well Irrigation

The wells used for irrigation in 1977-78 numbered 421 which were owned by 301 farmers which included 19.93 per cent marginal farmers, 58.81 per cent small farmers, 19.27 per cent medium farmers and about 2 per cent large farmers. The small farmers preponderated and covered 51.57 per cent among scheduled tribes and 64.16 per cent among other caste farmers. On an average a farmer possessed 2.77 hectares. This was 3.59 hectares for a tribal farmer and 2.16 hectares for other caste farmer.

Land utilization indicated the intensive use of land by marginal farmers and the intensity decreased gradually with the increase in the size of farm. The marginal farmers cultivated nearly all the area owned and it come down to 71.00 per cent among the large farmers.

The proportion of double cropped area was 64.71 per cent and it was 52.47 per cent on scheduled tribe farms and 79.72 per cent on other caste farms. According to size of farms, the marginal farms had the largest proportion of double cropped area (82.34 per cent) and it decreased with the increase in the size of farms and was 37.72 per cent on the large size farms. Proportion of area irrigated was 12.19 per cent and was nearly half, 6.58 per cent on the scheduled tribe farms and 20.19 per cent on the other caste farms. The irrigated area covered 31.80 per cent on the marginal farms and only 4.74 per cent on the large size farms.

Cropping intensity on the unirrigated area was 163.88 per cent and it was 153.33 per cent on scheduled tribe farms and 178.33 per cent on other caste farms. On irrigated area it was much higher, 210.79 per cent, in general and 216.46 per cent on scheduled tribe farms and 208.30 per cent on other caste farms. Over all cropping intensity was reported 170.07 per cent on total farms, 157.52 per cent on scheduled tribe farms and 184.40 per cent on other caste farms.

Crops grown included cereals, millets, pulses, oilseeds and vegetables. Paddy was the most important crop followed by wheat, maize, kodo/kutki, pulses and vegetables in that order. Both kharif and rabi crops were grown as area falls under heavy rainfall zone of the state. A few farmers also raised summer vegetables.

The irrigated crops occupied 106.17 hectares including 32.86 hectares on scheduled tribe farms and 73.31 hectares on other caste farms. Irrigated crops mainly included vegetable crops on 72.53 hectares or 68.32 per cent followed by wheat on 24.73 hectares or 23.30 per cent of gross irrigated area. Sugarcane on 5.99 hectares, paddy on 1.96 hectares, pea on 0.36 hectare, lentil on 0.20 hectare and orchard on 0.40 hectare were also irrigated. Vegetable growing, particularly onion on 63.11 hectares or 59.44 per cent area, was done under irrigated conditions, more so by the other caste farmers. Summer vegetables were sown only on 3 hectares as there were very few wells which could provide irrigation in summer.

Paddy and wheat were the two crops sown both irrigated and unirrigated. Average yield per hectare of wheat on unirrigated area was 1270 kg. and that of paddy 703 kg. Much higher yield under irrigated conditions was obtained. For wheat it was 1,655 kg. and for paddy 2,312 kg. per hectare. Other castes obtained better yields in both the conditions as compared to the scheduled tribes. In the case of unirrigated wheat average yield per hectare on other caste farms was 718 kg. as against 682 kg. on scheduled tribe farms. In the case of irrigated wheat, these figures were 2034 kg. on other caste farms and 1232 kg. on scheduled tribe farms.

Average yearly return per hectare on irrigated and unirrigated farms was worth Rs. 1,609.72 and Rs. 450.12 respectively. Other caste farmers earned Rs. 1,675.04

per hectare from irrigated area and Rs. 526.36 from unirrigated area. These figures for scheduled tribe farms were lower being Rs. 1453.89 per hectare on irrigated and 307.31 on unirrigated farms. This means that on an average a farmer earned an additional amount of Rs. 1,151.60 per hectare from the irrigated area during the year. In the case of other caste farmer this figure was Rs. 1,148.68 and that for scheduled tribe farmer Rs. 1,066.58 per hectare.

9.4.5 Factors for under Utilization of Wells

There were basic factors for the under utilization of irrigation wells in Mohgaon block. Firstly, the water table was not known to the farmers and the substructure of the earth was full of hard rocks. Thus, digging of well was a very difficult task and most of the money was spent on this operation. Whenever, there were hard rocks, further deepening was stopped in the absence of blasting aids. Such wells were completed just to obtain the remaining parts of the sanctioned amount of subsidy. High cost of digging did not leave sufficient funds for other constructions and most of the wells could not be constructed in the proper manner and these did not serve well for long. On account of these situations 64 wells could not come up in the form of a well, remaining faced with paucity of water supply and many of them did not possess water for irrigation in summer.

Secondly, the tribal people were not interested in the construction of wells for irrigation

due to their experience about the efficiency of existing irrigation wells. But the targets fixed under different schemes were to be achieved at any cost, therefore, the officers motivated them in one way or the other.

Finally, the tribal farmers obliged them on the pretext of attractive amount of subsidy. In fact the tribal farmers did not like to spend any more beyond the amount of subsidy and loan. Consequently some of the wells were not completed, some of them ^{were} completed carelessly and were not used for irrigation. The owners did not pay proper attention on the maintenance of wells, therefore, the wells did not serve well for long time. The tribals also did not get connected a larger number of electric pumps on their wells.

Lower scale of finance, scarcity of construction material like cement and bricks, paucity of water discharge, hard bottom rocks, absence of water lifting equipments on large number of wells, absence of repairing facilities for the water lifting equipment, lack of bullock power and such other reasons were the immediate reasons for the non-utilization and under utilization of irrigation wells. Had there been no subsidy, the tribal farmers would not have constructed the wells in the Mohgaon block in such a large number.

SUGGESTION

The developmental schemes in the tribal areas are to be dealt with a great caution. Tribals are tradition bound people in general, therefore, the

task of change is thought to be extremely delicate and difficult as the process of change is very slow among them. Therefore, the schemes which have cent per cent chances of success should only be taken up so as to generate interest and faith among the tribals about the developmental activities. Schemes for schemes sake to achieve the targets should not be the motive of development in the tribal areas. Such a practice affects badly the acceptance of a genuinely good scheme in future by the tribal people. As regards the irrigation wells certain suggestions have been made here on the basis of the experiences of Mohgaon block.

(1) Ground water survey should be a pre-condition for carrying out a scheme for irrigation wells in a particular area. If it is not possible the efficiency of the existing wells should be evaluated to take a decision whether the well irrigation would be feasible.

(2) Scale of financing should be rationalized in view of the actual expenditure for digging operations and other construction works and installation of water lifting equipments at the ruling rates of labour and current prices of material and the machinery.

(3) Composite cases for wells and equipments should be sanctioned at a time although the equipment need be supplied only after confirming the volume of water in the wells. The supply of building material like bricks, cement and iron should be guaranteed to the farmers along with the installation

of water lifting equipment by the financing and forwarding agencies.

(4) Present procedure for sanctioning the well and pump should be further simplified so that the farmer may not be required to approach a number of officers at different places.

(5) Wells and pumps should be sanctioned to the farmers who are really interested in irrigation. Such persons usually do not need motivation ~~but~~ themselves come forward and approach the concerned officials. Motivation on the pretext of attractive subsidy should be avoided so that needy persons may take advantage of it.

(6) It will be useful if the wells be got constructed for them along with the installation of water lifting equipment. The number of wells be also brought down so as to ensure sinking of only functioning wells. The running operations of wells and pumps should be managed ^{by} a departmental worker for a year, who should evaluate the efficiency of the wells and pumps and should train the tribal farmers in running the pump and developed techniques of agriculture. After one year wells and pumps should be given in the charge of the farmers. This may be taken up on package basis where a good number of wells existed in the near by group of villages.

(7) Ordinarily well irrigation should not be taken up as a programme in the tribal areas as the tribal farmers feel it very difficult to manage the

construction of wells, installation of water lifting equipments and their operations. Therefore, they should be provided with other sources of irrigation. If no other source is available, well irrigation may be taken up on package basis to avoid the large wastage of money, material and the efforts.

(8) Repairing services for the water lifting equipments must be arranged at the doorsteps of the farmers by the concerned agencies. For this purpose mechanics and workshops should be provided. It will be much better that they should purchase particular brand of pump-set and the manufacturer should provide repairing services for five years at minimum charges on the spot.

(9) Farmers who do not use the well and water lifting equipment for irrigation should be deprived of the subsidy and it should be recovered from them as a loan. At least one should use well for 5 years for irrigation if he has taken the subsidy.

(10) Subsidy should not be used as a means to attract the tribal farmers for the well irrigation but as financial help to the needy farmers.

APPENDIX TABLES

Appendix table 1 Village wise area, population, literacy, workers and wells owned in Mohgaon Block

S.No. Village	Area in Hect.	Population	S.T. S.C.	Distribution of population in percentage			No. of Wells				
				Literates Total	Culti- Agri.	Owned	Used				
				Workers	Vatons	Labour					
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
1.	Saligara Mat	138.00	230	90.87	-	17.39	39.13	91.11	1.11	7	5
2.	Saligara Ryt	89.03	148	85.14	-	22.97	36.49	90.74	-	6	2
3.	Chandwara	730.48	1010	19.01	-	21.38	52.67	58.08	36.09	101	99
4.	Palehara	339.14	698	88.25	1.58	16.90	51.72	42.66	52.63	37	28
5.	Jhina (f.v.)	458.12	347	90.20	-	4.32	43.52	98.68	1.32	-	-
6.	Padari Ryt.	428.58	386	97.15	-	17.62	49.74	96.88	2.60	-	-
7.	Chaugaan Ryt.	714.70	835	88.26	1.44	14.13	39.76	56.63	38.55	2	2
8.	Basania	175.24	359	40.67	-	11.42	42.06	51.66	47.68	15	13
9.	Nidhani	397.01	524	96.56	-	17.94	52.29	43.80	54.74	25	12
10.	Suntikri	147.72	268	61.57	-	14.18	49.25	55.30	41.67	26	23
11.	Bilgaon	165.93	1004	8.56	1.79	23.11	48.80	77.35	16.73	117	113
12.	Hareatikur	829.23	476	82.98	-	13.66	53.15	64.82	31.62	20	13
13.	Guhdar	264.67	204	97.06	-	4.90	51.47	81.90	17.15	-	-
14.	Kudopani	610.69	807	89.22	-	9.54	57.25	78.79	16.45	31	22
15.	Kasota	203.56	455	2.42	10.94	29.23	23.08	80.00	17.14	39	37
16.	Manu alis Manori	276.41	1015	19.90	-	37.34	37.34	62.53	28.23	4	3
17.	Barwari	159.45	79	87.34	-	10.13	53.16	35.71	59.52	3	3
18.	Pipariya Ryt	405.51	500	55.60	-	13.20	53.20	72.56	26.69	13	-

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Contd. Appendix table 1

1.	2.	3.	4	5.	6.	7.	8.	9.	10.	11.	12.
19.	Machla	446.79	592	88.01	0.84	9.29	55.24	88.68	7.64	13	5
20.	Mircha Khairo (f.v.)	222.58	179	80.45	-	3.91	63.13	91.15	5.31	-	-
21.	Sudgaon	519.23	875	28.34	0.46	11.31	28.34	80.65	15.32	7	4
22.	Deogaon	478.76	956	26.57	37.87	21.13	53.56	68.55	25.98	4	2
23.	Saliwada	305.95	409	91.69	-	15.40	24.94	74.51	12.75	7	4
24.	Banlatara	543.11	428	42.52	10.98	16.59	32.24	73.91	18.12	1	-
25.	Raigaon	378.80	485	47.63	8.04	25.98	37.73	34.97	57.38	3	-
26.	Gorakhpur	168.76	311	72.35	-	4.50	27.97	90.80	9.20	-	-
27.	Simla (f.v.)	132.74	87	65.52	-	16.09	29.88	76.93	15.38	-	-
28.	Kamhria	440.31	459	91.28	-	6.54	32.46	81.21	11.41	6	3
29.	Umaria Ryt.	424.12	717	87.73	1.39	9.62	53.70	90.13	7.27	1	-
30.	Singarpur	420.48	855	23.86	23.16	21.17	33.92	52.07	41.38	-	-
31.	Dongargaon	560.10	437	92.68	2.29	7.78	31.81	93.52	2.88	5	-
32.	Kanchangaoon	371.92	74	100.00	-	1.35	32.43	87.50	12.50	-	-
33.	Dhangaon	349.25	369	76.96	-	4.06	53.39	77.16	21.83	1	-
34.	Rampur	278.84	293	84.30	-	6.82	54.95	81.37	16.77	2	-
35.	Dupta	509.11	326	75.15	-	8.28	64.72	65.88	30.80	1	-
36.	Odhar	411.58	584	75.34	2.05	6.68	54.45	78.93	19.18	1	-
37.	Bilgarha Ryt.	270.34	311	89.07	2.89	13.18	28.30	75.00	18.18	2	-
38.	Deori	292.19	443	80.36	7.45	11.29	63.66	69.50	23.05	2	1
39.	Bilgarha Mal	205.18	500	72.20	1.60	18.80	28.20	58.86	32.63	4	1

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Contd. Appendix table 1

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
40.	Kauwa Dongari	424.53	480	26	95.26	81.67	15.38	60.83	73.63	21.23	4	
41.	Jaranga (f.v.)	137.60			82.07		12.11	58.42	76.58	23.42	5	1
42.	Sakari	106.44	190	290	88.71		5.86	61.38	86.52	7.30	4	
43.	Khairi Ryt.	251.32	319		80.69		5.02	59.87	74.87	24.61		
44.	Badjhar Mal	380.01	492				1.83	63.21	80.38	18.66		
45.	Umaridi alias	737.36			96.25		2.50	55.00	100.00			
46.	Padadar Ryt. (f.v.)	315.67	80		94.74		2.19	59.21	88.89	10.37		
47.	Dhamanpani	335.09	228		85.17		6.78	55.51	89.69	7.26	5	
48.	Chubhawal	520.04	472		90.20	1.96	3.92	56.21	89.54	9.30	2	
49.	Banjhidh	301.10	153		06.22		5.45	65.70	88.79	9.75		
50.	Ghughra Mal	418.86	312		66.28	0.59	4.69	62.32	90.03	7.76		
51.	Khistimal	901.27	682		95.19		1.07	59.36	90.09	9.01		
52.	Tikra Githori	210.44	187		88.58		13.52	55.94	56.67	42.50	9	4
53.	Mohgaon Ryt.	359.78	429		82.73		18.47	50.60	63.49	36.51	2	
54.	Bijnhi mal	140.03	249		55.41		21.97	55.41	63.31	34.91	1	
55.	Indramal	157.02	305		87.98		21.86	69.40	54.33	45.67	2	
56.	Indra Ryt.	125.46	183		12.88		40.30	29.93	35.96	31.23	3	1
57.	Mohgaon Mal	379.61	1273		92.07		20.00	52.76	86.93	9.15	30	10
58.	Umaridh	157.83	290									

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Contd. Appendix table 1

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12
59.	Khalho Githori	556.87	671	54.84	2.68	13.71	44.26	57.91	39.73	-	-
60.	Andia Dar	206.80	312	48.40	1.92	19.23	60.25	74.47	23.90	3	-
61.	Malpahri	232.30	274	45.62	-	13.87	37.95	74.04	24.04	5	1
62.	Githar Malpahri	412.39	594	24.92	0.17	25.59	43.43	70.16	26.36	3	-
63.	Githar	189.40	461	1.74	1.74	23.64	34.27	84.81	12.66	-	-
64.	Bodesilli Ryt.	484.83	548	91.42	-	18.06	63.69	71.63	23.50	-	-
65.	Kharachhapar Ryt.	327.81	518	87.84	-	10.04	63.71	89.39	10.00	3	1
66.	Kharra Chhaparmal	244.44	147	47.62	4.76	13.61	53.74	82.28	13.92	-	-
67.	Ramkhitrye Ryt.	340.35	534	86.33	5.80	9.74	54.87	67.92	30.72	23	-
68.	Pipardara	772.98	448	91.96	-	6.92	71.43	91.88	7.50	2	-
69.	Patadehi	335.90	336	93.15	4.17	5.95	68.75	92.21	5.19	3	1
70.	Amjhar	437.88	276	91.30	-	0.36	62.32	90.70	8.14	-	-
71.	Mugwani	1001.23	1145	87.51	2.36	9.95	59.30	83.80	11.64	13	2
72.	Panchhipani	479.57	273	83.52	-	5.49	59.34	93.83	5.56	1	-
73.	Pondi Mal	625.67	686	78.60	-	14.41	41.78	73.87	16.38	2	-
74.	Bhanpur Mal	290.98	208	69.23	-	8.17	57.69	44.17	55.83	-	-
75.	Jhugi Ryt.	434.65	606	46.70	-	12.05	60.07	53.58	45.60	1	-
76.	Karegaon	672.61	595	48.07	0.50	8.91	57.98	78.26	13.33	-	-

Contd...

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
77.	Thebha	492.92	917	59.76	0.41	8.72	69.80	90.95	8.58	3	-
78.	Andiya Mal	510.73	400	67.75	2.00	8.25	49.25	81.73	14.21	1	-
79.	Andiya Ryt.	409.91	291	66.32	-	3.78	53.61	60.90	24.36	-	-
80.	Bagli	225.42	693	28.43	5.63	42.14	35.06	27.57	35.80	5	-
81.	Khairi Ryt.	126.27	182	35.71	60.44	26.92	58.79	84.11	10.28	2	1
82.	Khairi Mal	414.01	534	34.45	47.19	28.65	57.30	86.93	10.46	2	-
83.	Chabi	991.11	1212	50.91	2.48	18.18	54.04	73.44	15.42	-	-
84.	Khudlo	683.94	453	68.65	-	1.77	42.60	76.68	22.28	-	-
85.	Andia alas chhila tola	891.96	600	86.84	-	7.89	35.69	62.24	30.41	-	-
86.	Kumharra	679.09	385	82.60	1.82	5.97	36.10	64.03	30.94	-	-
87.	Slighiti	406.32	343	82.80	-	14.87	31.20	75.70	10.28	-	-

Appendix Table 2 Village wise Well owning households, population and Wells owned

S.No; V.L.W.Circle /Villages	Wells owning Households			Population			Wells owned		
	S.T.	O.C.	All	S.T.	O.C.	All	S.T.	O.C.	All
1.	3.	4.	5.	6.	7.	8.	9.	10.	11.
2.	12.	13.	14.						

CHANDWARA CIRCLE

1.	Salivara mal	6	-	6	57	-	-	7	-	-	7
2.	Salivara Ryt.	6	-	6	31	-	-	6	-	-	6
3.	Chandwara	10	1	55	66	84	15	451	550	14	86
4.	Palehara	24	-	10	34	176	-	89	263	25	12
5.	Chaugaan Ryt.	2	-	-	2	6	-	-	6	2	-

BILGAON CIRCLE

6.	Basanta	8	-	3	11	66	-	28	94	12	3
7.	Nidhan	19	-	3	22	139	-	32	171	22	3
8.	Suntikri	9	-	12	21	88	-	96	184	12	14
9.	Bilgaon	-	-	60	60	-	-	669	669	-	117
10.	Haratikur	17	-	2	19	168	-	57	225	18	2

MANU CIRCLE

11.	Kudopani	30	-	1	31	332	-	8	340	30	1
12.	Kasota	-	-	25	25	-	-	211	211	-	39
13.	Manu ails manori	-	2	2	4	-	23	25	48	-	2
14.	Barwari	2	-	1	3	20	-	5	25	2	1
15.	Pipariya Ryt.	12	-	-	12	86	-	-	86	13	-

Contd.....

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.
16.	Machla	13	-	-	13	108	-	-	108	23	-	13	13
17.	Raigaon	2	-	1	3	14	-	13	27	2	-	3	3
18.	Kharia chhapar-Ryt.	3	-	-	3	22	-	-	22	3	-	-	3
19.	Ramkhatiya Ryt.	23	-	-	23	146	-	-	146	23	-	-	23
20.	Pipardaria	2	-	-	2	24	-	-	24	2	-	-	2
SINGARPUR CIRCLE													
21.	Sudgaon	6	-	1	7	43	-	14	57	6	-	1	7
22.	Deogaon	2	1	-	3	9	6	-	15	2	2	-	4
23.	Saliwada	7	-	-	7	53	-	-	53	7	-	-	7
24.	Banlatara	1	-	-	1	7	-	-	7	1	-	-	1
25.	Khamria	6	-	-	6	39	-	-	39	6	-	-	6
26.	Umaria Ryt.	1	-	-	1	8	-	-	8	1	-	-	1
27.	Dongargaon	5	-	-	5	41	-	-	41	5	-	-	5
BILGARHA CIRCLE													
28.	Dhangaon	1	-	-	1	9	-	-	9	1	-	-	1
29.	Rampur	2	-	-	2	9	-	-	9	2	-	-	2
30.	Dupta	1	-	-	1	8	-	-	8	1	-	-	1
31.	Odhari	1	-	-	1	2	-	-	2	1	-	-	1
32.	Bilgarha Ryt.	2	-	-	2	31	-	-	31	2	-	-	2
33.	Bilgarha mal	4	-	-	4	46	-	-	46	4	-	-	4
34.	Deori	2	-	-	2	27	-	-	27	2	-	-	2

Contd

Appendix table 2 contd....

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.
35.	Kauwa Dongari	10	-	-	10	62	-	-	62	10	-	-	10
36.	Sakari	5	-	-	5	48	-	-	48	5	-	-	5
37.	Khairi Ryt.	4	-	-	4	44	-	-	44	4	-	-	4
38.	CHUBHAWAL CIRCLE												
38.	Chubhawal	5	-	-	5	35	-	-	35	5	-	-	5
39.	Banjhdih	2	-	-	2	21	-	-	21	2	-	-	2
40.	Mohgaon Ryt.	7	-	2	9	43	-	12	55	7	-	2	9
41.	Bijnhi Mal	2	-	-	2	12	-	-	12	2	-	-	2
42.	Indra Mal.	1	-	-	1	6	-	-	6	1	-	-	1
43.	Indra Ryt.	2	-	-	2	10	-	-	10	2	-	-	2
44.	Mohgaon Mal	-	-	2	2	-	-	21	21	-	-	3	3
45.	Patadehi	3	-	-	3	18	-	-	18	3	-	-	3
46.	UMARDIH CIRCLE												
46.	Umaridih	24	-	-	24	167	-	-	167	30	-	-	30
47.	Khaihe Githori	4	-	-	4	21	-	-	21	4	-	-	4
48.	Andia Dar	3	-	-	3	17	-	-	17	3	-	-	3
49.	Malpahri	4	-	1	5	26	-	15	41	4	-	1	5
50.	Githar Malpahri	3	-	-	3	38	-	-	38	3	-	-	3

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1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.
66													
51.	Mugwani	13	-	-	13	89	-	-	89	13	-	-	13
52.	Panchhipani	1	-	-	1	2	-	-	2	1	-	-	1
53.	Thebha	3	-	-	3	17	-	-	17	3	-	-	3
	CHABI CIRCLE												
54.	Pondi Mai	-	2	-	2	-	21	-	21	-	2	-	2
55.	Jhugi	1	-	-	1	10	-	-	10	1	-	-	1
56.	Andya Mai	1	-	-	1	13	-	-	13	1	-	-	1
57.	Bagli	4	-	1	5	35	-	5	40	4	-	1	5
58.	Khairi Ryt.	1	-	1	2	3	-	1	4	1	-	1	2
59.	Khairi Mai	2	-	-	2	14	-	-	14	2	-	-	2
	All	334	6	183	523	2648	65	1752	4465	358	7	290	655