

## **CHAPTER - V**

### **MAHARASHTRA EXPERIMENT**

#### **1. Historical Perspective**

5.1.1 Maharashtra was one of the states where farmers' participation in irrigation management had been going on for more than two hundred years. Farmers managed irrigation system could be divided in two broad groups i.e. i) Traditional and ii) Non - Traditional System. Traditional system known as Phad system consisted of those constructed, funded and maintained by the farmers on their own initiative prior to independence. The system entailed dividing the entire command in a number of blocks known as phads followed traditionally in Nasik and Dhule districts. Under this scheme bhandaras (weir) were constructed across the river to divert the flow of river to canals. The command area of each phad varied between 8 and 480 hect. The system was entirely managed by farmers themselves for operation and maintenance of head work and sluice gate. The system was useful upto a point of time when reservoirs on the upstream of the rivulets were not constructed and constant flow in rivulets was maintained. The system which was in operation for more than 200 years gradually lost its importance and the system started declining due to upstream water withdrawals by government as well as private users. Construction of reservoirs upstream marred the initiative of the people Another example of the traditional system was provided by Malgajari tanks in Chandrapur and Bhendara districts of Vidarbha region. The tanks were operated and maintained by a committee of eight to ten farmers. Later on these tanks were acquired by the government after which the earlier system came to an end. The non -traditional WUAs were of recent origin. These are described below.

#### **5.1.2 Non - Traditional Irrigation System WUA**

5.1.2.1 Cooperative societies on lift irrigation. A number of lift irrigation societies were formed mostly in Kolhapur, Satara and Sangli districts, for lifting from small storage weirs across small rivers for irrigation. Water charges were collected by Irrigation Deptt. on the area basis of sanctioned crops.

5.1.2.2 Cooperative societies in major, medium and minor projects where bulk water was supplied at the head of the minor on volumetric basis (TCM). Water distribution and management beyond minor level was done by farmers themselves.

5.1.2.3 The Maharashtra Irrigation Act. 1976 empowered the Irrigation Department to provide water on volumetric basis with the stipulations that, i) The holders or occupiers of not less

than 51 percent of the land in the command area or 51 percent of the holders or occupiers of the land gave consent to take over on payment water on volumetric basis and ii) To form a water committee of all such holders and occupiers of land. Section officer or his nominee should also be a member of the water committee, covering all villages in the command area. The functions of the water committee inter-alia included assisting the canal officer regarding receiving complaints, preventing unauthorised use of water and assisting the canal officer in discharge of his duties.

- 5.1.2.4 The progress of formation of Water Users Association (WUA) has been given in Chapter II. A detailed study of 3 non-traditional experiments earlier was carried out. These were (i) Veer Savarkar Water Users Society under Palkhed Project, (ii) Brahma Nath Pani Watap Sanstha under Parunde Irrigation Project and (iii) Jaikisan Cooperative Water Users Association under Loni Irrigation Project. The findings and conclusions are given below.

## **5.2 Veer Savarkar Water Users Society - Palkhed Project (Major)**

### **5.2.1 Background**

- 5.2.1.1 In the Palkhed Left Bank Canal System in Nasik district selected for the study, under Upper Godavari Project, 31 water users associations (WUAs) having 11,332 hect. of culturable command area (CCA) and 8331 hect. ICA were in operation, whereas another 21 WUAs with CCA of 7652 hect. and 5711 hect. ICA were in different stages of formation. Out of operating 31 WUAs, Veer Savarkar Water Users Cooperative Society, Rui, in Niphad Taluk in operation since october 1992 was selected for the study.

### **5.2.2 Formation of WUA**

- 5.2.2.1 The selected WUA, Veer Savarkar Water Users Society limited, Rui, was formed in 1992. The WUA drew water through sub-minor 26, known as Rui minor of 3.125 kms, out of Darangoan Veer distributary number 19 of PLBC with total length of 7.280 km. The CCA managed by the selected WUA was 250 hect. with ICA of 165 hect. After the MOU was signed with Irrigation Department (ID), management of irrigation by the WUA commenced in Nov. 1993.
- 5.2.2.2 River Kadwa was one of the major tributaries of the river Godavari which met river Godavari after flowing for 64 kms with total drainage area of 1664 sq.kms. Contribution to river flow was from its left side tributaries of rivers Unanda, Garashari and Wadali, whereas river Knowan was the only tributary from its right side. The river Kadwa originated in inter-montane terrain, forming the ridge portion between Tapi and Godavari valleys. Rainfall in

the catchment varied between 750 mm. to 2500 mm. In later part of the last century a small storage tank (434 mcft) was constructed on the river. Water left into the river from this storage was diverted at Palkhed weir on the Kadwa river for irrigation through the Palkhed right bank canal (PRBC) constructed in Dintori and Niphad talukas of Nasik district. Since available water potential of kadwa river was much, there was steady demand for irrigation in low rainfall areas of Niphad Yeola and Chandwad talukas of Nasik district. Therefore, to provide irrigation to rainfall scarcity areas project report of the Upper Godavari Project was prepared in 1966. According to the project report, Palkhed left bank canal (PLBC) of 110 km. length was constructed.

Before handing over irrigation management to the WUA, ID carried out joint management survey (walk-through survey) along with the farmers to locate defects in the water distribution system with a view to repairing the same. It was, however, observed that while some of the repair works including construction of outlets to both left and right field channels, construction of standing water flume (masonry water channel constructed with measuring gauge to calculate volume of water passing through) were completed before handing over irrigation management, some of the defects were mentioned in MOU itself, to be carried out by ID subsequently. The MOU signed in September 1993 would continue for 5 years and would be reviewed and new clauses, warranted, if any, would be incorporated.

- 5.2.2.3 The WUA comprised 139 farmers, all of one village (Rui). Number of farmers whose land fell in the ICA of the distributary was 212. The condition stipulated by ID for formation of the association was that minimum 51 percent of farmers whose land was covered under the canal sub - minor should be willing to form the association. The farmers were mostly marginal and small in as much as 93 (66%) had land upto one hect. and 30 (22%) owned land of 1 to 2 hect each. Only 10 farmers (7%) owned land up to 5 hect. and only 6 (4%) had more than 5 hect. each. Land holding pattern of the executive members of the Association was almost in same proportion in so far as 7 (63%) of 11 members owned land upto 2 hect. and 3 (27%) had land upto 5 hect. each, whereas only one member owned land above 5 hect. As regards social profile, all executive members belonged to high cast Maratha. In this village there was no SC, ST farmer. In the whole command area of sub-minor also, no land belonged to SC & ST.

### **5.2.3 Selection of Sample Households (Bold)**

- 5.2.3.1 Impact of the farmers participation in irrigation management in the selected project were

assessed at the selected beneficiary level. As already explained in the sampling design, 40 farmer members whose land fell in the command area of the distributary channel were selected at random. To facilitate observation as to availability of water from the adequacy and timeliness from users points of view, equal number of farmers were selected from the head, middle and tail end of the distribution channel. The socio-economic profile of the farmer members has already been discussed.

- 5.2.3.2 Another village adjacent to the selected project where irrigation water was supplied direct by ID through one outlet was selected as control area and 20 farmers who were non-members of the WUA were selected for the study. The socio-economic profile of the selected non members was as follows :

Holding size group	No
upto 1 hect.	5
1 to 2 hect.	5
2 to 5 hect.	5
5 hect. and above	5

All belonged to the Maratha caste (other caste group)

#### **5.2.4 Functioning of WUA**

- 5.2.4.1 The executive committee took all decisions through consensus of all members at a joint meeting. Executive committee members were elected unanimously at a meeting of all members. No contest for that purpose was held. The committee had been continuing for the last 5 years as per the constitution of the WUA and next election was scheduled in September 1998. The executive members commanded respect and confidence of ordinary members. The question of caste dominance also did not arise since all members belonged to the same caste.
- 5.2.4.2 No village level committee as such was formed. All members residing in the same village decided by sitting together as to which crops were to be grown and acreage thereof and what would be the irrigation charges per crop on area basis to be realised from members. Non-members, who utilised water out of the system, were required to pay extra 30 percent over the irrigation charges realised from members. After formation of the association, ID ceased to enter into water supply contract with individual farmers whose land was covered under the command area. It is to be noted that even 6 years after formation of association, about one-third (74 out of 212) farmers whose land fell in the command area were non-members. There was no provision in the constitution of the association to make membership

compulsory. A few of them were asked as to why they did not become members of the association. They reported that with availability of water in the canal their wells got recharged automatically which by and large met their irrigation requirements. As a result, they were either unwilling to become member of the association on payment of about Rs. 250/- as share money in addition to admission fee. It was, however, pointed out that whenever they required extra water for irrigation they did not mind paying 30 percent extra charges.

### **Irrigation Aspect**

5.2.4.3 Ensuring availability of assured water supply was one of the cardinal reasons for signing MOU with ID so that given the assured quantum of water, farmers themselves decided on crops to be grown in rabi and hot weather seasons. The eagerness of the farmers to ensure assured quantum of water in rabi season was perceived in this water starved state. For example, in the Kukadi irrigation project (Major) in Pune district where left bank canal was under construction for extension upto Ahmednagar District (the project was in construction stage and water not yet released) many water users associations had already been formed and MOU signed with ID to reserve assured water at the earliest possible. Farmers knew that the whole command area of the canal would not get full irrigation even after the project was completed. Hence, they wanted to reserve their share of water in advance.

### **Water Charges**

5.2.4.4 The water rates per TCM of water payable by WUA to ID which underwent several revisions since the formation of the WUA, were as follows.

Season	Water rate (Rs.) per TCM		
	1.7.92 onwards	1.7.93 onwards	1.7.94 onwards
Kharif	16/-	18/-	20/-
Rabi	24/-	27/-	30/-
Hot weather	48/-	54/-	60/-

5.2.4.5 In the 8 months irrigation system there was generally no scope of water supply during hot weather. But farmers invariably tried to save as much rotation in rabi as possible for use in hot weather season for growing high value crops like grapes, sugarcane etc. If the water was available for irrigating field in hot weather, ID generally did not object to releasing water for hot weather crops. As per normal practice followed, of the saved water 30 percent was deducted as evaporation and transmission loss and 70 percent was supplied for raising high value crops in hot weather. Sugarcane, though annual crop, was also

considered for irrigation in hot weather season in relaxation of rules.

5.2.4.6 Seasonwise water released by ID to the WUA during the last three years was as follow.

<b>Year / season</b>	<b>Volume of water released (TCM)</b>	<b>Water Rate per TCM</b>	<b>Amount paid to ID</b>
<b>1995-96</b>			
a) Rabi	372.40	Rs. 30/-	Rs. 12,847/-
<b>1996-97</b>			
a) Kharif	59.51	Rs. 20/-	Rs. 1,428/-
b) Rabi	590.52	Rs. 30/-	Rs. 16,030/-
c) Hot weather	39.94	Rs. 60/-	Rs. 2,755/-
		Total	Rs. 21,013/-
<b>1997-98</b>			
a) Kharif	337.78	Rs. 20/-	Rs. 6,418/-
b) Rabi	175.71	Rs. 30/-	Rs. 5,016/-
c) Hot weather	164.78	Rs. 60/-	Rs. 9,393/-
		Total	Rs. 20,827/-

Irrigation charges realised by ID in 1992-93, before formation of the WUA was Rs. 1,350/- only.

5.2.4.7 Water charges were paid by the WUA in subsequent season. After the water was supplied by ID the demand was made by ID in standard format indicating water on volumetric basis supplied by ID and water charges payable thereon. In case water charges were not paid in time 10 percent extra charge was levied, whereas for timely payment 5 percent rebate was allowed to the WUA. Canal Inspector and Dy. Executive Engineers in charge of the distributary were responsible for checking the system.

5.2.4.8 As regards water charges realised by the WUA from members, it was decided at a joint meeting as to who would be growing which crops and on what area. The procedure followed was purely democratic and there was no instance of dominance of executive members over ordinary members in forcing their decisions on them.

5.2.4.9 The water charges realised by WUA from members on crop acreage basis varied for different crops. Under the irrigation management system the WUA and its members had full liberty

about crops grown and area to be covered under each crop. ID would only ensure availability of water as per quantum fixed in the agreement. An innovative feature of this experiment was that a big pond was constructed nearby. Storage water in the pond helped raising water level in nearby wells through seepage. In fact, some of the farmers who had not become members of the WUA utilised raised water column in their wells for irrigating fields. Since all the members of the association belonged to one particular village, the question of distribution of water as between different reaches did not arise.

5.2.4.10 Generally no case of default in payment of water charges by members was reported, However, in exceptional cases where water charges were not paid within the stipulated time 10 percent penalty was realised.

5.2.4.11 As against the water charges paid to the Irrigation Department on volumetric basis the WUA realised the following water charges from its members.

1995-96 Rs. 27,315/-

1996-97 Rs. 32,227/-

1997-98 Rs. 24,564/-

#### **Maintenance of Field Channels and Main Channel**

5.2.4.12 Regarding maintenance of field channels, the member farmers were responsible for maintaining them alongside their respective plots. The sub-minor distributary no. 26 was not properly maintained at the time of handing over irrigation management to the WUA. The work was done after joint management survey was taken up which had revealed several deficiencies like broken outlets to field channels, broken masonry outfits etc. Those were gradually set right by ID after handing over irrigation management to the WUA.

5.2.4.13 The irrigation charges realised by WUA from individual members was on crop specific acreage basis. The above data tended to show that after paying water dues to ID the association was left with substantial excess fund for running its day to day activities.

5.2.4.14 For maintenance of main channel, ID provided funds at the rate of Rs. 20/- per hect. of ICA every year to the association whose responsibility was to undertake repair work including extraction of grass and sand. No other funds were provided to the association which had to manage with this amount. Actual funds received from ID and expenditure incurred by WUA on maintenance of distributary during last three years were as follows.

Year	Amount received from ID	Expenditure incurred by WUA on maintenance of distributary
1995-96	Rs. 3,260/-	Rs. 5,000/-
1996-97	Rs. 3,260/-	Rs. 5,500/-
1997-98	Rs. 3,260/-	Rs. 5,500/-

5.2.4.15 However, major problems of maintenance of field channels arose due to resource constraints. These have been discussed later on. As per agreement signed with ID, the association also got management subsidy of Rs. 100 per hect. of CCA per year for first two years of operations. For 3rd year, the rate of management subsidy was reduced to Rs. 75 per hect. of CCA. From 4th year onwards no management subsidy was given. Details were as follows :

Year	Management subsidy received by WUA from ID
1993-94	Rs. 25,000/-
1994-95	Rs. 25,000/-
1995-96	Rs. 18,750/-

5.2.4.16 Problems of maintenance of canal distributary; the WUA received Rs. 20 per hect. CCA of the command area as annual maintenance charges from Irrigation Deptt. This amount was hardly sufficient for proper maintenance of canal distributary under their charge through contractor. The meagre amount of Rs. 20/ hect. given to WUA could hardly be justified. As a result, the WUA experienced difficulty in ensuring proper maintenance of the distributary assigned to them. It was suggested by farmers that ID should atleast raise the maintenance charges to Rs. 50/- per hect. of CCA.

5.2.4.17 Soil in the society area was shallow in nature and had more permeability strata resulting in more seepage at some places.

#### **Training Aspects**

5.2.4.18 Assumption of the responsibility of managing irrigation system by farmers themselves requires proper training in water management so as to derive optimum benefit out of the water available. The training should also equip farmers to prevent water loss through proper maintenance of field channels. Only 10 (25 percent) of the selected respondents including



chairman, vice chairman and secretary of the Association attended training at WALMI Aurangabad on judicious use of water, better management of soil and water and timeliness of irrigation. The training lasted for two days. The respondents who attended the training course reportedly derived benefits such as increase in area of irrigation through optimal use of water and better crop productivity. The information was as per perception of the farmers trained. The actual data collected at the beneficiary level, however, did not indicate any difference between the practices followed by farmers trained and those not trained.

Besides providing some technical knowledge, the training, however, did not provide the necessary guidance for farmers participation in decision making, as stated by the respondents. It was, however, observed that all members being resident of the same village and more or less of the same socio-economic status, all decisions were amicably taken at joint meetings. The members were not subjected to any class dominance. All the respondents also reported no problem with regard to water management.

#### **Maintenance of Accounts**

- 5.2.4.19 The Association had a paid employee to keep record of all decisions taken and for proper maintenance of accounts, both receipts and payments of the association. The bank account was operated jointly by chairman and secretary of the association. The accounts prepared by accountant of the association were audited by government auditors. The accounts were maintained annually.

#### **Views on WUA's Functioning**

- 5.2.4.20 None of the respondents cited any group dominance in the management committee. Everybody had adequate chance to participate in decision making. As already explained, the whole farming community within the command area of the distributary belonged to one particular caste group and the managing committee members did not take measures against the interest of the general members. The distributary committee was working well as reported by all respondents to ensure equitable distribution of water.
- 5.2.4.21 All the selected respondents expressed full satisfaction with management of irrigation system by farmers themselves as it ensured timely irrigation as well as equitable distribution of water amongst the members. The present system also resulted in less irrigation charges being paid by member farmers to the WUA than what they used to pay to ID under earlier dispensation. For example, farmers paid earlier to ID irrigation charges of Rs. 100 per hect.

for wheat, and Rs. 60/hect. for bajra for kharif. Crops like sugarcane, onion, grapes etc. were not allowed to be irrigated by ID due to the reasons already stated. Management of irrigation by farmers themselves rooted out or reduced to minimum the corrupt practices. They were also happy that irrigation channel was properly maintained by the association itself. Fair and equitable distribution of irrigation water minimised tension among the users of water and fostered fellow feeling. Infact, not a single respondent disagreed with any of the above opinion and reported any problem in irrigating crops.

## 5.2.5 Impact of the Programme

(A) Before and After Approach

### Change in Area Under Irrigation

5.2.5.1 Crops grown 'before' and 'after' with average area per respondent under irrigation at two points of time are given in the table below :

**Table 5.2.1 : Average Irrigated Area per Respondent (0.00 hect.)**

Crop	Before(1992-93)		After (1997-98)	
	No. reported	Irrigated area per respondent	No. reported	Irrigated area per respondent
1	2	3	4	5
Bajra	37	0.95	35	0.60
Wheat	25	0.82	36	0.56
Onion	–	–	19	0.62
Potato	–	–	8	0.33
Grapes	–	–	18	0.57
Sugarcane	–	–	30	0.27
Total	39	1.44	40	2.17 (50.6)

Figs. in bracket are indices of growth

5.2.5.2 For a comparative study, data for the year immediately preceding formation of WUA (92-93) and for latest year, 1997-98 were collected. Data for two years were collected to take care of seasonal fluctuations. Bajra and wheat were the main crops grown before. Irrigated area per respondent increased by 51 percent in 1997-98. In this project 27 (67%) out of 40 respondents reported increase in irrigated area from 25.7 hect. 'before' to 60 hect.

'after', net increase of 133 percent. For others irrigated area remained the same at both points of time. After formation of the WUA several new and high value crops like onion, potato, grapes and sugarcane were introduced. This resulted in a decline in area under bajra and wheat.

### **Quality of Irrigation**

5.2.5.3 All the respondents reported adequate and timely irrigation and no shortage of water was reported at any level. While irrigation was adequate 'before', supply of water was erratic, as reported by most of the respondents. Farmers were free to decide which crops to grow and utilise available irrigation water according to their requirement, whether in rabi or hot weather season. This option was not open to farmers before the formation of WUA.

### **Change in Crop Yield**

5.2.5.4 The following table depicts productivity of crops grown (qtl / hect.) 'before' and 'after'. Yield data for the latest year (1997-98) were collected for the comparative study. Yield of bajra and wheat, the only crops grown earlier, increased by 18 and 30 percent respectively over the period. This was due to assured irrigation which induced farmers to use better input package like better seeds, chemical fertilisers, and use of agro-chemicals as preventive measures.

**Table 5.2.2 : Average Yield of Major Crops per hect. (Quintal)**

<b>Crops</b>	<b>Before (1992-93)</b>	<b>After (1997-98)</b>
Bajra	17.84	21.08 (18.16)
Wheat	19.04	24.83 (30.40)
Onion	–	60.40
Potato	–	107.50
Grapes	–	90.33
Sugarcane	–	745.00

Figs. in brackets are indices of growth.

### **Value of Produce**

5.2.5.5 The following table brings out average value of produce per respondent.

**Table 5.2.3 : Average Value of Produce per Respondent  
(at constant prices)**

**(Rs.)**

Crops grown	<u>Before</u>		<u>After</u>	
	No. reported	Average value of produce (Rs.)	No. reported	Average value of produce (Rs.)
Wheat	25	9,628	36	12,665 (31.54)
Bajra	37	7,761	35	9,172 (18.18)
Gram	10	9,52	42	7,275 (-23.61)
Jowar	9	4,22	57	2,391 (-43.41)
Onion	—	—	19	11,974
Potato	—	—	8	8,580
Grapes	—	—	18	19,333
Sugarcane	—	—	30	39,862
Total value of produce per respondent	39	14,754	40	65,253 (342.27)

Figs. in brackets are indices of growth

Data pertaining to 'before' was for 1992-93 and 'after' for 1997-98, the latest year for which data were available. Value of producer was based on the current commodity prices prevailing in 1997-98 for both points of time to take care of temporal fluctuations. In this table value of all crops grown with or without irrigation (Jowar grown without irrigation both 'before' and 'after') has been included. There was a galloping increase in value per respondent, more than four fold, over the period mainly through growing of cash crops like onion, potato, grapes and sugarcane, not grown earlier. As regards value of individual crops, with the introduction of cash crops, cultivation of wheat and bajra, principal food crops grown 'before', lost their primacy as evident from diminution of irrigated area under wheat and bajra per respondent depicted in an earlier table, yielding places to more economically profitable cash crops. Value of wheat and bajra increased by 32 and 18 percent respectively over the period, whereas, average value of crops like gram and jowar, grown without irrigation decreased considerably, by 23 and 43 percent respectively.

## 5.2.6 Impact of the Programme

(B) With and Without Approach

### Average Irrigated Area

5.2.6.1 Information on cropwise irrigated area per respondent was collected for two points of time with a view to measuring change, if any, in the irrigated area. Data were collected for 1992-93 viz. the year immediately before formation of the corresponding association and for the latest year 1997-98. Data are presented in the table below :-

**Table 5.2.4 : Average Irrigated Area per Repondent (0.00 hect)**

Season / Crop	'Before' 1992-93			'After' 1997-98		
	No. reported respondent	Total area	Irrigated area per respondent	No. reported	Total area	Irrigated area per
1	2	3	4	5	6	7
<b>Kharif</b>						
i) Bajra	12	0.89	0.89	13	0.93	0.93 (4.49)
ii) Onion	7	0.31	0.31	3	0.30	0.30 (-3.33)
<b>Rabi</b>						
i) Wheat	10	0.94	0.94	13	0.79	0.79 (-15.95)
ii) Onion	7	0.40	0.40	10	0.34	0.34 (-15.0)
<b>Total</b>	<b>20</b>	<b>1.25</b>	<b>1.25</b>	<b>20</b>	<b>1.41</b>	<b>1.41</b> <b>(12.4)</b>

Figs. in brackets are indices of growth.

Irrigated area per selected non-member increased by about 12 percent over the period, as against 50 percent in case of the selected beneficiaries. No new cash crop was introduced by the selected non-members. Irrigated area under other crops, except bajra, decreased over the period, whereas for the selected beneficiaries new cash crops were introduced and area under traditional crops like bajra and wheat grown 'before' decreased.

#### **Quality of Irrigation**

5.2.6.2 All the selected non-member respondents reported that there was no difference in the quality of irrigation 'before' and 'after' from adequacy and timeliness points of view. Irrigation was adequate and timely at both points of time.

#### **Yield**

5.2.6.3 Yield of crops per hect. grown by the selected non-members 'before' and 'after' are given in the table below :

**Table 5.2.5 : Average Yield / per Hect. (Quintals)**

Crops grown	Before	After
	yields / qtl. hect.	Yield qtl. hect.
<b>Kharif</b>		
i) Bajra	14.86	18.76 (56.24)
ii) Onion	55.00	55.00 (0.00)
<b>Rabi</b>		
i) Wheat	18.00	20.00 (11.10)
ii) Onion	50.00	50.00 (0.00)

Figs. in brackets are indices of growth

Yield of bajra and wheat reported by the selected non-members were less than the yield rate reported by the selected beneficiaries, both 'before' and 'after'. Yield rate of the other crop onion grown in kharif and rabi was more or less same as reported by the selected beneficiaries.

**Value of Produce**

5.2.6.4 Value of crops grown by the selected non-members 'before' and 'after' are brought out in the table below. Value of produce was estimated at constant prices based on the current year's prices.

**Table 5.2.6 : Average Value of Produce per Respondent  
(at constant prices)**

Crops	No. reported	Before	No. reported	After
		Average value (Rs.)		Avg. value per (Rs.)
<b>Kharif</b>				
i) Bajra	12	1115	13	1220 (9.42)
ii) Onion	7	3400	3	1,533 (-54.91)
<b>Rabi</b>				
i) Wheat	10	1801	13	2638 (46.49)
ii) Gram	9	1911	11	2294 (20.06)
iii) Jowar	7	6771	7	4662 (-31.20)
iv) Onion	7	2742	10	2140 (-21.95)
Total per respondent	20	6610	20	6701 (1.37)

Figures in brackets are indices of growth.

For the selected non-members increase in value of crops produced 'after' was almost the same as against more than three fold increase in average value of crops grown by the selected beneficiaries. The spectacular growth of crops produced by the latter group of respondents was due to introduction of several high value cash crops, whereas selected non-members did not introduce any new cash crop over the period.

### **Awareness of Non-Members**

5.2.6.5 All the respondents were aware of the new experiment of irrigation management by farmers themselves being carried out in a neighbouring village. They reportedly knew about the benefits derived by WUA members with regard to the choice of crops being grown. Although they were willing to form association they could not do so for want of required irrigated area as prerequisite for formation of the association. This constraint was also reported by the ID functionaries. As reasons for being willing to form the association they reported that under the new system it would be easier to get irrigation to grow crops of their own choice. Irrigation water given by ID on individual basis was essentially for raising food crops. Some of the respondents grew cash and high value crops with the help of tubewell irrigation only, whereas under the WUA farmers were left with the choice to grow crops with canal irrigation as they liked.

5.2.6.6 As regards maintenance of canal by ID, no problem with consequent water loss was reported. The existing system getting water direct from ID was also considered alright by the respondents. Still, they preferred farmers own management of irrigation system as under the new dispensation they would have their own choice of crops to be grown.

### **5.2.7 Influence of Panchayati Raj**

5.2.7.1 The local Panchayat did not interfere in day to day activities of the association, nor had it any role in its formation. Attitude of panchayat towards the WUA was congenial. Infact,

members of the association were all members of the Panchayat. Its attitude was not inimical to the functioning of the WUA. After having discussed with ID officials and members of the WUA there was no reason to infer that official attitude towards farmers participation in irrigation management had worsened. Infact, local panchayat and the WUA had distinct role to play in the betterment of village and their role was complementary to each other.

### **5.2.8 Factors Responsible for Successful Operation of the WUA**

- i) Influence of dedicated selfless leadership in the district was instrumental in motivating farmers to form the WUA in this village as well as in other parts of the district also. The role of Samaj Parivartan Kendra under leadership of Shri Bhau Sahab Upadhyaya was very important. This kendra guided farmers to unite together to form the Water Users Association so that availability of water for rabi cultivation would be ensured by entering into an agreement with I.D. The farmers, especially at tail-end of the canal, as in case of Rui village, did not get assured irrigation earlier. In their endeavour to get assured supply of water they formed the association with an active cooperation and help from the Irrigation Deptt. The irrigation functionaries helped and guided them in the formation of the WUA. It was also pointed out by Irrigation Officials that formation of the farmers association had considerably reduced their work load on distribution of water as they dealt with the association as a whole.
- ii) After JMS the pending work pertaining to repair of field channels was done subsequently by ID after handing over management to WUA.
- iii) In this project all member farmers in the command area belonged to Maratha caste. About two - thirds of them had land upto 1 hect. and 21 percent had 1 to 2 hect. Only 12 percent had land between 2 and 10 hect. Since all of them belonged to the same caste the question of caste dominance did not arise. The farmer members were by and large marginal and small farmers and formed the socio - economic homogeneous group.



- iv) Better scheduling of water distribution for irrigation and maintaining equitable distribution of water from tail to head in the command area for growing various crops during different seasons of kharif, rabi and hot weather.
- v) Within the given quantum of water available, farmers were free to select crops to be grown in different seasons. There was no restriction imposed by ID for selection of crops.
- vi) Field channels as far as possible were maintained by the members of WUA and no problem was encountered in this regard.

### **5.2.9 Overview of the Programme**

5.2.9.1 The respondents were unanimous in reporting that the new system of management of irrigation system by farmers themselves was much better than the earlier system of ID managing distribution of water to individual farmers. The flexibility inherent in the new system, such as choice of crops to be grown or quantum of irrigation water assured, some portion of which was generally kept reserved for use afterwards, mainly for cultivation of high value crops according to their own choice, was reported as principal benefits of the new system. Farmers were responsible for maintenance of field channels alongside their respective plots and no problems in this regard was faced. The WUA encountered financial constraints in maintaining the main distribution channel for which charges @ Rs. 20 per hect. of CCA was given by ID. The actual cost of maintenance of the distributary system was comparatively more than the actual maintenance charges received from ID. However, the excess charges the WUA could afford to incur was out of the marginal left of water charges after payment to ID. The operation of the project as discerned did not appear to have been bristled with any significant problem.

### **5.2.10 Suggestions**

5.2.10.1 Several water users associations formed on the canal system in this area worked more or

less independently and there was practically no coordination among them. It is suggested that steps be taken to form a federation comprising all water users associations for interface with ID to sort out common problems likely to be faced in management of the irrigation system. Federation of the water users associations would be in a better position to evolve procedures and methodology for joint management survey (walk-through survey) by representatives of the association on the one hand and ID officials on the other for correction of defective canal structures before forming the association.

### **5.3 Brahma Nath Pani Watap Sanstha, Parunde Irrigation Project (Minor)**

#### **5.3.1 Background**

5.3.1.1 The construction of Parunde Minor Irrigation Tank situated in Junnar Taluka of Pune District was started in the year 1986 and completed in the year 1989. This was one of the 90MI schemes included in minor projects financed under "USAID". The gross storage capacity of the dam was 0.939 Mcm<sup>3</sup> (33.69 Mcft), whereas live storage was 0.869 Mcm<sup>3</sup> (30.69 Mcft). There was only one canal on the right bank having a length of 2.5 km. irrigating 112 hect. of land of Parunde village. Another 60 hect. of land of Bhuhckewadi village on the lake fringe was irrigated by LI (Lift irrigation) schemes. The total area irrigated under the scheme was 172 hect. The gross annual utilisation was 1.094 Mcm<sup>3</sup> (36 Mcft).

5.3.1.2 The Right Bank canal was served by 10 outlets directly from the canal. The entire command was divided into 10 chaks, average number of beneficiaries on each chak was 25 to 30 and command area of chak varied between 1.6 hect. and 22 hect.

5.3.1.3 The tank was handed over to management division of I.D. in September 1991. This being "USAID" project, the outlet committees were already formed. In 1990-91 the irrigation activities were carried out in traditional manner with little element of participation at the chak level.

5.3.1.4 This MI tank project selected for study of WUA namely Bramha Nath Pani Watap Sanstha, comprised 112 hect. of cultural command area (CCA). The entire CCA was irrigated and formed irrigable command area (ICA). Based on the objectives laid down for water users associations, a water users society was mooted in February 1991, and the association subsequently took over the responsibility of distribution of water to the members and also the entire administration of water management.

#### **5.3.2 Formation of the WUA**

5.3.2.1 The motivation of farmers in the command area served by the canal system at Parunde village proved quite effective and most of the farmers willingly joined the association for judicious use of water for irrigation. In 1992, due to close association of irrigation staff with farmers and several joint meetings, a majority i.e. 125 out of 132 in the command area decided to join the water users association. The society was finally registered in October 1992. And thus, the Bramha Nath Pani Watap Sanstha was formed. The MOU was signed in October 1992. After this, the irrigation system (i.e. main canal and field channels) was handed over to the

society.

5.3.2.2 The WUA consisted of 127 members who were mostly marginal and small farmers in as much as 85 (67%) had upto 1 hect. land and 39 (30.7%) owned land from 1 to 2 hect. each. Only 3 (2.3%) had 2 to 5 hect land. Land holding of executive committee members more or less followed the same pattern.

### **5.3.3 Selection of Sample Households**

5.3.3.1 As already explained in the sampling design, 40 member farmers whose land fell in the command area of the distributary channel were selected at random. To facilitate observation as to availability of water with respect to adequacy and timeliness from users point of view, equal number of farmers from head, middle and tail end of the distribution channel serving the command area in the village were selected.

5.3.3.2 From the control areas of the selected project where WUA was not formed, 10 cultivators who received water direct from ID were contacted and data as to their irrigation status, crops etc. were collected for two points of time, 'before' and 'after'. Year 'before' was construed as 1990-91 i.e. the year before the formation of the selected water users association and for the latest year 1997-98 'after'. Data for these two years were collected for a comparative study with the irrigation scenario of the selected beneficiaries of the selected project.

5.3.3.3 Of the ten selected non-beneficiaries 40 percent each were marginal and small farmers and rest 20 percent had operational holdings between 2 and 5 hect. each. All of them belonged to other backward castes.

### **5.3.4 Functioning of WUA**

5.3.4.1 For each outlet, a sub-committee comprising farmers whose land was irrigated by the outlet was formed. One or two members from each sub-committee were taken in the main executive committee of the association. Formation of the executive committee was done on democratic line without any class or caste dominance. Infact, the Secretary of the association was a small farmer having 1.5 hect. of land and barring chairman and another executive member other members were marginal and small farmers. As regards social profile of members, SC comprised only 9%, ST 6.3%, OBC 15.7% and the rest were others (69%).

5.3.4.2 The executive committee took all decisions through consensus of all members present in a

meeting. As per MOU the same committee had been functioning since inception.

### **Irrigation Aspects**

5.3.4.3 As per MOU, the society's entitlement for water for irrigation in different seasons was as below.

- i) Kharif - 1,14,000 Cubic M @ Rs. 16 per Thousand Cubic M
- ii) Rabi - 4,56,000 Cubic M @ Rs. 24 per Thousand Cubic M

However, water saved in rabi could be utilised in hot weather at hot weather rates of Rs. 60/- per TCM upto 70 percent of water saved in rabi, the rest was accounted for by evaporation and transmission losses.

5.3.4.4 The method adopted for water distribution by the WUA was simple but needed strict compliance. Water distribution to the users started from three outlets at tail end. After total area covered by last three outlets were fully irrigated, the outlets were closed and preceding three outlets were opened for releasing water. This way outlets at the beginning of the channel received irrigation water at the last. This system was followed so as to ensure equitable distribution of water. It was reported that in times of acute need water was also allowed to be lifted by pump for irrigating fields of other villagers whose plots were located at higher levels after the last outlet.

5.3.4.5 Water charges were paid by WUA in subsequent season after the water was supplied by ID. The demand was made by ID in a standard format indicating water supplied on volumetric basis and if water charges were not paid in time then 10% extra charges were to be levied. For timely payment, however, 5% rebate was allowed to WUA.

5.3.4.6 Water charges were realised by WUA from its members on crop acreage basis. The rates varied for different crops. Under the irrigation management system, the WUA and the members had full liberty about the cropping pattern and area to be covered under each crop. Irrigation Department would only ensure availability of water as per quantum fixed in the agreement.

The water charges realised by the WUA from its members for the last three years were as under :

1995-96	-	Rs. 16,863/-
1996-97	-	Rs. 16,695/-
1997-98	-	Rs. 19,897/-

5.3.4.7 All member farmers of the village decided by sitting together what would be the irrigation charges to be realised on area basis of specified crops from all members. The non-members who utilised water of the system were required to pay extra 30 percent over the irrigation charges realised from the members.

Water charges paid by WUA on water released by ID on volumetric basis are given below :

	<b>Water released</b> (TCM)	<b>Water charges paid to ID</b> Rs.
1995-96		
Kharif	29.4	1,059
Rabi	302.0	10,872
		11,931
1996-97		
Rabi	346.4	12,472
1997-98		
Rabi	347.7	12,519

There was a margin of about 25 to 38 percent of water charges realised by WUA every year, after payment to ID. The excess amount was utilised for running the affairs of the society. The managerial subsidy which was paid at the rate of Rs.100/- per acre of ICA as per MOU to the association for first three years of operation was no longer payable from the fourth year.

5.3.4.8 The Irrigation Department provided funds for maintenance of channel at the rate of Rs. 40/- per hect. of ICA every year to the association whose responsibility was to undertake repair work of main canal including extraction of grass and sand.

Maintenance charges paid by ID to WUA for the last three years were as under :

1995-96	-	Rs. 6,500
1996-97	-	Rs. 6,800
1997-98	-	Rs. 6,500

5.3.4.9 The amount paid as maintenance charges every year was less than the amount received by ID. as water charges from the WUA namely Rs. 11,931, Rs. 12,472 and Rs. 12,519 during 1995-96, 1996-97 and 1997-98 respectively. As against the amount received as maintenance charges the association incurred the following expenditure for maintenance of the canal

distributary.

1995-96	-	Rs. 6,500
1996-97	-	Rs. 7,000
1997-98	-	Rs. 7,500

### **Training Aspect**

5.3.4.10 Of the selected farmers, 7 (17%) including the chairman were trained at Water and Land Management Institute (WALMI) in Aurangabad. The training period was for 4 days and individual farmers attended the courses in water management and judicious use of water system. The training helped them in increasing irrigated area and promoting increase in agricultural production.

### **Maintenance of Accounts**

5.3.4.11 The association had a paid employee to keep record of decisions taken in various meetings and maintenance of accounts related to both payments and receipts. The bank accounts were jointly operated by chairman and secretary. The accounts prepared were audited by government auditors.

### **Views on Functioning of the new Experiment**

5.3.4.12 All the selected respondents reported awareness of the new experiment of irrigation management with farmers participation which they learnt from fellow farmers. They also considered the new system better than the management of irrigation system by ID. As reasons as to why new experiment was better, it was reported that under the new experiment farmers would have own choice of crops to be grown. Moreover, it would be convenient and easier to sort out any internal disputes among farmers within the association, as far as irrigation of crops was concerned. Under their present system getting irrigation direct from ID on individual basis, such internal disputes continued to linger on as there was practically no effective grievance redressal forum. On being asked as to why they were not taking steps to form the association, it was reported that their total land holding was not sufficient as per the amended Irrigation Act to form farmers association.

5.3.4.13 The respondents also reported that as far as availability of water was concerned, they considered their present system (individual farmers getting water from ID direct) to be more or less the same as the other system. About 50 percent of them, however reported that siltation and damaged structure caused water loss under their own system which could be

prevented under the new dispensation. For farmers themselves would take care of the maintenance and upkeep of distributary and canal structure.

The interaction with the selected non-beneficiaries indicated their preference for the new system which would enable them to grow crops of their own choice. They also considered new system better since there was better possibility of water loss being prevented under farmers own management.

5.3.4.14 All the selected farmers appeared to be quite happy and fully satisfied after formation of the WUA. The freedom to choose crops to be grown, better water scheduling and equitable distribution of water without preference for any group of farmers, starting from tail to head were mainly instrumental in increasing their agricultural production and generating substantial increase in value of crops produced. The farmers maintained field channels in good condition involving less expenditure. Disputes, if any, were amicably settled. Fair and equitable distribution of irrigated water minimised tension. Not a single respondent disagreed with any of the above opinions and reported any problem. Due to proper maintenance, condition of distributary did not deteriorate and remained same as before, as reported by all respondents, while proper upkeep of field channels was their responsibility. No water loss was reported by anybody.

5.3.4.15 The selected farmers had no doubt about rectitude of the members of the management committee. The farmers were happy with its functioning and no instance of corrupt practice and caste dominance in water distribution was reported by any of them. The respondents reported smooth working of the distributary committees at each outlet level to ensure equitable distribution of water.

### **5.3.5 Impact of the Programme**

(A) Before and After Approach

5.3.5.1 Impact of farmers participation in irrigation management in terms of i) increase in area under irrigation, ii) introduction of new crops if any, and iii) change in productivity of crops and in value of produce 'before' and 'after' were assessed at the selected beneficiaries level.

#### **Change in Irrigated Area**

5.3.5.2 For a comparative study, data for the year immediately preceding formation of WUA, 1990-91 and for the latest year 1997-98 were collected. Data are given in the table below.



**Table 5.3.1 : Average Irrigated Area per Respondent (0.00 hect.)**

Crops grown	Before (1990-91)		After (1997-98)		
	No. reported	Irrigated area	No. reported	Irrigated area	
	1	2	3	4	5
Wheat	13	0.50	40	0.46	
Gram	37	0.59	27	0.27	
<b>New crops</b>					
Rabi vegetables	-	-	8	0.30	
Onion	-	-	6	0.18	
Potato	-	-	8	0.24	
Total	40	0.71	40	0.78	(9.85)

Figs. in brackets are indices of growth.

Before formation of WUA, the only crops grown were wheat and gram with average irrigated area per respondent of 0.50 hect. and 0.59 hect. respectively. After taking over irrigation management by farmers themselves, there was an increase in number of respondents producing wheat and decline in that of gram. Moreover, as a result of the systematic distribution of water from tail to head and better water scheduling, farmers started getting assured irrigation. This encouraged many farmers to introduce new cash crops such as onion., potato, and rabi vegetables (cabbage, cauliflower and tomato). Area under the earlier crops declined somewhat. The irrigated area per respondent across the board increased by about 10 percent.

For 15 respondents irrigated area increased from 13.22 hect. 'before' to 18.18 hect. 'after', by 38 percent. For other respondents irrigated area remained same.

Irrigated area per respondent for conventional crops reduced marginally as a result of shifting of part of irrigated area for growing new crops. The availability of assured irrigation opened up better income opportunities through cultivation of cash crops. This was the main benefit achieved by the farmer members after assuming the responsibility of water management.

### Quality of Irrigation

5.3.5.3 Before formation of the Association, availability of water was erratic. Only 53 percent of the respondents reported that irrigation was adequate while the rest reported that it was inadequate. Supply of water was timely for 50% of them while for the rest it was untimely. After formation of the Association quality of irrigation improved as all the respondents reported that irrigation was adequate and timely.

### Change in Crop Yield

5.3.5.4 The inception of farmers participation in irrigation management had resulted in increasing productivity of crops. Table given below depicts productivity of the crops grown (qtl. / hect.) 'before' and 'after'.

**Table 5.3.2 : Average Yield of Major Crops per / hect. (Quintals)**

	Before Yield / hect.	After Yield / hect.
<b>Crops</b>		
Wheat	12.38	25.17 (103.31)
Gram	7.54	12.70 (68.43)
<b>New crops</b>		
Rabi vegetables	–	120.00
Onion	–	80.83
Potato	–	121.87

Figs. in brackets are indices of growth.

The yield data for 90-91 and latest year were collected for the comparative study. Yields for wheat and gram, only crops grown earlier, increased by 103 and 68 percent over the period. This was possible because assured irrigation encouraged farmers to go in for better input package like better seeds, fertiliser and agro-chemicals after formation of the WUA.

### Value of Produce

5.3.5.5 That formation of the WUA providing better irrigation facilities, both timely and adequate, had benefited farmers in the form of manifold increase in value of produce, is reflected in the following table which depicts average value of produce per respondent from crop production 'before' and 'after'. This includes value of produce from non-irrigated crops also.

**Table 5.3.3 : Average Value of Produce per Respondent (Rs.)**  
(at constant prices)

Crop	Before		After	
	No. reported.	Value of produce (Rs.)	No. reported	Value of produce per respondent (Rs.)
Wheat	13	3,704	40	6,300 (70.08)
Gram	37	5,929	27	5,419 (-8.60)
New crops				
Rabi vegetables		-	8	25,750
Onion			6	11,418
Potato		-	8	8,925
Flori culture			3	15,333
Total respondent	40	6,438	40	19,967 (210.14)

Figs. in brackets are indices of growth.

5.3.5.6 Average value of produce of different crops per respondent as calculated for both the periods was compared at constant prices based on current year's prices to neutralise seasonal fluctuations in prices between two points of time. Data on ruling market prices were collected through consensus of opinion of the villagers.

5.3.5.7 Comparing 'before' and 'after' situations, average value of produce increased by more than three fold over the period mainly through introduction of new cash crops. As regards traditional crop of wheat, increase in value of produce 'after' was derived mainly due to increase in yield per hect. as a result of better irrigation. For gram, however, average value decreased by about 8 percent, albeit increase in yield by two-thirds, mainly due to shrinkage in area under the crop 'after'. With availability of assured water supply an innovation in crop production was introduction of floriculture by a few respondents with annual average value of produce 15000/- per respondent.

### 5.3.6 Impact of the Programme

(B) With and Without Approach

#### Average Irrigated Area

5.3.6.1 Cropwise average area irrigated per respondent is given in the table below.

**Table 5.3.4 : Average Irrigated Area per Respondent (0.00 hect.)**

Season/ Crop	No. reported	Before (1990-91)		After (1997-98)		
		Total area (hect.)	Irrigated area	No. reported	Total area (hect.)	Irrigated (hect.)
<b>Kharif</b>						
i) Bajra	3	0.47	0.47	-	-	-
ii) Groundnut	1	0.40	0.40	-	-	-
<b>Rabi</b>						
i) Jowar	1	0.20	0.20	-	-	-
ii) Wheat	3	0.60	0.60	-	-	-
iii) Gram	1	0.20	0.20	-	-	-
<b>Hot weater</b>						
Sugarcane	5	0.60	0.60	10	0.86	0.86 (43.33)
<b>Total</b>						
per respondent	10	0.70	0.70	10	0.86	0.86 (22.85)

Figs. in brackets are indices of growth.

5.3.6.2 The remarkable feature of the crops grown by the selected respondents was that in 1997-98, with availability of adequate irrigation, all had switched over to sugarcane cultivation in place of food crops like bajra, jowar, wheat and gram grown 'before'. Average area under sugarcane per respondent increased by 43 percent over the period. This is in contrast to the cropping pattern of the selected beneficiaries of the WUA where after formation of the WUA, besides, growing food crops 'after' cash crops like onion, potato and rabi vegetables were also introduced. Surprisingly, none of the selected beneficiaries grew sugarcane. Perhaps because sugarcane is an water intensive crop and adequate water was not available for the purpose.

### Quality of Irrigation

5.3.6.3 For all the respondents irrigation was adequate and timely 'after', as against 40% of them who had adequate and timely irrigation 'before'.

### Yield

5.3.6.3 Average yield per hect. of major crops grown 'before' and 'after' are given in the table below :

**Table 5.3.5: Average Yield of Major Crops per Hectares (Quintals)**

Season / crops grown	Before (1990-91) Yield	After (1997-98) Yield
<b>Kharif</b>		
i) Bajra	20.83	-
ii) Groundnut	8.00	-
<b>Rabi</b>		
i) Jowar	20.00	-
ii) Wheat	23.66	-
iii) Gram	10.00	-
iv) Sugarcane	1246	1213 (-3.4)

Figs. in brackets are indices of growth

Average yield 'before' of crops like wheat and gram was reportedly more than the yield of such crops grown by the selected beneficiaries. For example, yield of wheat per hect. was 23.66 qtl. vis-a-vis 12.38 qtl./hect. 'before' reported by the selected beneficiaries; this was higher by about 90 percent. However, yield rate of wheat reported by them 'after' was comparatively more. Yield of gram per hect., 'before' 10.00 hect./qtl. reported by the selected non - members was about 33 percent higher than 7.54 qtls/hect. reported by the selected beneficiaries. For subsequent year, 1997-98 yield rate between two sets of respondents was not comparable. For, the selected non-members did not grow such crops 'after' they switched over to sugarcane crops, whereas the selected beneficiaries did not grow sugarcane in either of the years.

### Value of Produce

5.3.6.5 The study revealed that after switching over to sugarcane cultivation average value of produce per respondent increased by 138 percent over the period. This increase was, however, less

than that of the selected beneficiaries, in whose case growth in value of produce was around 200 percent. For the selected non-members, sugarcane cultivation proved to be more remunerative, than general food crops grown earlier. Since yield rate of sugarcane remained more or less the same between two points of time, growth in value of produce was due to increase in average area under irrigated cultivation (43%) per respondent. The data are given in the table below :

**Table 5.3.6 : Average Value of Produce per Resopndent (Rs.)**  
(at constant prices)

Seaason / crops grown	No. reported	Before	After	
		Value of produced per respondent	No. reported	Value of produce per resopndent
<b>Kharif</b>				
i) Bajra	3	4,900	-	-
ii) Groundnut	1	4,320	-	-
<b>Rabi</b>				
i) Jowar	1	4,800	-	-
ii) Wheat	3	10,033	-	-
iii) Gram	1	2,400	-	-
Sugarcane	5	66,958	10	93,280 (39.30)
<b>Total</b>	<b>10</b>	<b>39,111</b>	<b>10</b>	<b>93,280</b> <b>(138.50)</b>
per respondent				

Figs. in brackets are indices of growth.

### 5.3.7 Factors Responsible for Successful Operation of WUA

5.3.7.1 The farmers of Parunde village had shown keen interest in the formation of WUA. The selfless, dedicated leaders of the area were instrumental in motivating farmers to join the association in large numbers. The factors which were responsible for successful operation of WUA were as under.

- i) Better understanding among the farmers about the utility of the association, which would enable them assured and timely irrigation during different seasons.

- ii) The dam had assured irrigation potential for the whole command area covered by the WUA. In addition, several lift irrigation schemes were also in operation under cooperative managements which drew water from the storage tank. Availability of assured irrigation was the prime motive for the formation of the association. The cooperation and support provided by the ID officials in forming the association was no less important.
- iii) There was incentive for farmers to save water in rabi season which would be utilised for raising high value crops in summer season. Although under minor irrigation scheme there was no provision for releasing water in hot weather, generally ID officials did not object to releasing saved water in hot weather (upto 70 percent of water saved in rabi season) provided there was adequate water in the storage tank required for its upkeep and maintenance.
- iv) Proper maintenance of field channels involving less expenditure.
- v) Better cohesiveness, interaction and understanding between chairman, farmer members and ID in amicably sorting out disputes, if any, and providing best water distribution management.
- vi) Farming activities were better organised by collective decisions so as to get better yield.

### **5.3.8 Overview of the Project**

- 5.3.8.1 After taking over water distribution management, the farmers appeared to be holding unanimous opinion that the new system was much better than the earlier system of ID managing distribution of water to individual farmers. The independence of choice of crops to be grown and quantum of irrigation each member farmer got enabled them to introduce HYV cash oriented crops. These were the principal benefits achieved by the farmers. The system devised to ensure equitable distribution of water by supplying water first to tail enders and subsequently to other farmers gradually was worth emulating by other user associations. This would lead to smooth and harmonious management of irrigation system.

## **5.4 Jaikisan Co-operative Water Users Associations, Loni Minor Irrigation Project**

### **5.4.1 Background**

5.4.1.1 Situated in Aurangabad district, Loni was a minor tank irrigation project providing irrigation since the last four years. It had a gross storage capacity of 0.8583 mm of which dead storage capacity was .0064 mm<sup>3</sup> and live storage capacity was 0.8519 mm<sup>3</sup>. The earthen dam was 376 m in length and in 16 m height. The project had culturable command area (CCA) of 281 hect. of which irrigable command area (ICA) was 170 hect. Supply of water for irrigation was available through left bank canal of 2.52 km length. Irrigation availability depended upon tank inflow and planned withdrawal for the canal, whereas requirements of irrigation were influenced by crop mix and crop water requirement. The rainfall pattern analysis implied assured irrigation only for 4 months, i.e. June to September, but that too could not be adhered to every year due to dearth of water. Situation became critical in 1996-97 when rainfall in Aurangabad district suffered a great set back. As a result, ID could not supply any water for irrigation to the cultivators in that year.

### **5.4.2 Formation of WUA**

5.4.2.1 Farmers in Loni village were initially reluctant or indifferent to form WUA because they were doubtful of getting assured irrigation from water storage tanks. Other impediments were dearth of suitable ID officials with dedication to motivate farmers to form WUA and lack of local leadership which could act as catalytic force to organise WUA. However, due to minimal motivation and possible persuasion by the extension officials of WALMI, Aurangabad, Shri Jaikisan Cooperative Water Users Association comprising 281 hect. of cultural command area (CCA) and 170 hect. of irrigable command area (ICA) started functioning in 1993-94. MOU was signed in September 1994. Subsequently, irrigation system consisting of the main canal and field channels were handed over to WUA, to handle water distribution among farmers.

5.4.2.2 The Water Users Association comprised 244 farmers most of whom were marginal and small farmers. Their land holding pattern showed that 115 (47%) had land upto one hect. 66 (27%) owned land 1 to 2 hect. and the rest 63 (25.8%) had 2 to 5 hect each. The social profile of members was SC & ST 16.4% and OBC and others 83.6%.

### **5.4.3 Selection of Sample Households**

5.4.3.1 For the study in Loni project, 40 farmers, whose land fell in the command area of the distributary channel, were selected at random in order to find out adequacy and timeliness of water from



users point of view. Equal number of farmers were selected from head, middle, and tail end of the distributary channel.

5.4.3.2 A neighbouring project Nirgudi storage tank where farmers participation in irrigation management had not materialised was selected as control area and 15 farmers from the command area of the project were selected for a comparative study. The storage tank had CCA of 990 hect. and ICA of 547 hect. The economic profile of farmers selected was as follows.

	Size of holding	No.	
1.	below 1 hect.	4	(27%)
2.	1 to 2 hect.	4	(27%)
3.	2 to 5 hect.	4	(27%)
4.	more than 5 hect.	3	(20%)
<hr/>			
	Total	15	

The selected farmers mostly belonged to other castes.

#### 5.4.4 Functioning of WUA

5.4.4.1 The functioning of the WUA had been marked by an acute scarcity of water from the tank. In 1994-95, the first year of the association, only 62 hect. (36%) out of 170 hect. were irrigated. However, in that year, about 23 hect. (13%) also got irrigation for raising hot weather crops. In 1995-96 and 1997-98 release of water from the storage tank was even much less, adequate for only 24 hect (14%) and 39 hect (23%) respectively, whereas no water was released in 1996-97.

5.4.4.2 Erratic water supply more often than not resulted in disputes over equitable distribution of water to plots of different members. A few of the economically powerful members of the executive body whose plots happened to be at the head of the distributary channel diverted more water at the cost of other plot holders at the tail end. Such irregular practice led to discontentment, tension and strife among the members. Such a situation was not perceived in the other two projects where water was available to all plot holders adequately and in time. Infact, in Parunde the association devised distribution of water through beneficiary committee at field channel levels in such a manner that tail enders were first to receive water.

5.4.4.3 Another reason for the farmers discontentment was that ID permitted several lift irrigation

projects on the same storage tank outside the command area of the selected project. Although at each outlet level (there were 13 outlets on the canal distributary) one distributary level committee was set up to coordinate flow of water to the field, the committee could not be of much use mainly due to scanty water accumulation in the storage dam.

5.4.4.4 It was also reported by the ID officials that with meagre resources at their disposal, they could not take up desilting operation, and other maintenance work on storage tanks, especially from where no water was released for irrigation for whatsoever reason and consequently no revenue earned. Naturally, with limited resources at their disposal they took up proper upkeep of such irrigation structures which earned revenue. Postponement of maintenance work for a year made subsequent maintenance even more daunting. Under this scenario, it was quite natural that influential members tried to grab as much water as possible specially when water was so vital for crop production in this semi-arid region.

5.4.4.5 The Executive Committee members were elected by members and the same committee continued. The land holding pattern of executive members varied between 18 hect. to less than one hect. including Chairman and Secretary who were having lands 18 hect. and 1.2 hect respectively.

#### **Irrigation Aspect**

5.4.4.6 The WUA in Loni village was formed on the same guidelines and pattern as other associations were constituted in different parts of Maharashtra State. The society started functioning well but after a lapse of one year it was realised that it would not be possible to distribute water for irrigation to all farmer members as per schedule. The main hurdle was acute shortage of water in the catchment and consequently descending water level in the storage tank. Although social dominance by any group in the executive committee was not discernible, economic dominance by certain influential wealthy farmers over other farmers, especially having much less land holding was visible. Since water was not always available in adequate quantity there was a tendency on the part of influential executive committee members whose land was situated at the head of the distribution channel to take more water at the cost of farmers whose plots were at lower reaches of the channel. This caused tension and disturbed harmony among farmers. This situation was not perceived in the other two selected projects where sufficient water was available for meeting full requirements of members of the WUA.

#### **Irrigation Charges**

5.4.4.7 Volume of water received from ID, irrigation charges paid thereon and irrigation charges

realised from members during last three years were as follows.

<b>Year</b>	<b>Release of Water (TCM)</b>	<b>Water Charges Paid to ID</b>	<b>Water Charges realised from farmer members</b>
1995-96	76.2	2,286/-	12,240/-
1996-97	No water released	—	
1997-98	98.5	2,954/-	6,596/-

The association realised irrigation charges from farmers at crop specific rate on acreage basis, while it paid to ID on volumetric basis. There was substantial margin between the two, about 80 to 55 percent of the water charges realised by the farmers association every year, which the association appropriated for its day to day activities. The irrigation charges realised by the WUA were quite high. For example, for cotton cultivation the association realised Rs. 300/- and on wheat and groundnut 200/- each per hect.

#### **Maintenance**

The association received from ID maintenance charges for maintenance of canal distributary as per MOU, at the rate of Rs. 20/- per hect. of ICA. Funds received from ID and actual expenditure incurred on maintenance during last three years were as follows.

<b>Year</b>	<b>Funds received from ID</b>	<b>Expenditure incurred on maintenance of distributary channel</b>
1995-96	Rs. 3,400/-	Rs. 5, 000/-
1996-97	Rs. 3,400/-	Rs. 5, 500/-
1997-98	Rs. 3,400/-	Rs. 6, 000/-

5.4.4.9 The actual expenditure incurred was more than the amount received from ID. The expenditure related to maintenance and up-keep of the main distributary whereas proper maintenance of field channels was the responsibility of individual farmers. The excess expenditure on maintenance of canal distributary was incurred by the association out of excess water charges retained by it. Moreover, the association received managerial subsidy @ Rs. 100/- per hect. of CCA for first two years of its existence and thereafter @ Rs. 75 per hect. of CCA for the third year. From fourth year onwards no managerial subsidy was admissible. This was essentially to enable the WUA to stand on its feet at initial stage and later on become economically viable.

## **Training**

5.4.4.10 A few selected farmer members were sent to WALMI, Aurangabad, for 2 to 4 days to receive training in water management and judicious use of water for irrigation. However, for lack of adequate water for irrigating fields, it was not possible to put into practice the methods learnt through the training for optimum water management.

## **Views on Management Committee**

5.4.4.11 The management committee of WUA invited many criticisms from the members for its failure to sort out problems on

- i) Management of equitable distribution of water and proper scheduling.
- ii) Adequate and timely availability of water among users, especially tail end farmers.
- iii) Dominance of powerful executive committee members in water distribution system of the society.
- iv) Sorting out inequitable water distribution related disputes among the farmers, and
- v) Ensuring proper maintenance and repair to field channels which was the responsibility of individual farmers.

## **5.4.5 Impact of the Programme**

(A) Before and After Approach

### **Irrigated Area**

5.4.5.1 Yearwise data on non availability of adequate water in the storage tank which was the bane of this project has been given earlier. A similar picture emerged after analysis of beneficiary level data collected by us during this study. Irrigated area per respondent was calculated for the year 1993-94, as 'before', the year immediately preceding formation of the association and for year 1997-98 as 'after' being the latest year for which full cropping pattern data were available. Average irrigated area per respondent at two points of time are given in the following table.

**Table 5.4.1 : Average Irrigated Area per Respondent (0.00 hect.)**

Crops Grown	Before (1993-94)		After (1997-98)	
	No. reported	Irrigated area	No. reported	Irrigated area
1	2	3	4	5
Sugarcane	1	1.00	5	0.55 (- 45.0)
Cotton	7	1.92	35	0.25 (- 86.4)
Wheat	9	1.58	24	0.26 (- 83.5)
Gram	9	0.97	14	0.13 (- 85.0)
Jowar	3	0.86	NIL	NIL
<b>Total</b>	<b>24</b>	<b>1.67</b>	<b>40</b>	<b>0.49</b> <b>(- 70.6)</b>

Figs. in brackets are indices of growth

5.4.5.2 In 1993-94 only 24 (60%) out of 40 respondents reported irrigation on their field, while the rest reported no irrigation..Each of such respondents reported irrigated area of about 1.67 hect. under different crops. Although more respondents reported irrigation on different crops 'after', the actual irrigated area per respondent decelerated by 70 percent in 1997-98, taking 1993-94 as the base year. For 24 (60%) sample beneficiaries who had reported irrigation 'before' for as many as 19 (80%), their total irrigated area dwindled by 40 percent 'after', from 31.3 hec. to 18.7 hect. Only for 4 (16%) beneficiaries, who wielded dominance over others because of their standing in the village and whose plots were located near head of the distributory channel, reported increase in irrigated area by about 30 percent, from 7.0 hect. 'before' to 9.2 hect. 'after', while for another respondent irrigated area remained static over the period. As regards individual crops irrigated, area under different crops receded every year after formation of the association. That inadequate irrigation every year after formation of the association unlike the other two selected projects had badly affected total crop yield will be evident from subsequent paras.

It was perceived in the field that whenever water was released in the distribution channel that

invariably recharged the nearby wells which facilitated irrigation of crops along with canal irrigation. With less quantum of water available for release, water in the nearby wells also dried up and thereby further reduced the scope of irrigation.

### **Quality of Irrigation**

5.4.5.3 Before formation of the WUA irrigation was scanty. But unlike other associations studied in this report the situation did not improve even after formation of WUA. Instead, it deteriorated as can be seen figures given below.

5.4.5.4 The data collected from the selected beneficiaries indicated that about 60 percent of them reported adequate irrigation available before formation of the association, while for another 40 percent it was either inadequate or very inadequate. About one-third of them did not receive timely irrigation. After formation of the association, the scenario presented a gloomier picture in so far as 80 percent reported inadequate and untimely irrigation due to extreme shortage of water.

### **Yield**

5.4.5.5 Productivity of crops increased after formation of the association. This was mainly due to better management of irrigation and judicious use of inputs. While productivity per hect. increased, value of agricultural produce dwindled considerably, as we shall presently see as comparatively lesser irrigated area was sown with crops for want of adequate irrigation for the whole command area. Data are given in the table below :

**Table 5.4.2 : Average Yield of Major Crops Grown per Hectare (Qtl. )**

Crops	Before (1993-94) Yield (Qtl./hect.)	After (1997-98) Yield (Qtl./hect)
Sugarcane	448.0	562.90 (25.64)
Cotton	5.42	11.34 (109.22)
Wheat	16.86	22.45 (33.15)
Gram	7.62	12.64 (65.87)
Jowar	13.93	NIL

Figs in brackets are indices of growth

## Value of Produce

5.4.5.6 Although productivity of crops showed an uptrend 'after', average value of produce per respondent in 1997-98 was less by one-third of value of produce grown in the year 1993-94. Value of produce was computed at current year's prices. This was mainly due to shrinkage in irrigated area for want of assured irrigation. One redeeming feature of the scenario was that number of growers of crops like sugarcane, wheat, gram, and cotton increased with the prospect of getting assured irrigation. But their hope was ultimately belied and for lack of adequate irrigation they had to be content with lesser area under the crops. Data are brought out in table below :

**Table 5.4.3 : Average Value of Agricultural Produce per Respondent (Rs.)  
(at constant prices)**

Crops	Before		After	
	No. reported	Average value	No. reported	Average value
Sugarcane	1	32,256	5	22,291 (-30.89)
Cotton	7	21,870	35	6,248 (-71.43)
Wheat	9	12,256	24	2,731 (-77.71)
Gram	9	8,132	14	1,808 (-77.76)
Jowar	3	4,200	NIL	NIL
Total	24	15, 893	40	10,525
Average value per respondent				(- 33.77)

Figs in brackets are indices of growth

### 5.4.6 Impact of the Programme

(B) With and Without Approach

#### Average Irrigated Area

5.4.6.1 Average irrigated areas per respondent 'before' and 'after' were as follows. For comparison 'before' was reckoned as year 1993-94, i.e. before formation of the selected association and 'after' as 1997-98.

**Table 5.4.4 : Average Irrigated Area Per Respondent (0.00 hect.)**

Crop grown	Before			After		
	No. reported	Total area(hec.)	Irrigated area (hec.)	No. reported	Total area(hec.)	Irrigated area (hec.)
1	2	3	4	5	6	7
i) Jowar	15	1.65	1.65	15	1.68	1.68 (1.8)
ii) Cotton	15	1.06	1.06	15	1.02	1.02 (- 3.00)
iii) Tur	1	1.00	1.00	1	1.00	1.00 (0.0)
Total per respondent	15	2.78	2.78	15	2.76	2.76 (- 0.7)

Figures in brackets are indices of growth

Average area was calculated on the basis of number reported. While all farmers cultivated jowar and cotton under irrigated condition, only one of them cultivated tur (arhar) both 'before' and 'after'.

5.4.6.2 Average irrigated area per respondent under cotton slightly decelerated 'after'. Total irrigated area per respondent remained more or less the same over the period. Average irrigated area per respondent was more than the corresponding figures for the selected beneficiaries, especially 'after' due to non-availability of adequate irrigation for the earlier group of farmers. About 60 percent of the respondents received adequate and timely irrigation both 'before' and 'after'.

### **Yield of Crops**

5.4.6.3 Yield of major crops per hect. reported by the selected non-members was more than that reported by the selected beneficiaries. For them jowar yield increased from 21 Qtl. / hect. to 22 Qtl. hect., an increase of about 5 percent over the period. For selected beneficiaries who



reported severe constraints of adequate irrigation, average cotton yield before formation of the association was around 5.42 Qtl. / hect. which however increased to 11.34 Qtl. / hect. in 1997-98 showing a growth of more than 100 percent. The yield position improved with increasing availability of irrigation after formation of the association, albeit yield rate was nowhere near the yield rate reported by the selected non-members, who reported consistent supply of irrigation water by ID at two points of time. For other crops grown by the selected respondents there was no commonality as far as crops grown by two groups of the selected respondents were concerned. Hence no comparison in yield data was possible. The data are given below.

**Table 5.4.5 : Average of Yield Major Crops Grown per hectare (Qtls.)**

Crops grown.	Before Yield Qtl./hect.	After Yield Qtl./hect
Rabi		
i) Jowar	20.92	22.26 (6.40)
ii) Cotton	15.66	22.63 (44.5)
iii) Tur (arhar)	8.00	10.00 (25.0)

(Figures in brackets are indices of growth)

#### **Value of Produce**

5.4.6.4 For reasons stated above i.e. availability of assured irrigation at both points of time 'before' and 'after', value of produce per selected non-members was comparatively much higher in the year 'before' around Rs. 38,000/- on an average per respondent, vis-a-vis Rs. 16,000/- per selected beneficiary. While for the selected beneficiaries, average value of produce per respondent decreased by more than one third 'after', for the selected non-members growth in average value of produce 'after' was in inverse proportion. The value of produce was computed at constant prices based on current year's prices to take care of temporal fluctuations in prices. The data are given in the table below :-

**Table 5.4.6 : Average Value of Produce per Respondent (Rs.)**  
(at constant prices)

Crops grown	Before		After	
	No. reported	Average value of produce (Rs.)	No. reported	Average value of produce (Rs.)
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
Rabi				
i) Jowar	15	14,547	15	18,200 (25.11)
ii) Cotton	15	22,400	15	31,733 (41.66)
iii) Tur	1	12,000	1	15,000 (25.00)
Total per respondent	15	37,733	15	50,933 (34.98)

Figures in brackets are indices of growth

#### **Awareness of New Experiment**

5.4.6.5 All respondents were aware of the new experiment of participatory management of irrigation system by farmers. While 40 percent learnt about the new system by the ID officials, the rest came to know about it from fellow farmers. All of them showed willingness to form the association. However, lack of local leadership to take initiative in motivating farmers to go for participatory management was reported to be main inhibition. There was lack of initiative on the part of ID officials also to motivate farmers to go for participatory irrigation management. Moreover, as the data show, there was no dearth of irrigation in the control area and hence the ground situation did not prompt farmers initiative in forming their own association, although participatory management was considered better from the farmers point of view. Under own management farmers would have choice of crops to grow. About 50 percent of the selected respondents also considered water loss in their present system (irrigation provided directly by ID) due to siltation and damaged structure which were not properly attended to by ID regularly. This also resulted in water loss. Such problems could be tackled by farmers themselves under

their own management of irrigation system.

#### **5.4.7 Overview of the Programme**

- 5.4.7.1 The factors primarily responsible for successful operation of the new experiment of farmers participation in irrigation management unfettered from departmental shackles and control, such as (i) dedicated local leadership to motivate farmers to go for such experiments, ii) availability of adequate water for irrigation, and iii) helpful attitude of local irrigation officials to promote management of irrigation system by farmers themselves were not discernible in this area. The selected project therefore could not achieve success due to such factors.
- 5.4.7.2 There was disinclination on the part of the farmers to go in for such experiments. They were initially apathetic to the idea of taking over the irrigation management by themselves. For, they were not hopeful of the prospects of adequate water accumulation in the storage tank. It was through the extension efforts of WALMI officials that they were ultimately persuaded to form the association.
- 5.4.7.3 The attitude of the irrigation officials was, by and large, lukewarm towards the new experiment. No effort was made by them at initial stage to help farmers in forming the association. Afterwards, when the association was formed, they could not put forth better efforts towards its successful operation for want of adequate water. This was the picture of almost all medium and minor irrigation projects in this region as the whole area was stricken with drought conditions and inadequate rainfall. This was a unique scenario which affected successful operation of farmers' participation in irrigation management, not perceived in other regions of the state.
- 5.4.7.4 The farmer members also held the view that executive committee members having land at the head of the channel grabbed more water for irrigation whenever water was released at high pressure by I.D. Farmers at tail end could not get required quantum of water for irrigation. It is, therefore, suggested that the same experiment of water distribution system as tried at Parunde and Rui (Palkhed) should also be implemented at Loni village.

## **5.5 An Overview of the selected Projects in the State (Maharashtra)**

- 5.5.1 In Maharashtra the farmers association selected under the major irrigation project had a command area of about 212 hect. CCA within the sub-minor distributary. In other two selected projects also total command area of the distributary on which the farmers associations were formed for participatory irrigation management was also not very large, around 300 to 100 hect. each. Though the area under operation of each selected project was not very large, the study brought to light some of the conspicuous benefits derived by the farmers out of the new dispensation. The main benefit derived by them was the choice of crops grown by them with the available water in each season as per MOU signed by the farmers' association with the Irrigation Department. Infact, uncertainty of availability of water, especially at the tail end of the canal system impelled farmers to unite together and form the association to ensure quantum of assured water from Irrigation Department. The new experiment was also preferred by ID officials as farmers own management relieved them of the onerous task of entering into agreement with individual farmer for supply of water so that they could devote more time and energy to the maintenance of the main canal system. The new experiment also proved economically beneficial to the farmers in so far as it was within their choice to save water through judicious use in rabi season for utilisation in hot weather season for raising high value crops and thereby increase their income.
- 5.5.2 The study further revealed that successful implementation of farmers participation in irrigation management depended on several factors, such as supply of assured water in each season as per agreement signed with ID, local leadership to inspire farmers especially in water starved areas to form water users society to ensure assured availability of water by entering in to agreement with ID, and dedicated and cooperative ID officials to encourage farmers to go for such experiments. Wherever these factors were absent, the new experiment could not make much headway.
- 5.5.3 Each of the selected projects in Maharashtra covered a compact command area comprising a single village. This also helped successful operation of the project as all farmers belonged to a homogenous social group where everybody knew others and no problem in taking joint decision on the management of irrigation system was encountered.
- 5.5.4 A study of the irrigation system being followed in control areas of the selected projects where irrigation was provided by ID direct to individual farmers showed that whenever assured irrigation was available there was not much difference in economic and irrigation status between two

groups of farmers. Nevertheless, the selected non-members in control areas preferred participatory management in irrigation system by themselves due to its inherent merits, such as option to choice crops to be grown and the advantage of saving water in one season for use afterwards for raising high value crops. However, despite their best intentions they could not go for new experiment due to certain inhbiting factors such as area of land not being within the prescribed limit to form the association as per amended Irrigation Act or lack of local leadership for motivation.