A CASE STUDY OF FOUR FARMERS ORGANISATIONS IN MANAGEMENT OF IRRIGATION SYSTEM IN INDIA

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ABSTRACT

Four Water Users Associations (with 1618 ha culturable command area and 575 farmers) were formed in Gudha Medium Irrigation project, Rajasthan, India. Rehabilitation of the canal system by WUAs and handing over of these canals to farmer's organizations has resulted in 34% to 41% saving in canal running days in the year 2003-04 as compared to 1997-98. This has been mainly achieved due to management of irrigation system by Farmer's Organizations and rehabilitation of canals. It was also found by sample cutting of various crops that the yield of Sugarcane, Wheat, Pea (vegetable), Lentil, Gram, Mustard and fodder increased to the tune of 40.19%, 58.14%, 54.02%, 84.73%, 19.23%, 25.00% and 51.77% respectively in the year 2003-04 as compared to 1997-98 after initiation of Participatory Irrigation Management activities.

The recoveries of irrigation charges by the WUAs were as high as 93.23% for current dues and 52.23% for old dues of Alod minor. Over all recovery of four minors by WUAs was about 8% higher over recovery of remaining minors of Gudha Project during 2000-01. Similarly in the year 2001-02 the average recovery of all the four minors made by the WUAs was 30.8%. The reason of less recovery was that the farmers were not ready to deposit old dues pending since a long. The annual expenditure on operation & maintenance was 18% to 49% of the recovery made by water user associations during the year 2001-02. It shows surplus revenue with all the WUAs after the introduction of PIM.

1. INTRODUCTION

India's largest state Rajasthan is predominantly an agrarian state. Over seventy per cent of the population depends on the agriculture sector. Overall economy of the state largely depends upon the performance of agriculture sector, which in turn, cannot be assured without irrigation. Surface as well as ground water resources of the state are scare and rainfall in most parts of the state is low and uncertain.

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Gudha Medium Irrigation Project (District Bundi of Rajasthan), was constructed in the year 1958 across river Mej, a major tributary of river Chambal. The Dam is an earth fill Dam, 23 m high above the river bed. The Project is located at Longitude 76^{o} 26' 30" and Latitude 25^{0}56'0". The CCA of the Project is 10390 ha and irrigation is done through two main canals off taking from left flank and Right flank of the dam. The length of Right Main Canal and Left Main Canal is 27.6 Km and 25.80 km respectively. Right Main Canal has one Branch canal named as Hulaspura Branch and 9 minors where as Left Main Canal has 10 minors.

2. ACTION RESEARCH UNDER FINANCIAL ASSISTANCE FROM WORLD BANK

Under the Agricultural Development Project of the World bank four minors of the Gudha Medium Irrigation Project were taken up to motivate the farmers, to form Water Users Association under Action Research program of the Irrigation Management & Training Institute, Kota (Raj.) India, involving deferred maintenance, rehabilitation and PIM activity. These four minors namely LMC Minor No.1, LMC Minor No. 2, Alod Minor and Danta Minor were having total culturable command area of 1618 ha and 575 farmers.

Formations of Water Users Associations (WUAs) on these minors were initiated with an awareness campaign and group meetings with farmers to make them aware & understand the concept of participatory irrigation management (PIM). With subsequent persuasion, the farmers of these four minors responded favorably and about 70% farmers (as against the more than 50% requirement to form a society) agreed to take over the responsibility of irrigation system. These four WUAs (**Table 1**) were registered under The Rajasthan Co-operative Act along with election of nine executive committee members.

Project reports for all the four Minors amounting to Rs. 39.25 lakhs were prepared and clearance of the World Bank was received.

Table 1: Details of Water Users' Associations on Gudha Medium Irrigation Project

S. No.	Name of Minor	CCA (ha)	Number of	
			Farmers	Members
1.	Alod Minor	251	125	80
2.	Danta Minor	536	150	115
3.	LMC Minor No. 1	367	135	110
4.	LMC Minor No. 2	464	165	95
	Total	**1618**	**575**	**400**

As an initial step, the WUAs were given the full responsibility of ordinary repairs, jungle clearance and de-silting of the Minors as well as Water distribution during Rabi 1998-99, which they completed successfully. It was found that the small work of canal clearance and undertaking irrigation management by WUAs, have resulted in better irrigation, enabling first watering to be completed at a much faster rate and in lesser time as compared to past years as indicated in the **Table 2**.

Impressed by the quality of work and feedback received from farmers, transparency of work and involvement of WUA members, World bank agreed, rather recommended that rehabilitation works be also got executed through respective WUAs. The objective of giving complete rehabilitation to WUAs was to train the WUA members for doing maintenance & rehabilitation works in future as they will shed their sweat for execution and it will generate affinity towards the system. At the same time there will be transparency in entire execution of rehabilitation works.

Table 2: Details of First Watering done by WUAs

S.No.	Name of Minor	Discharge* (cusec)	Number of canal running days		Saving of canal running days
			Year 1997	Year 1998	
1.	Alod Minor	9.46	33	22	**11**
2.	Danta Minor	15.12	19	18	**1**
3.	LMC Minor No. 1	14.01	35	28	**7**
4.	LMC Minor No. 2	14.03	37	24	**13**

*Prior to Revision of L-Section of Minors.

The state government provided a relaxation as a special case for these minors, in the provisions of Public Works Financial & Account Rules and permitted all works of rehabilitation to be got executed by respective WUAs. An advance of 20% of the amount of work order was provided as financial support to these WUAs.

3. PLANNING OF REHABILITATION WORKS

The rehabilitation works on four minors was done by respective WUAs including following major steps:

- Nature and type of works to be done were discussed among respective WUA members.
- Since it was a time bound program, various WUA members were assigned specific jobs to execute.
- Looking to the major problem of water distribution below outlets and over-out letting, revision of network planning was essential. Hence it was essential that

each chak (area irrigated by a single outlet) was actually re-assessed and outlet size / location fixed as per actual.

- Re-designing the operation plan to cater revised network planning without changing discharge at head of each minor.
- Prioritize the works proposed in the project report and also addition works if found essential outside project provisions to meet out actual needs of farmers.
- Place work-wise work orders, in order of priority fixed, release 20% advance payment against work order amount and retain 10% of the cost as WUAs contribution towards rehabilitation works.

4. REDESIGNING OF OPERATION PLAN OF THE SYSTEM

One of major deficiencies in canal irrigation of these four minors was uncontrolled supplies and irregular distribution of water from head to tail. To over come this situation a systematic approach was evolved. The stepwise procedure followed was as follows:

- One-day workshop was organized for WUA executive members to explain in detail the procedure of rehabilitation.
- General body meeting of all the four minors were organised to assign the responsibilities of work to each WUA member to carryout general repair work.
- Joint walk through survey was conducted with WUAs members to identify the works requiring rehabilitation. Prioritization of works on each minor was conducted looking to the budget estimate.
- Walk through survey of each minor was also conducted to reassess the command boundaries and to mark the outlet, turn out, field channel alignment and to mark boundary of the chak (area irrigated by single outlet).
- The data so collected from field was discussed with each WUA by conducting series of meetings.
- It was also assured to the WUAs that as far as possible the irrigation system will not be disturbed, however they will have to run their outlets rationally and as per revised operation plan prepared to suit the revised situation.
- Accordingly revised capacity statements of each Minor were prepared.
- Wherever necessary suitable water control structures were provided.
- All outlets above cross regulator were provided with gates & some outlet below cross regulator were also kept as gated for early closing of outlets.
- All outlet gates were provided with locking arrangements.

- It was envisaged that entire area would be irrigated within 16-17 days after release of water from the head of minor.
- These revised plans were again discussed with farmers & suitable amendments wherever needed were made.
- All such decisions were taken in weekly meeting held with WUAs on every Wednesday to avoid unnecessary paper work & to ensure total transparency.
- All the fall structures were so designed so that sufficient working head is available at outlets. Crest levels of fall structures were worked out and incorporated in the revised L-section.

5. EXECUTION OF REHABILITATION WORKS

After the chak plans were reviewed and revised, location, size and numbers of outlets reassigned with full involvement of members of concerned WUAs, L-section and hydraulic parameters of all the four minors were re-designed to suit revised operation and water distribution plan amongst outlets, without increasing discharging capacity of their head regulators to influence operation of their parent channels. Details of outlets before & after rehabilitation were as follows:

Table 3: Comparative Statement of authorised, existing and finally proposed outlets.

S.No.	Name of Minor	C.C.A. (ha)	Number of Outlets		
			Before Rehabilitation		As per Rehabilitation Plan
			Authorised	Existing including Cuts	
1.	Alod Minor	251.00	13	45	27
2.	Danta Minor	536.00	11	41	21
3.	LMC Minor No.1	367.00	16	62	34
4.	LMC Minor No.2	464.00	19	60	41
	Total	**1618.00**	**59**	**208**	**123**

The average C.C.A. per existing outlet varies from 9.31 hectares to 25.52 hectares. This variation in C.C.A. per outlet was mainly due to local topography.

Provisions of various works taken in the project reports of all the four minors were also discussed with members of concerned WUAs and after giving due consideration to their own needs, some more works were also agreed to be executed, most of such additional works comprised of:

- Lining of some more reaches, of course after technically re-examining their necessity
- Construction of a few more Village Road Bridges / foot bridges.

- Improvement of service roads by raising their levels above (at least upto) Full Supply Level in Minors and putting a layer of quarry spells.

Due to above additional works and escalation (prevalent market rates), cost of all the rehabilitation works rose to Rs. 62.31 lacs.

Execution of work was conducted by respective WUAs with technical support from irrigation department. Weekly meetings were held in the project area itself to review progress of works and sort out problems if any. This has minimized traditional paper work for obtaining necessary approvals on issues related to Administrative, Technical & Financial matters.

With the completion of all the rehabilitation works, all relevant records of all the four minors including chak plans, canal operation plan and revenue record were handed over to the executive committee members of each minor along with the handing over of management of all the four minors, duly rehabilitated and brought to the designed standard to respective WUAs for their operation, maintenance, assessment & recovery of irrigation charges.

6. PERFORMANCE OF WUAs AFTER HANDING OVER SYSTEM TO THEM

Complete operation & management of irrigation system was handed over to the WUAs from rabi season 1999-2000. It was expected that WUAs will operate canals as per operation plan handed over to them and they shall regulate cross regulators and outlet gates accordingly. It was also presumed that WUAs executive would make the assessment of irrigated (crop wise) and will raise the demand and recover the same from respective farmers, as all revenue record was also handed over to them.

From the data of **Table 4** it can be concluded that about 34% to 41% saving in canal running days in the year 2003-04 was observed as compared to 1997-98. This has been mainly achieved due to management of irrigation system by Farmer's Organizations and rehabilitation of canals.

Table 4: Comparative Statement of water saved.

S. No	Name of Minor	Number of canal running days.						Saving of water in the year 2003-04 as compared to 97-98	
		Year 97-98	Year 98-99	Year 99-2000	Year 2000-01	Year 01-02	Year 03-04	Days	%
1	Alod Minor	89	31*	51	35 **	42	54	35	39.33
2	Danta Minor	89	31*	52	45**	57	52	37	41.57
3	LMC Minor No.1	79	28*	66	39**	54	51	28	35.44
4	LMC Minor No.2	82	28*	74	49**	62	54	28	34.15
	Total/Av.	339	118	243	168	215	221	128	37.76

Note:-

- Running days for pre-sowing irrigation + 2 irrigations
- *Due to shortage of water in Dam, only one pre-sowing irrigation was provided;
- ** Due to less availability of water in dam & for feeding tails during the year 2000-01, number of canal flow days for all the four minors were curtailed.
- During 2002-03 water of the Dam was reserved for drinking purpose. No irrigation was provided.

It was also found by sample cutting of various crops that the yield of Sugarcane, Wheat, Pea (vegetable), Lentil, Gram, Mustard and fodder increased to the tune of 40.19%, 58.14%, 54.02%, 84.73%, 19.23%, 25.00% and 51.77% respectively in the year 2003-04 as compared to 1997-98 after initiation of Participatory Irrigation Management activities. Before implementation of PIM the productivity of the wheat was 2.60 m tones per ha, which has increased to 59.65%, 49.57%, 67.07% and 56.14% on Alod, Danta, LMC Minor #1 and LMC Minor #2 respectively.. The area of high water requirement crop of Sugarcane has reduced to a greater extent and has increased under low water requirement crops like Pea (vegetable) and wheat.

The recoveries of irrigation charges by the WUAs were as high as 93.23% for current dues and 52.23% for old dues of Alod minor. Over all recovery of four minors by WUAs was about 8% higher over recovery of remaining minors of Gudha Project during 2000-01. Similarly in the year 2001-02 the average recovery of all the four minors made by the WUAs was 30.8%. The reason of less recovery was that the farmers were not ready to deposit old dues pending since a long.

The annual expenditure on operation & maintenance was 18% to 49% of the recovery made by water user associations during the year 2001-02. It shows surplus revenue (**Table 5**) with all the WUAs after the introduction of PIM. Reason of less O&M expenditure was that these canals were rehabilitated during the financial year 1998-99 and hence less maintenance was required. The saving with WUAs could be utilized in future.

Table 5: Details of Irrigation Recovery and Expenditure on Maintenance of the Canals by four Water Users' Associations on Gudha Medium Irrigation Project

S. No.	Name of Minor	CCA (ha)	Recovery (%)	In Rs per ha	
				Recovery	Expenditure
1.	Alod Minor	251	65.69	208	38
2.	Danta Minor	536	39.94	100	36
3.	LMC Minor No. 1	367	20.34	80	39
4.	LMC Minor No. 2	464	25.21	94	40
	Total	**1618**			

A social survey was conducted in the year 2000-01, by interviewing personally 115 farmers out of total 575 farmers (**Table 6**) to know the functioning of WUAs and response of beneficiaries. Survey included member as well as non-member farmers (farmers who were receiving water from these canals but were not ready to became member of WUAs by paying small contribution). Total 399 members (65%) and 176 non–members (35%) were interviewed. To maintain the homogeneity, 40 numbers of farmers from head reach, 35 farmers from middle reach and 40 farmers from tail reach were interviewed.

Table 6: Details of Socio Economic Survey of PIM Activities at Gudha Medium Irrigation Project

S.No.	Item	Unit	Name of Minor				Total
			Alod	Danta	LMC Minor No.1	LMC Minor No.2	
1.	**Total number of farmers**		125	150	135	165	575
1(a)	Member of WUAs	No.	82	113	105	99	399
1(b)	Non Member of WUAs	No.	43	37	30	66	176
2.	**Farmers Interviewed**						**Average**
2(a)	Members of the Society	%	56	67	78	59	65
2(b)	Non Members	%	44	33	22	41	35
2 (c)	Head Reach Farmers	Nos	8	7	16	9	40
2(d)	Middle Reach Farmers	Nos	8	7	10	10	35
2(e)	Tail Reach Farmers	Nos	9	10	11	10	40
	Total farmers Interviewed		**25**	**24**	**37**	**29**	**115**

Results of the data collected have been summarized in **Table 7**. From these data it is clear that about 86% farmers were of the opinion that they have been benefited by the implementation of PIM activities in their irrigation system. Similarly, 82% farmers said that they were informed in advance about the operation schedule of the canal, which was generally not present in the previous management system. About 79% farmers were of the opinion that management of irrigation system by WUAs was better as compared to the government-managed system, whereas 19% farmers didn't found any difference in the management of the irrigation system. One of the important finding was that 98% farmers said that they did not had any conflict about water distribution and all the farmers received the water in their fields on time. Similarly, 98% farmers replied that they were aware about the functioning of WUAs in their area.

Table 7: Results of the Socio Economic Survey of PIM Activities at Gudha Medium Irrigation Project

S.No.	Item	Unit	Name of Minor				Total
			Alod	Danta	LMC Minor No.1	LMC Minor No.2	
	Farmers Response to Four Major Questions						
1.	**Weather benefited by PIM activities?**						
1(a)	Yes	%	100	92	68	83	85.75
1(b)	No	%	0	8	32	17	14.25
2	**Were they informed about the operation schedule of canal in advance?**						
2(a)	Yes	%	80	79	86	83	82
2(b)	No	%	20	21	14	17	18
3.	**Was management of system better as compared to Govt. management system?**						
3(a)	Better	%	68	79	87	83	79.25
3(b)	No difference	%	32	21	5	17	18.75
3(c)	Previously it was better	%	0	0	8	0	2.00
4.	**Were there any conflicts about water distribution?**						
4(a)	No	%	100	96	100	97	98.25
4(b)	Yes	%	0	4	0	3	1.75
5	**Do you know whether WUA is working in your command?**						
5(a)	Yes	%	100	100	92	100	98.00
5(b)	No	%	0	0	8	0	2.00

7. CONCLUSIONS

Operation and Management of irrigation system by farmers' organizations at four minors of Gudha Medium Irrigation Project has given encouraging results. Social survey of 115 farmers out of total 575 farmers showed that they have been benefited by the functioning of WUAs (about 86% farmers), they were informed in advance about the operation schedule of the canal, management of the system was found to be better (75% farmers) as compared to the previous way of management, conflicts among

farmers about water distribution has been almost nil (98% farmers) and 98% farmers were knowing the functioning of WUAs in their area.

It was also found from the data collected that WUAs were able to save canal running days by 37.76% (34 to 41%) in the year 2003-04 as compared to 1997-98. No dispute in water distribution among the cultivators was observed after Participatory Irrigation management activities. The yield of Sugarcane, Wheat, Pea (vegetable), Lentil, Gram, Mustard and fodder has increased to the tune of 19.23% to 84.73% . Over all recovery of four minors by WUAs was bout 8% higher over recovery of remaining minors during 2000-01. Similarly in the year 2001-02 the average recovery of all the four minors made by the WUAs was 30.8%. The annual expenditure on operation & maintenance was 18% to 49% of the recovery made by water user associations during the year 2001-02. It shows surplus revenue with all the WUAs after the introduction of PIM.

8. REFERENCES

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