



CASE STUDY FROM

INDIA

SURVEY ON IRRIGATION MODERNIZATION

Samrat Ashoka Sagar Irrigation Project

Prepared by Ganesh Pangare, Rajat Hooja and Nitin Kaushal

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CONTENTS

1 BRIEF DESCRIPTION OF THE MODERNIZED IRRIGATION SYSTEM.....	3
1.1 Modernization Process	4
1.2 Step of the modernization process: Who, what, how?	5
1.2.1 Step of the modernization process: Who, what, how?	6
1.2.2 Implementation of the modernization process	6
1.2.3 Delineation of the area of operation.....	7
1.2.4 Election of WUA.....	8
1.2.5 Co-Ordination with Water Resources Department	8
1.2.6 Resolving disputes	9
1.2.7 Actual modernization that took place.....	9
1.2.8 Training Programmes conducted by Irrigation Department.....	9
1.2.9 Financing of the process:	10
2 PART C. IMPACT OF MODERNIZATION: DESCRIBE CHANGES, IF ANY, IN THE FOLLOWING ASPECTS OF THE SYSTEM AS A RESULT OF THE MODERNIZATION ACTIVITY	11
2.1 System Technology	11
2.2 Governance.....	11
2.2.1 Functions of WUA	11
2.2.2 Functions of the Distributory Committee (DC)	12
2.2.3 Functions of Project Committee (PC)	12
2.2.4 Water Rights, Water Allocation	12
2.2.5 Water Service Provider	12
2.2.6 Rights and Responsibilities of the Farmers Organization	13
2.2.7 Water Distribution Method	13
2.2.8 Water Service Fee Structure.....	13
2.3 System performance:.....	14
2.3.1 Agricultural and water productivity	14
2.3.2 Equity of water distribution.....	15
2.3.3 Farmers' satisfaction	15
2.3.4 Administrative, Economic and Financial indicators & impact on environment,, etc.	15
2.3.5 Have other systems in the country followed the same process?	15
3 PART D. CONCLUSIONS, SUGGESTIONS AND RECOMMENDATIONS.....	15
3.1 Appreciation of the modernization that took place	15
3.1.1 Have any MAJOR gaps occurred in the modernization process that took place?.....	16
4 REFERENCES	17
5 ANNEXURE	18

Case Study of Samrat Ashoka Sagar Project on Halali River, Madhya Pradesh, India

By Ganesh Pangare, Rajat Hooja and Nitin Kaushal

1 BRIEF DESCRIPTION OF THE MODERNIZED IRRIGATION SYSTEM

Location: The Samrat Ashok Sagar Project is a major irrigation project located in Vidisha district of Madhya Pradesh (India). Its command area falls in parts of Vidisha and Raisen districts. The dam itself (location Longitude 77°33" E and Latitude 23°30' N) has been constructed on the Halali River, which is a tributary of Betwa River about 40 km. from Bhopal (capital of Madhya Pradesh).

Date Built: The Water Resources Department of the Government of Madhya Pradesh commenced the project in 1973-74. The main dam was completed in 1977, while the main canal was completed in 1978.

Command Area: The gross command area of the project is 37419 ha and the culturable command area is 27 924 ha.

Irrigated Area: The Annual irrigated area is as follows:

- | | |
|---------------------------------------|------------|
| a. Rabi (1st November to 31st March) | 25 091 ha. |
| b. Kharif (15th July to 15th October) | 12 545 ha |

Rabi is the main dry season and irrigation is essential for crop production. Kharif is the main wet season and irrigation is complementary in nature.

Date Modernized: The modernization (as defined by the FAO in 1997) as a process of technical and managerial upgrading of irrigation schemes combined with institutional reforms, if required, with the objective to improve resource utilization (labor, water, economic, environmental) and water delivery to farms of the Samarat Ashok Sagar Project was started in 2000 and is still on going.

Water Sources: Samrat Ashok Sagar Project is a major irrigation project constructed along the Halali River, which is a tributary of the Betwa River

Energy Source: The project is based on catchment and gravity flow. However individual farmers use diesel and/or electric pump sets to lift water out of the canals.

System Type: Major Earthen Dam.

The catchment area of the tank at dam site is 699 km².

The gross storage capacity of the tank is 54 274 Hm³ live storage capacity is 22 695 Hm³ and dead storage is 2 590 Hm³. Total average annual yield for 1110 mm average rainfall is equivalent to 23 370 Hm³; at 75% dependability.

Q Design:

Length of Canal/discharge

- | | | |
|-------------------------|---|-----------------------------------|
| a. Main Canal | : | 3.24 km./22.74 m ³ /s |
| b. Left Bank Canal | : | 17.16 km./13.73 m ³ /s |
| c. Right Bank Canal | : | 23.43 km./5.24 m ³ /s |
| d. Sahodra Branch Canal | : | 12.33 km./8.63 m ³ /s |

e. Length of Distributaries & minors:

(i) Minors & sub minors of Left Bank Canal: 309.79 km.

(ii) Minors & sub minors of Right Bank canal: 109.48 km.

f. Water available at full supply level (FSL) of Dam: 25,285 Ha-m

Operation and Maintenance: From 1976 till July 2000 the responsibility of operation and maintenance rested wholly with the Water Resources Department of the Government of Madhya Pradesh. However from July 2000 the responsibility of operation and maintenance has been transferred to the newly formed Water User Associations (this will be described in detail in sections B and C)

Main crops:

Kharif: Soyabean is being grown in about 13 000 ha.

Rabi: Wheat, Gram and some pulses are being grown in about 29 750 ha.

Main soils: The soil of this command area is mainly covered by the soil of black cotton group – blackish or brown in color, clayey in texture. The depth of soil is more than 3 meters. The fertility according to agricultural needs of the area is good.

Land Tenure Structure: The average size of an operational holding in command area is 2 hectares.

Water Rights: As of July 2000, water rights (below the head) were transferred to the Water User Associations. Earlier, they were with the Water Resources Department of the Government of Madhya Pradesh. The water rights are collectively assigned as per provision of the Madhya Pradesh Participatory Irrigation Management Act.

Others (Map): Given at end of report.

1.1 Modernization Process

Cause that led to system modernization

Madhya Pradesh is the third largest state of India. It has a total potential irrigable area of 6.72 million hectare, but until 1998 only 1.97 million ha, or about 30%, has been realized. Of this potential, only 0.98 million hectares is being utilized, which is roughly 50%. The main reason for this underutilization is mismanagement of water-courses and a lack of feeling of ownership among water users. Another reason is that earlier systems were not designed for providing Kharif irrigation; irrigation was used only in case of insufficient and untimely rains (for complementary irrigation). So a large part of the potential developed is left without irrigation.

Thus, under the prevailing circumstances the State Government felt the need to bridge the gap between the potential and the utilized irrigated area. From past experience and by looking at statistical data for the past 5-6 years, the following problems were identified as major issues:

- Supply of water was inequitable (a) between the farmers at “ head” and “ tail” end; and (b) in canal water distribution between small and big farmers
- Supply of water was unreliable due to poor management.
- Maintenance of the system was irregular. Due to shortage of funds, maintenance was not carried out systematically and on time. Only work that was absolutely necessary was undertaken. Therefore the system was poor and untimely maintained.

- Water charges levied on the water users were low and thereby not able to meet the O&M requirements.
- Most of the allocations for repair and maintenance were consumed in overhead charges, leaving very little for even minor repair works.
- So called “Black Cotton” soil predominates in the command area. Therefore, all the distribution system such as canals, water-courses and structures are in black cotton soil area, and thus the maintenance cost is higher than average. Due to soil properties the canal and its structure are not stable under high water velocity; also soiling and shrinkage occurs. The result is high deposition of silt in the bed of the canal which reduces the carrying capacity and finally affects the area of irrigation.

Therefore, as a first step towards reforms in the important irrigation sector, the Government of Madhya Pradesh revised the water charges in June 1999. The new charges were about three times higher than the old ones.

Thus, in order to achieve efficient operation and maintenance of the canal system and its systematic development it was realized that farmer’s participation in Irrigation Management was a high priority. To ensure this farmers participation, and to develop a sense of ownership and emotional attachment towards the canal system, a reform to vest the beneficiary water users with responsibility and authority for O&M of the canal system was conceived. The Government of Madhya Pradesh decided to hand over the management of state irrigation canal network to its beneficiaries and thus introduced a Bill which has been passed by the state legislature in July 1999, and known as the “Madhya Pradesh Participatory Irrigation Management Act” (*Madhya Pradesh Sinchai Prabandhan Me Krishkon Ki Bhagidari Adhinyam*). It took effect from September 1999.

1.2 Step of the modernization process: Who, what, how?

Since its construction the Operation and Maintenance of the Samarat Ashok Sagar Project has been done by the Water Resources Department of the Government of Madhya Pradesh. Historically the Government had the responsibility for management and maintenance of the canal system. The participation of the farmers was negligible. As a result, the commitment and cooperation of the farmers in canal maintenance gradually disappeared.

However with the passage of the Madhya Pradesh Participatory Irrigation Management Act in 1999 [PIM Act], the Operation and Maintenance of the Samart Ashok Sagar Project was passed on to the farmers associations.

The Act makes the provision of some financial assistance to each farmer association, to enable them to do physical upgrading as well as normal maintenance of the canals and distributaries. (This is described in more detail in later sections)

Main Features of the Madhya Pradesh Participatory Irrigation Management Act

- Transfer of responsibility of management state assets to farmer organizations.
- Creation of new autonomous institutions as legal entities.
- Areas defined on a hydraulic basis.
- Equity achieved within the structure of a WUA by introducing the concept of “territorial constituencies”.
- All landholders in command area are member of the WUA and have voting rights.
- One member one vote.
- Elections by secret ballot.
- Functional and administrative autonomy.
- Freedom to raise resources.
- Resolution of disputes and compounding of offenses.
- Simplified procedures for undertaking repair works.
- Five-year tenure.
- Right to recall an elected member after one year.
- Annual social audit on accounts.

1.2.1 Organization/Institutions involved, including users participation

The Participatory Irrigation Management Act of Madhya Pradesh brought about a total change in the management of irrigation systems through Farmers Organization (FO). The Act envisaged the creation of a three-tier system:

- a) Water Users Associations (WUA) at the base (on-farm) level,
- b) Distributory Committee (DCs) at the distributory level, and
- c) Project Committee (PCs) at the Project (main) level.

All minor irrigation schemes in the state have only one tier of FOs (WUA), the medium size irrigation schemes have a two-tier structure (WUA and PC) and the major irrigation projects have a three-tier structure (WUA, DC and PC).

The Samarat Ashok Sagar Project is a major irrigation project and thus it has all the three tiers of farmer organizations.

1.2.2 Implementation of the modernization process

The implementation of the modernization process at the Samarat Ashok Sagar Project was undertaken in line with the way it was defined in the Madhya Pradesh PIM Act. In this respect

Madhya Pradesh has adopted a simultaneous approach – thus both physical rehabilitation and institutional reform are being carried at the same time.

The command area of the Samarat Ashok Sagar Project has been divided into

- 1 Project Committee (PC) for the entire area.
- 3 Distributory Committees (DC) at the Distributory level
- 16 WUA at the base (on-farm) level

The new institutional set up derived from the transfer process can be seen in the table at all three levels: PC, DC and WUA indicating the command area and the corresponding district (administrative unit).

Organization of the New Institutional Setup at Samarat Ashok Sagar Project				
S. No	Type of Farmer organization	Location	Command Area (Hectares)	District
	Project Committee	Entire Project	24737	Videsha & Raisen
1	Distributory Committee	On Left Bank Canal	8749	Videsha
1 (a)	Khamkhera – WUA	On Left Bank Canal	2406	Videsha
1 (b)	Kararia – WUA	On Left Bank Canal	1848	Videsha
1 (c)	Lashkarpur – WUA	On Left Bank Canal	1160	Videsha
1 (d)	Chirkhera – WUA	On Left Bank Canal	1381	Videsha
1 (e)	Jivajipur – WUA	On Left Bank Canal	1954	Videsha
2	Distributory Committee	On Sahodra Branch Canal	10074	Videsha
2 (a)	Villori – WUA	On Sahodra Branch Canal	1827	Videsha
2 (b)	Bamuria – WUA	On Sahodra Branch Canal	1782	Videsha
2 (c)	Sakalkhera - WUA	On Sahodra Branch Canal	1653	Videsha
2 (d)	Duparia – WUA	On Sahodra Branch Canal	2431	Videsha
2 (e)	Gharla – WUA	On Sahodra Branch Canal	2376	Videsha
3	Distributory Committee	On Right Bank Canal	5914	Videsha
3 (a)	Sayar – WUA	On Right Bank Canal	1128	Videsha
3 (b)	Neemkhera – WUA	On Right Bank Canal	399	Videsha
3 (c)	Sunpura – WUA	On Right Bank Canal	724	Videsha
3 (d)	Sarchampa – WUA	On Right Bank Canal	702	Raisen
3 (e)	Uchher – WUA	On Right Bank Canal	1878	Raisen
3 (f)	Merki – WUA	On Right Bank Canal	1083	Raisen

The following activities took place within the WUA establishing process in the Samrat Ashok Sagar Project.

1.2.3 Delineation of the area of operation

The area of operation of every WUA has been identified and notified. The areas have been delineated on hydraulic basis. As the Samrat Ashok Sagar Project is a major irrigation project a group of minors and direct pipe outlets constitute WUAs areas. The Water Resources Department held extensive consultations with the farmers in identifying the areas of each WUA and care was taken to see that it is a viable [production-wise] area.

This work of delineation and its notification was completed in November 1999. Then the voter's list was notified and the complete election process (including the Notification of WUA area voter list and Managing Committee of WUA) was conducted by the respective District Collectors of their respective districts under the direction of the State Government; as per the provisions of the MP PIM Act. Afterwards, the Distributory Committee was constituted at the distributory level in March 2001, as per provisions of the MP PIM Act.

1.2.4 Election of WUA

All water users in the area of each WUA is a member of that WUA. The Act provides with voting rights, to those members who have been registered as owners or tenants in the records. In cases where the landowners have leased out the land to a tenant, the rights reside with the tenant.

The WUA has a managing committee, which attends to the day-to-day functioning. This body has a president and executive committee, who are elected directly by all landholders through secret ballot.

The operational area of every WUA is divided into territorial constituencies with equitable representation of voting members in that area. The president of the WUA or any member of the Executive Committee can be recalled by the members after a period of one year by giving written notice; signed by not less than one third of the members. Likewise, every farmer organization is elected for a five years tenure. While direct elections take place for the WUA, election to both the Distributory Committee and the Project Committee are indirect. Only the Presidents of the 16 WUA participate in these.

1.2.5 Co-Ordination with Water Resources Department

In order to have a closer interaction between the Farmer Organizations and the Water Resources Department, the Madhya Pradesh government has decided to include officials from the Water Resources Department in the farmer's organizations. The officials of the Water Resources Department support the WUA in the following ways.

- Provide Technical Assistance
- Ensure safety (structural) of system
- Help the farmer organization in preparation of estimates for operation and maintenance
- Help in prioritizing works

Relationship of Water Resources Department personal and Farmer Organizations	
<i>Farmer Organization-</i>	<i>Competent Authority-</i>
WUA	Sub Engineer of Water Resources Department
Distributory Committee	Assistant Engineer of Water Resources Department
Project Committee	Executive Engineer

In addition to this, a Nodal Officer of Executive Engineer rank has also been appointed by the Water Resources Department of the MP Government for each district. His main duties and responsibilities include organizing a monthly meeting of WUA functioning within his district and resolving other issues as they emerge. An official from the Revenue Department for assisting in maintaining revenue records and a Rural Agricultural Development Officer for Agricultural

Extension related-works have been appointed to assist each WUA. In summary, each WUA has been assigned 3 persons for assistance and guidance: a sub-engineer, an administrative person and an agriculture officer.

1.2.6 Resolving disputes

The disputes between the farmers within the association are taken care of by the WUA itself. The Executive Committee of the Distributory Committee determines disputes arising between two or more members of the Executive Committee of an WUA or between two or more WUA. The Executive Committee of the Project Committee handles disputes or differences arising between two or more Distributory Committees.

1.2.7 Actual modernization that took place

The elections of the President and members of the Executive Committees of the WUA were held in April 2000 and the transfer of the responsibility of management of the Irrigation System to the respective WUA occurred in June 2000. The election of the President and members of Distributory Committees were conducted in February 2001. The project committee for the entire Samrat Ashok Sagar Project is in the process of being formed.

However as described earlier, the two facets of modernization – physical rehabilitation and institutional change-- were carried out simultaneously at the Samrat Ashok Sagar Project. Thus the government of Madhya Pradesh enacted a fresh PIM Act and created farmer associations, which had a legal status and transferred the management of the irrigation assets to these bodies. However, at the same time the government provided these farmer organizations with financial support to help them carry out the rehabilitation and normal operation and maintenance of the canal system.

The amount released to these WUA is by no means a very large amount; despite this many WUA in the Samrat Ashok Sagar Project have been able to undertake significant rehabilitation work in their respective areas. They have been able to do this by convincing the beneficiary farmers to “donate” their labor and in many cases they have also raised resources on their own. One such case is documented in the box.

Some of the WUA's have shown considerable enthusiasm and have gladly taken up the responsibilities of canal operation and maintenance granted to them – for example the WUA in Villori approached the local MP and was able to get funding from the MP development fund for conducting certain repairs and de-silting of the Sahodra Branch Canal

1.2.8 Training Programmes conducted by Irrigation Department

The Government of Madhya Pradesh fully understood that capacity building is the key to successful institutional change. With this in mind the government decided to begin the first phase of training before the hand over of O&M responsibilities to the farmer organizations. Thus the training of the Assistant Engineers of the Water Resources Department (who later on became the Competent Authority of the Distributory Committees) was started in March 2000, held at WALMI (water and Land Management Institutes) in Bhopal.

After the election of the WUA's Presidents and the members of the Executive Committees the first phase of a capacity building program for them as well as for field level officers (Sub Engineer) was started in May 2000.

The 2nd phase of this training program paid special attention to the implementation component of the PIM program. Accordingly, the training of master trainers was started in October 2000 and further training of field functionaries has been on-going since April 2002.

This training is being conducted at the Academy of Administration Govt. of MP, Bhopal. So far the department has done 78 training programmes, nearly 22 programmes remain and they should be finalized within a few weeks. So far they have covered 38 out of the total 45 districts.

At these training courses WUA Presidents and the Government Competent Authority attached to them (i.e Sub Engineers) are trained together. This exercise helps in increasing their coordination at the field level. Each training program is of three days duration and basically covers the following points:

- Powers, duties and responsibilities of WUA.
- General Accounting procedures for the WUA.
- Tips for better coordination between WUA and Competent Authority.
- Information about already transferred and future schemes for the overall betterment of the WUA.
- Information about various relevant provisions of the Act and its Amendments
- Coordination with other departments like Agriculture, Rural Development, Forest.
- Information about various sub-committees that can be constituted under the provisions of the Act. For instance:
 1. Sub Committee for resolving canal related disputes. (*Nahar vivad nirakaran samiti*).
 2. Sub Committee for resolving canal related illegal activities. (*Nahar apradh nirakaran samiti*).
 3. Sub Committee for resolving economic problems. (*Aarthik samadhan Samiti*.)
 4. Sub Committee on Social audit and annual accounting. (*Samajik sampariksha and varshik lekha samiti*.)

1.2.9 Financing of the process:

The financing of the modernization process is being done entirely by the Water Resources Department of Madhya Pradesh government, with some support from the Central Government.

Estimate cost of the process: Total, per unit area

Daily wages for one staff for every 200 ha was provided in order to carry on minor maintenance and assist with manual canal regulation. In addition to this, a one time sum of US \$106.38 (about Rs. 5000) was released to each WUA so as to meet out their administrative requirements like travel and per diem of the WUA President, stationary etc.

Also a one time grant at the rate of 10.6 \$/Ha, or about 500 Rs/ha, (with 4.78 \$/ha to be contributed by each the Central Government and the State Government, and matched with 1.06 \$/ha by the WUA) is being provided to the WUA. This was a one time grant and it was to be a capital fund, which means the respective WUA have to use the interest accrued by that amount to undertake maintenance-related work.

In addition, the Water Resources Department paid some labourers to the WUA for assisting in the regular maintenance of the distribution system. For instance, under the Samrat Ashok Sagar Project, which is having 16 WUAs, the WRD provided 72 to 75 labourers of the State Govt.

Finally, it has also been decided that a share of past irrigation revenue recovered with the help of the WUA will be placed at the disposal of the WUA to further help meet their O&M requirements.

Was system performance evaluation done PRIOR to modernization? Elaborate

Here it needs to be noted that the modernization of the Samrat Ashok Sagar was not an isolated case. The government of Madhya Pradesh decided to introduce Participatory Irrigation Management across the entire state and across all types of irrigation projects. Thus while no specific system performance evaluation on the Samrat Ashok Sagar project was done, the project was part of a general study of all the irrigation project in the state undertaken before the enactment of MP PIM Act.

2 PART C. IMPACT OF MODERNIZATION: DESCRIBE CHANGES, IF ANY, IN THE FOLLOWING ASPECTS OF THE SYSTEM AS A RESULT OF THE MODERNIZATION ACTIVITY

2.1 System Technology

The technology remained the same. There were no technological changes in the infrastructure. The main task under the modernization process was the managerial upgrading involving the water users assisted by the Water Resources Department.

2.2 Governance

The modernization of the Samrat Ashok Sagar Project has resulted in a complete overhaul of its governance. According to the new Madhya Pradesh Participatory Irrigation Management Act (MP PIM) farmer organization have been granted the responsibility of Operation and Maintenance of the system. The elected representatives are deciding the priorities of repairs and up-keep of the system. The WUA are now responsible for deciding the extent of the command area to be irrigated along with the delivery schedule. Before the hand over almost all these things were being done by the Water Resources Department of the Government of Madhya Pradesh.

2.2.1 Functions of WUA

Under the hand over, the WUA is responsible, among others, of:

- To prepare and implement a Warabandi schedule for each irrigation season,
- To prepare a plan and carry out the maintenance of the irrigation system (including both the distributory system, minors and field drains) in the area of its influence. This is to be done at the end of each crop season with the association's funds,
- To regulate the use of water among the various pipe-outlets; according to the designed Warabandi schedule,
- To monitor water availability for irrigation.
- To raise financial resources for system upkeep,
- To promote water use efficiency,
- To conduct regular water budgeting and periodical social audits.

2.2.2 Functions of the Distributory Committee (DC)

Under the hand over, the DC is responsible, among others, of:

- To prepare at the beginning of each irrigation season an operation plan (based on its assigned area, soil type and cropping pattern), consistent with the overall operational plan prepared by the Project Committee,
- To prepare a plan for the maintenance of both distributaries and corresponding drains; at the end of each cropping seasons,
- Execute maintenance works, with committee-assigned funds, as required,
- To regulate the use of water among the various water users associations; under its area of influence,
- To monitor water availability for irrigation,
- To promote economy in the use of water allocated,
- To conduct regular water budgeting and periodical social audits.

2.2.3 Functions of Project Committee (PC)

Under the hand over, the PC [still under their implementation process] is responsible, among others, of:

- To approve, at the beginning of each irrigation season, an operational plan (based on its assigned area, soil type and cropping pattern) prepared by the competent authority for the entire project area,
- To approve a plan for the maintenance of irrigation system, including the major drains, at the end of each cropping season,
- Execute the maintenance works, with committee-assigned funds, as required,
- To promote economy in the use of water allocated.
- To conduct regular water budgeting and periodical social audit.

2.2.4 Water Rights, Water Allocation

Before modernization both the water rights and the responsibility of preparing a water allocation (Warabandi) schedule rested with the Water Resources Department. Now, both have been transferred to the WUA's. However, the Sub Engineer of the Water Resources Department assists the WUA in preparing the water allocation (Warabandi) schedule.

2.2.5 Water Service Provider

The Water Resources Department of the Madhya Pradesh government is still the water service provider in the Samrat Ashok Sagar Project. It is responsible for the operation and maintenance of the main dam. Also the water charges are also still being collected in the name of the Water Resources Department with the help of the WUA.

2.2.6 Rights and Responsibilities of the Farmers Organization

Right	Responsibilities
<ul style="list-style-type: none"> • Collect irrigation water fees towards better O&M of system, they can also mobilize additional resources. • Right to resolve conflict in its command. • Right to impose penalties for offences. 	<ul style="list-style-type: none"> • Operation & maintenance of the system. • Collect water charges on behalf of the Irrigation Department. • Decide the delivery schedule of water with assistance of WRD.

2.2.7 Water Distribution Method

Before 1999 the Sub Engineer of the Water Resources Department prepared a seasonal *Warabandi* program in consultation with the beneficiaries concerned. However, the distribution of water beyond (below) the outlet ordinarily rested with the beneficiaries who were to apportion the flow amongst themselves, on rotating basis as per the schedule.

After 1999, the distribution of the water in the distributaries has also become a responsibility of the WUA. However, the Water Resources Department still has control over the overall Project, or main system level. Thus, the Water Resources Department decides when the main canal is to be opened and when it is to be closed. So, the macro level is still controlled by the Water Resources Department while the micro management (below main canal) is in the hands of the WUA.

2.2.8 Water Service Fee Structure

The water service fee structure is still controlled by the Water Resources Department. It sets the fees, which the WUA's collect on behalf of Department. The Table below provides information on water service fees before [pre-revised] and after transfer [as per revised dates].

It is clear from the Table, that water charges have at least double (and in one case increased 9 times) between the pre-revised data and the revised on 15/06/99. A further increase, although in considerable less proportion, has occurred on 01/11/02. By looking at the last column and at today's exchange rate (approx. 1 US \$ = Rs 50) the fees vary from as low as US \$ 2.0 for wheat and gram to US\$ 16 for banana, rubber and sugarcane, the permanent and/or industrial crops.

It is interesting to note that the fees change according to the crop and the season, which supposes quite a bit of work in terms of monitoring and subsequent fee collection. There is in addition the possibility of requesting an extra irrigation, at a cost; and water for land preparation is also charged separately. Thus, the table depicts a relatively complex method of determining the service fee.

The fees revision are directly related to the MP PIM Act, that is came as a consequence of the transfer of sustem management to the farmers organizations and WUA.

Water Service Fees and revisions

Type of Crops	Water-rate in Rupees per Hectare-season		
	Pre-revised	Revised 15/06/99	Revised 01/11/02
Paddy Kharif	60	127.5	215
Rabi	55	500	525
Wheat Gram			
Palewa	62.5	202.5 (Palewa+3 watering)	105
Every Extra Watering	37.5	62.5	65
Banana, Rubber, Sugarcane	300	750	800
Cotton ordinary	60	175	185
HybrWRD	93.75	375	400
Crops of Green Grass, Groundnut (Kharif), Jwar, Maize, Kidney-bean (Kharif), Soyabean (Kharif), Sesamum, Tuar (Kharif), Urad	45	125	130
Coriander, Groundnut (Rabi), Kidney-bean(Rabi), Mustard Kusum (Set Flower), Sunflower, Soyabean (Rabi), Tuar (Rabi),	60	250	265
Perennial Crop Zo, Brinjal, Carrot, Cauliflower, Chilly, Cucumber, Marrow, Fenugreek, Ginger, Garlic, Gwar-fali, Lady-finger, Shahtut, Pit, Khaskhas, Pumpkin, Potato, Radish, Spinach, Tobacco, Tomato, Turmeric, Green Vegetables	300	500	525
Berseam Grass (Fader Cap)	125	375	400
Water for preparing the land (Palewa)	30	100	105

2.3 System performance:

2.3.1 Agricultural and water productivity,

Before analyzing the agricultural and water productivity in the Samrat Ashok Sagar Project, it needs to be noted that the past three years (i.e. from 2000 onwards) have been drought years. Thus the amount of water available in the dam itself has decreased and consequently the duration for which the canal has been open has also been reduced. This can be seen in the box. In 2002 the canal was closed nearly 2 months before the normal closure time.

Canal Running Periods		
	Canal Opening Dates	Canal Closing Dates
Average Dates	25 th October–5 th November	10 th January- 20 th January
2001	25 th October	15 th January
2002	28 th October	15 th November

Due to the drought, the general soil conditions have been affected. As a result, the area under high yielding crop varieties has decreased. Thus, crop yields could be expected to drop. However in discussions they have been confident that yields have remained, at least, at pre-drought levels.

2.3.2 Equity of water distribution

Also, significant improvement in the distribution of water has occurred. Farmers reported that in 2002, for the first time in 20 years, those at the tail-end of the system managed to get water since November instead of the normal early December. In fact, every farmer appears to have received at least one round of water or rotation, even though the canal was closed 2 months earlier. This appears to be the consequence that at many places farmers --organized through their respective WUA-- have contributed their labor free of charge and cleaned up the canals.

2.3.3 Farmers' satisfaction

Additionally, it has been reported that the WUA have been reasonably successful in resolving the disputes between their members. Thus the farmers have realized that they don't have to approach government officials for every small problem. Thus, it seems clear that farmers' satisfaction with the system has considerably improved. In general, farmers' conditions seem to have improved

2.3.4 Administrative, Economic and Financial indicators & impact on environment, etc.

There is no readily information on administrative, economic or financial indicators derived specifically from the transfer process. Likewise, the impact on the environment as a result of the hand over shows no apparent negative effect. None has been reported.

2.3.5 Have other systems in the country followed the same process?

As described in earlier sections, the modernization of the Samrat Ashok Sagar Project is part of a statewide program. Thus according to guidelines laid out in the Madhya Pradesh Participatory Irrigation Act, 1999, similar modernization programs have been implemented across the 16 major irrigation projects in the state.

3 PART D. CONCLUSIONS, SUGGESTIONS AND RECOMMENDATIONS

3.1 Appreciation of the modernization that took place

It needs to be noted that in India most of the post-independence activities in the irrigation sector have been construction-driven. The focus was on creating more and more irrigation potential and less attention was paid to the management and maintenance of the systems. As a result of this, a huge gap has developed between created and utilized irrigation potential. In addition, the water charges levied on the water users were low and thereby not able to meet out O&M requirements.

Under the country's --and particularly the MP State-- present financial scenario, it is not possible to take up the construction of new irrigation project. There is a shortage of financial resources for completing even on-going construction projects. Thus, the States were confronted

with a situation in which it has become essential to improve the utilization of the irrigation potential already created. It was therefore necessary to optimize production per unit of water. The hand over program, as modernization, was a response of such necessity.

As mentioned earlier, the modernization of the Samrat Ashok Sagar Project was part of statewide program in Madhya Pradesh. In this respect the government of Madhya adopted a slightly different approach – it created farmer organizations and made them responsible for the operation and maintenance of the branch canals, distributaries and minors and at the same time it made funds (through one time and annual grants) available to the farmer organizations. The WRD kept control of the main level; thus the handover can be seen as a co-management IMT.

The physical upgrade work that has been done so far was initiated by the farmer organizations, with the lower level functionaries of the Water Resources Department providing technical support.

The farmer organizations have gladly accepted this new responsibility of and have not allowed the lack of funds to prevent them from undertaking up proper maintenance works, within their financial capacity. They have raised their own resources where ever necessary and have contributed their labor free of charge to help line the canal banks, clean the canals etc. Some of these accomplishments can be seen in the box.

Innovations by WUA

- The WUA in Villori made a presentation to the local member of Parliament and was able to get fund released from the Member of Parliament Development Fund.
- The Sahodra Branch Canal has been lined in key and critical places.
- Better management led to the creation of a more efficient water distribution schedule and thus even farmers in the tail reaches managed to get water earlier than usual.

3.1.1 Have any MAJOR gaps occurred in the modernization process that took place?

There are basically two issues reported by farmers during field visits.

- Coordination between department officials and farmer organization – The government of Madhya Pradesh, has made a concerted effort to ensure proper coordination between officials of the Water Resources Department and the Farmer Organizations. As described earlier, a number of training courses, field exercises and seminars have been conducted. In these training courses, both member of the executive committee of the WUA and officials of the Water Resources Department have been educated about the purpose and method of the new system of participatory irrigation management. Still, it is felt that more efforts are needed in this direction and a degree of mistrust still exist between the two parties. However, at the same time it can be pointed out that 2003 corresponds only to the 4th year since the WUA came into existence and thus the progress so far is quite commendable.
- Need for minimum rehabilitation works – Despite the innovativeness and eagerness with which the farmer organization have accepted their new responsibility of managing the irrigation systems at the Samrat Ashok Sagar Project, the fact remains that funds available for the WUA are quite small. There are sections of the canal network, which are in need of major repairs, and these repairs are quite beyond the financial capacity of the farmer organizations. Thus there is need for minimum rehabilitation works on then part of the state government.

Can the process be replicated elsewhere?

As mentioned earlier, similar modernizations programs have been launched all across Madhya Pradesh including all types of irrigation systems (major, medium and minor). These efforts are following the same (or very similar) pattern as described in this report.

What lessons can be learned from the modernization process that took place?

The modernization of the Samrat Ashok Sagar Project (and for that matter all irrigation projects in Madhya Pradesh) does not follow the usual pattern found elsewhere in India. In most other states of India (Andhra Pradesh is a prime example) modernization of major irrigation systems has seldom been carried out without massive capital expenditure, in fact in most cases such programs have usually been implemented with the help of international donors.

However, in case of the Samrat Ashok Sagar Project the entire process has been financed by the State government itself (with some support from the central government). Thus, the experiment in Madhya Pradesh has shown that it is possible to improve the efficiency of irrigation systems without spending millions of rupees; and from the information emanating in relation to the Samrat Ashok Sagar Project the results are quite encouraging.

This has been achieved by careful and purposeful investment in the institutional (capacity building) side of the modernization process. Also the physical rehabilitation work done till date has been done by the farmer organizations and thus it has been more in line with the priorities of the farmers rather than the priorities of the engineers of the Water Resources Department.

Is there enough information in order to undertake a more IN-DEPTH study on the modernization process?

Yes, there is enough information available to undertake a more in depth study. However, we are of the opinion that such a study would be of more value if it also included a comparison with a similar type/sized irrigation system in the State of Andhra Pradesh. It might be better to wait one more season, so as to give the new methods applied in the modernization process some more time to mature.

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5 ANNEXURE

Feedback from Farmers of the Halali Command WUA

- Farmers were of the opinion that a sense of ownership for the canal has started developing among them.
- Occasionally, they have conflicts regarding water sharing and on some other issues, but the WUA presidents have handled the disputes successfully most of the time.
- Other works like de-silting of canals are also being taken up by the WUA.
- A visit was made to one of the tail-end WUA i.e. Duparia WUA, whose president Sanjay Yadav is quite active in his area. Despite his young age his voice is heard in village matters, especially regarding revenue collection and water sharing. During the discussion farmers felt that, despite scanty rainfall during the last 3 to 4 years, there has not been much decline in agricultural productivity. Farmers also felt that if the rainfall pattern remained normal then they could obtain better yields as a result of the better management.
- The President of the Duparia WUA manifested that a positive change from the last few years is that there has been a significant improvement in revenue collection. He further intimated that his family was also among the defaulters till last few years, but now since he has become the President everyone is regularly paying fees, increasing revenue.
- It was a general feeling among all the 16 WUA falling under the Halali Dam Command, that the work undertaken during the National Water Management Programme (NWMP) in 1995-96 was not sufficient. Effective lining is still required for key canals' spots, damage caused to banks of canals also needs to be repaired. Upon contacts with the WR Department located at Vidisha, they agree with the farmers. However, they indicated not having access to required funds at that moment under the NWMP programme. But, since The Indo Canadian Environment Fund (ICEF) is going to give some grant for the physical works, probably they will be able to undertake those needed repairs. Priority will be established for the work require.
- The ICEF will cover 6 major projects in Madhya Pradesh. The Samrat Ashok Sagar Project is one of them, so now significant work can be taken up, as stated by the department people.
- The farmers were of the opinion that the WUA should be given more rights, like fishery and others, so that the funds in WUA could be raised and can be utilised for other needed physical works.
- The relationship of both WUA and irrigation officials was found to be cordial, sometimes conflicts emerges regarding water sharing and canal breaching. One such instance was observed during a field visit; the administration was forced to use police protection inn relation to a breaching of a canal.

Presently, farmers who are withdrawing canal water through pumps are paying US \$ 8.5 (aprox. Rs 420) for 12 hours; fuel is the responsibility of the farmer working his field. The Water Resources Department also used to charge a fee to pump users; the water fees for these farmers was only half of the water rates declared by the Department. This applies also to those farmers who fall outside the command of the canal, but pump from it.