

# IWMI-TATA WATER POLICY RESEARCH PROGRAM

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Who Should Manage the Tanks:  
Irrigation Department, Users'  
Organisation or Private Management  
Agency?

A Quest to Find a Sustainable Institutional  
Solution – Interim Findings of Study into Tanks  
in Bundelkhand, Madhya Pradesh

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**WHO SHOULD MANAGE THE TANKS?  
IRRIGATION DEPARTMENT, USERS' ORGANISATION OR  
PRIVATE MANAGEMENT AGENCY?**

A QUEST TO FIND A SUSTAINABLE INSTITUTIONAL SOLUTION - INTERIM  
FINDINGS OF STUDY INTO TANKS IN BUNDELKHAND, MADHYA PRADESH

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**Who should manage the tanks?  
Irrigation department, users' organisation, or private management agency?  
A quest to find a sustainable institutional solution**

***Interim Findings from Study into Tanks in Bundelkhand, Madhya Pradesh***

**Manas Satpathy, Arvind Malik, Ujjal Ganguly, and Ved Arya**

The paper is divided into four parts. It begins with a background and purpose of the study and then lists the key questions that we are pursuing in the study. We describe the study methodology then. Lastly we present the evidence so far and interim findings.

**1.0 Background and Purpose of the study**

Tikamgarh district focus of present study is part of Bundelkhand. It lies in the Ganga drainage system. The river Betwa flows along its NW boundary. The west and east boundaries of the district are formed by Jamni and Dhasan rivers respectively and around 75% of the area drains to Dhasan.

Bundelkhand, known as such since Bundelas ruled this part of MP and UP. In northwestern part of Madhya Pradesh, this covers Tikamgarh, Chhatarpur and some other districts. Chandelas, a ruling dynasty, about a thousand years ago, built a large number of tanks in these parts. They are traditionally known as "Chandeli" tanks. The special feature of these tanks is the huge bund strengthened by pitching large well-cut stones on the side of water storage. The purpose of these tanks seems to have been recreation, domestic use over and above improvement of ground water regime in the plateau area to facilitate well irrigation. Considering the huge storage in some of these tanks the British and later the irrigation department of state government converted them to flow irrigation systems.

The Water Resources Department (irrigation department is so re-named) has also constructed a number of tanks since Independence. According to a report published by it, Tikamgarh has 995 *chandeli* tanks, of which nearly 100 tanks are used for irrigation with a potential of nearly 17500 ha. Out of the 115 schemes of WRD nearly 60 are *chandeli* tanks having a design command area of 16000 ha.

***Institutional Changes***

During late 1970's, tanks irrigating less than 40 ha of land were transferred to *Janpad Panchayat (JP)*. Another major institutional change happened recently. In 1999, under the MP *sinchai prabandhan mein krishakon ki bhagidari* act, the responsibility for distribution of water among users and maintenance of irrigation system has been transferred to the newly formed WUAs (water users associations).

Most of these tanks are silted and tank bed area has been encroached. WRD and Janpad Panchayat (JP) have not been able to provide adequate financial allocation and utilization for operation and maintenance of these tanks. The primary concern of the people of this area is revival and upgrading of these tanks to sustain the livelihoods of farmers as well as several other users particularly fishermen. On the other hand, government is worried about tanks' long-term sustenance once the improvement is

done. In the past, both irrigation department and JP have failed to distribute water equitably among the users as well as collect revenue and maintain tanks.

**Purpose of the study is primarily to examine the feasibility of the government's plan to handover the management of irrigation system to farmers, especially of tanks and make recommendations on institutional alternatives.** The study has been funded jointly by WRD, DPIP MP, and IWMI.

## 2.0 Key Questions

1. What is the extent of deterioration in the system (and thus water wastage), and what are the causes of such deterioration? What kind of repairs is still undertaken by users themselves? Which repair measures will give better returns on investment? Instead of subsidies, could the option of loans (such as from NABARD) be availed?
2. How is the water distribution pattern determined? What part do factors such as caste and class play? What are the exceptions to the rule that head farmers always get more than the tail farmers? What are the possibilities of making the water distribution fairer? Are there any examples of fair distribution?
3. Who pays and who does not? Is the pattern related to caste or class? How fair are the water rates and how honest is the system of revenue collection or enforcement by government (how prevalent is the system of under recording or non recording? water rates? Now the lift irrigation has become a common practice, should not the lift irrigators be specifically recognised?
4. What changes has the new policy and act have brought on the ground (handover to WUAs)? What is class or caste profile of WUA leaders? What is the impact of the all powerful position of WUA president a la Sarpanch in a Panchayat?.
5. What institutional and management change possibilities can improve the system? Explore three options - WUAs assisted by government engineers, WUAs assisted by irrigation management professionals (NDDDB model), and Local irrigation management enterprises that are supported by a holding company. Can we examine the financial viability of the three alternatives?

## 3.0 Study Methodology

The following 11 tanks, 8 under WRD and 3 under JP were selected for the present study. Except one the rest are Chandeli tanks. Most of these tanks are in the villages selected under DPIP<sup>1</sup>. Very big tanks benefiting a large number of villages were not taken to avoid complexity and stay within the time and budget allotted.

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<sup>1</sup> The above table interestingly shows that actual area benefiting from tanks is sometimes more than the "design" area. What it does not show is the decline in fish yield or income that is the other major benefit from tanks (**our bias?**).

*Table 1: The selected tanks and their problems (physical state)*

SI No	Name	Block	Ownership	Rabi designed command area (ha)	Present use (ha) (Average of last 5 years)	Problems of physical deterioration
1	Upatsagar	Tikamgarh	WRD	160	251	Sluice repair, Canal repair, Waste weir repair
2	Raira	Tikamgarh	WRD	72	58	Inlet channel repair, sluice repair, canal repair
3	Dhanera	Baldeogarh	WRD	93	85	Lowering of sluice, canal reconstruction
4	Chanderi	Baldeogarh	WRD	69	41	Waste weir repair, sluice repair, canal repair
5	Jeron	Prithwipur	WRD	104	210	Not visited yet
6	Dumduma	Prithwipur	WRD	69	64	Canal repair
7	Morpariya	Palera	WRD	64	55	Excavation, waste weir repair, canal repair
8	Chitanala	Palera	WRD (not Chandeli)	190	110	Canal repair
9	Guna	Baldeogarh	JP	72	60	Sluice construction, canal repair, heightening of bund
10	Majna	Tikamgarh	JP	36	51	Inlet construction, sluice repair, canal repair
11	Narguda	Tikamgarh	JP	40	45	Sluice repair, waste weir repair, canal repair, heightening of bund

In each of these tanks stakeholders were mapped and value of tanks to each of them was assessed. Existing conflicts of interest among them also were studied. Cost of improvement and expected return were assessed for each tank. Present practice of water distribution among users was captured with details to understand the decision making process at village level. Revenue payment performance among different set of users was analyzed to understand who pays and when, and who does not pay. Information was collected on present cropping practices to ascertain financial viability of the schemes. Users' opinion on better management of tanks was gathered to generate alternatives for institution building.

Assessment of present situation was done through PRA. Agricultural and irrigation practices were observed by taking a walk through the command area. The need for improvement in the infrastructure was also assessed during the walk. Focus group discussions were held with each section of the community to understand their point of view. Key informants, both in the community and outside, were interviewed.

#### 4.0 Evidence so far and Interim findings

##### 4.1 System Deterioration and Water Wastage

Following seem to be the main reasons that have led to deterioration in the system and increase in water wastage.

- i. *Siltation.* The deterioration has happened gradually over years. Due to denudation of vegetation a lot of silt has been deposited in the tanks. Except in Morpariya, this has not affected the live storage. People engaged in fishery nevertheless want desiltation for increasing the dead storage that in turn would increase fish yield. Thus fishery is the main occupation that has so far been affected by siltation.
- ii. *Old style regulation system.* Most systems have an old styled hole-plug regulation system that has two or three holes that are plugged periodically. Once the plug (wooden rod/pole) is taken out for first irrigation, water is too cold for anybody to go inside and plug the hole and stop the irrigation flow. Water continues to flow even if there is no need, or there is under utilization. So, there is a demand for screw operated sluice gates that can drastically reduce losses. In Majna, Narguda and Raira still the old style hole-plug system exist.
- iii. *Canal seepage.* Losses from the canals are quite common (and are high). In all the eleven studied tanks, canals need repair to reduce losses. Generally the demand by people is to construct concrete or masonry canals to completely check seepage<sup>2</sup>. Placement of outlets from the canals at proper places is another important requirement, in absence of which people have damaged the canals in a number of places that worsened subsequently.
- iv. *Who has been maintaining the system?* Primarily the government, people come in when there is no alternative. When the pattern was studied in Chitanala, it was found that when the tank was constructed the supply was more than the demand. Gradually demand increased and supply reduced due to losses from the system. By the time the supply went below the demand, the damage to the system was too high for people to address. Another factor for not being able to address the issue is dependency on government. Government has always been responsible for maintenance of the tanks irrespective of farmers' behavior in repayment of dues. Examples of people's involvement in maintenance:
  - I. *Minor cleaning by people.* When minor cleaning of canals is involved people in Raira and Dhanera do it every year. Raira people even go to construct an earthen bund every year to divert runoff to their tank. Of course they first expect government to do it. Only when there is a delay by government, to avoid late sowing, people do it themselves.
  - II. *Canal maintenance by users.* In Upatsagar, users properly maintain one of the canals whereas the other one is silted up. People who

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<sup>2</sup> There is a lot of scope here to experiment with different types of conveyance systems, like LDPE lining, pipes and so on, to address the issue.

clean it said that as most of them belonged to the same community there is a better unity among them and hence they could maintain the canal properly. The users of the other canal conversely said that since the canal passed below the hill, the siltation was more and cleaning it every year was beyond their capacity. In most of the years government (now WUA) does the cleaning of the main canal with whatever budget is made available.

- III. *Cleaning the canal in JP owned tanks*, however, is a regular phenomenon. JPs neither collect revenue nor do annual maintenance of canals. So people do it themselves every year before the irrigation season. In Narguda, however, since number of farmers benefiting by canal irrigation is small, they are finding it difficult to clean it and want the canal to be covered with a concrete slab. A large number of families here lift tank water to their fields and they do not participate in canal cleaning for obvious reasons.
- IV. *Problems of land acquisition.* In tanks like Raira and Majna the problem is different. The inlet to tank was constructed in the private lands whose owners subsequently denied allowing their land to be used for carrying water to the tanks. For the construction of inlet and canals, in most of the Chandeli tanks, land acquisition was not properly done or even if it was done the records are not presently available with the government. So now when the owners claim the land used for the above purpose the irrigation department feels helpless.

#### **4.2 People's Priorities for Repair**

The table 1 also shows the improvements demanded by people in various tanks. The prioritization of activities in the tanks is as follows:

- Filling of tank to its capacity
- Better control of stored water with a proper sluice and
- Prevention of wastage of water through seepage in bunds and canals

#### ***Return on Investment for various Physical Improvements***

The following table compares the returns of three important improvements needed in most of the tanks.

*Table 2: Comparison of activities based on return*

<b>Item of work</b>	<b>Availability of more water for crops per unit investment (Lit/ Rs.)</b>
Tank excavation	35
Canal repair	130
Sluice	500

From the above table, sluice repair comes out to be most cost-effective.

#### ***Users' Willingness to Borrow and invest in Tanks***

For minimum repairs, necessary in the tanks required investment is in the range of Rs 2-5 lakhs. In most of the sites people showed interest to even go for loans at 12%

interest to get these repair work done. They are ready to pay an irrigation charge of Rs. 150-200 per acre against the present charge of Rs 91/- per acre. They of course do not want to pay anything to government till the full repayment of the loans. In some of the tanks where required investment is higher, people suggest the lease amount collected from fishing community to be used for loan repayment. In each tank a committee can play the role of collection of revenue provided government supports them in disciplining people when required.

**4.3. Water Distribution: Question of Who gets water and who does not**

In most of the tanks irrigation is done only during rabi. Where there is no proper sluice water is not used during kharif even in a drought situation. **Saving of water for rabi is the priority** (everywhere), as *kharif* is not the main cropping season in this area. Coverage during *rabi* far exceeds that in *kharif*.

The general trend in distribution of water is from **head to tail**. The following table shows the sharing of water between different sets of users in the tanks studied so far.

*Table 3: Distribution of water between different sets of users*

Tank	Distribution								
	Head			Tail			Lift		
	Fami- lies	Area (ha)	Water- ing	Fami- lies	Area (ha)	Water- ing	Fami- lies	Area (ha)	Water -ing
Chitanala	129	90	3	21	12.5	2	9	8	3-4
Morpariya	38	25.5	2	48	32	1	17	10	2
Majna	36	30	4	11	32	0	37	40	4
Nargora	18	14	3	0	0	0	7	12	3
Guna	0	0	0	0	0	0	100	60	2-3

This is a very interesting set of data. In some tanks, the entire water is lifted without any gravity flow (Guna), and in others the lift irrigation from tank directly is affecting the tailenders adversely (in Majna, nothing is left for them). When the water in the tank is inadequate, which often is the case, head reach people get at least one more irrigation than the tail reach people. Water flows to their field even when there is less water in the tank and again pumping dead storage to their fields is less costly. We found at least one example of tail to head system.

**Tail to Head System in Narguda:** *Only in Narguda tank we discovered to our surprise that in some years farmers from tail end had taken water first. The reason seems to be presence of influential farmers on either end. Again only 35 farmers take water from the canal, which is quite less in comparison to other schemes. Again water is lifted from both canals as well as the tank against prohibition.*

### *Conflicts over water*

There are several conflicting interests over water.

- Fisheries and irrigated agriculture. In a typical tank the stakeholders are: people taking water from canals, people lifting water from canals, people lifting water from the tank, tank bed cultivators and fishing community. There are mainly three kinds of conflicts of interest among the tank users. The most common is between fishing community and farmers. Due to increasing lift irrigation from tanks, people in the command area often get the last water by lifting water from tanks. This together with reduction of dead storage due to siltation affect the growth of fish and hence the return to fishing community. In all the tanks except Narguda the powerful people, who stop people from lifting water once the dead storage is left, control fishing activity. Only in Majna, Guna and Raira they have been able to do so.
- Tank bed cultivation and command area cultivation. The second conflict exists between tank bed cultivators and farmers in command area. When tank bed cultivators want the tank water to be emptied rapidly in order to have water recede and more land available for cultivation, the command area farmers want the water to be released slowly. This problem was severe only in Chanderi where tank bed cultivators have damaged the waste weir and do not allow command area farmers to check leakage in the sluice completely. Even though the government policy is to allocate tank bed for cultivation among the poor community in practice the farmers having lands adjacent to the tank extends their cultivation to tank bed. *Recently, the state government has decided to form a new committee involving the panchayat leaders to lease tank bed for cultivation.* So WRD has not leased it this year to anybody and the normal practice prevails.
- Between those who lift water and those who get water through flow irrigation. Nearly 35 percent of water is used by lift irrigators as against 65 percent by flow irrigators.

### *Influence of caste*

Again in the same reach all do not have similar rights over the tank water. The society is divided along caste and class. Every village consists of people from more than 5-6 castes and a few families from the upper caste/ dominating caste have more say in community affairs. In case of water distribution too they have comparatively more access to tank water than others. EXAMPLES: This is starker in Upatsagar and Raira. In Upatsagar we came across a farmer from lower caste in the head reach who was unable to get water even after paying tax and obtaining permission from government official. In Raira people from lower caste were made to take water during the difficult hours of the day even though they are the first to clean canals. So, **everybody gets water sooner or later and crops are rarely allowed to die due to water scarcity.** His yield may reduce due to water stress. For fairer distribution the only suggestion that farmers could give was to make sufficient water available in the tank so that all the present users' need be fulfilled. People in Chitanala and Majna, however, suggest

clear water allocation among users and strict monitoring by a tank level committee for distribution accordingly.

*It is still unproven whether caste plays a major role in water distribution.*

*In conclusion, distribution of water among users becomes uneven due to:*

- Wastage of water from the system
- Increase in area due to free access (lift irrigation)
- Reduction in the efficiency of canal system (seepage losses)
- The system of distribution of water from head to tail
- Establishment of more right by influential people over tank water (However, extent of their influence is not established unless we do caste and class analysis for a few tanks.)

#### **4.4 State of Cost Recovery and Question of who pays and who does not**

The present rate of revenue collection by WRD is shown in the following table.

*Table 4: Rate of Revenue Collection BY WRD*

Year	Previous outstanding (Rs)	Current year demand (Rs)	Total demand (Rs)	Recovery (Rs)
1998-99	14884000	1624000	16508000	418000
1999-2000	16090000	1922000	18312000	1706000
2000-2001	16593000	5839000	22432000	2435000
2001-2002*	19997000	3887000	23884000	1856000

\* On going

#### **Who pays and who does not**

*Pattern of payment among large land holders versus small land holders*

The following table shows the revenue collection pattern in the studied tanks by people with different land holding in the command area.

*Table 5: Revenue Collection Pattern*

Tank	> 3 acres of land in CA		1-3 acre		< 1 acre	
	Paid	Not paid	Paid	Not paid	Paid	Not paid
Chitanala	12	12	44	31	25	35
Morpariya	2	13	4	33	6	45
Upatsagar	4	20	10	68	2	153

*Table 6: Pattern of Payment by caste*

Tank	General		OBC		SC		ST	
	Paid	Not paid	Paid	Not paid	Paid	Not paid	Paid	Not paid
Chitanala	13	13	36	27	34	36	0	0
Morpariya	2	9	4	55	6	10	0	0
Upatsagar	1	21	14	202	1	21	0	13

In the tanks under JP revenue is not collected. Normally a sense prevails that poor pays and better off do not pay. However, **the data of above tanks do not prove it sufficiently if land holding in the command area is considered as the indicator of poverty.**

#### *Effect of better service on repayment behavior*

An analysis of Chitanala showed that 52% of head farmers and only 37% of tail and lift farmers have paid their revenue. Actually **all the farmers lifting water from the tank are not recorded by the *ameen* of the irrigation department.** In case of Chitanala it was found that only 25% of the farmers lifting water from the tank are recorded. Again area reported is around 15% of the actual area.

#### *Reasons for lack of cost recovery*

People getting enough irrigation but not paying revenue blame the system for poor revenue collection. They ascribe lenience in the past, confusion regarding the charges and untimely collection by the government officials for this. The government officials on the other hand say that the lack of power to take strong action against defaulters is the primary reason for poor revenue collection. They suggest the system in UP to be most effective for this purpose. The irrigation revenue collection system of UP was studied as a part of the present assignment. In UP the irrigation department is responsible only to make the demand list and submit it with revenue department timely. The revenue department then collects the revenue from the farmers. The farmers also expressed the fear of arrest as the reason for payment of revenue. Payment of revenue is no way related to maintenance of tank. The condition of tanks is no better there even though the collection is 100%.

Information on revenue collection system is generally very low among users in MP. People even do not know how the irrigation charges are calculated. Due to ignorance most of them are charged penalty. Penalty is charged when the agreement form with WRD to use tank water is not signed irrespective of payment of revenue. In comparison to UP system MP system of irrigation charge estimation is more complicated. In UP there is no system of charging interest to defaulters. They basically do not allow anybody to be the defaulters.

#### **4.5 Institutional Question - Who Should Manage The Tanks?**

##### *Impact of Handover to WUAs.*

There are three major observations. One, **On ground there is no visible impact. Not many people are aware of the existence and role of these associations.** For many, the WUAs do not make any difference since they do not have the required representation of all the water users and tank groups in the command area. And therefore, people feel that present kind of WUAs are more of a political move than the practical alternative for better management of tanks. Two, *WUAs have been formed by taking 5-6 tanks together.* The command area of each WUA is divided into a number of territorial constituencies (TCs). Tank users have directly elected the president of the WUA and a member from each TC. Three, *influential people contested only for the president post.* They compare the WUA system with *Panchayat* system and expect more money to be channelised through them in future. As for panchayat sarpanch, WUA Presidents too identify themselves more with government

officials than people. People fishing in the tanks too come to them instead of panchayats similarly now expect them to do better maintenance of canal and sluice than government. People think that they are getting money but are not spending it in maintenance.

#### *Viability of Existing System?*

The present cost and expenditure of WRD is given in the following table.

*Table 7: Cost and Expenditure of WRD*

<b>Year</b>	<b>Exp (Establishment)</b>	<b>Exp (work)</b>	<b>Target revenue (Rs)</b>	<b>Net loss (Rs)</b>
<b>1998-99</b>	15282000	5456000	1922459	18,815,541
<b>1999-2000</b>	11292000	6432000	5848993	11,875,007
<b>2000-2001</b>	16619000	11436000	3888026	24,166,974

Even if the target revenue is collected every year the average yearly loss to the department during last three years is nearly Rs 1.8 crore. If the actual collection of revenue is taken into account, which is around 15% of the demand, the losses to the department will be more than 2 crore rupees per year.

### **5.0 Alternative strategies, advantages & disadvantages of each**

Albeit management by users' associations is widely recommended, hardly any evidence exists in India to amply support the argument. Again when such associations are made responsible for running community irrigation systems a small group of selected or elected members practically looks after the day-to-day operation. The success of the schemes depends a lot on the composition of such group and its affiliation with rest of the members. So one needs to look beyond this to generate options for proper management of tanks. A few alternative strategies with their advantages and disadvantages are presented below.

#### **1. WUAs assisted by government engineers**

Advantages:

- This is the present system where advantages are limited. May be execution of work will be timely.

Disadvantages:

- Less participation of users in decision-making
- Government engineers do not have any interest in building WUA as an institution to do justice with the users
- Lack of transparency

#### **2. WUAs assisted by irrigation management professionals,**

Advantages:

- WUAs will have better systems in place for distribution of water and collection of revenue
- Users' capacity at tank level built to take care of maintenance of tanks
- Agricultural practice and water management may improve

Disadvantages:

- Cost of professionals will be additional
- Outcome will depend on quality of professionals
- Need to engage local professionals to manage the multi-caste social system to build a coherent WUA

### **3. Local irrigation management enterprises that are supported by a holding company**

Advantages:

- Water utilization will be the best
- Overall efficiency will increase
- Return will be maximized which in turn will bring development in agriculture

Disadvantages:

- Poor people's priority may be overlooked

There is now a need to work on financial viability of the three models.

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