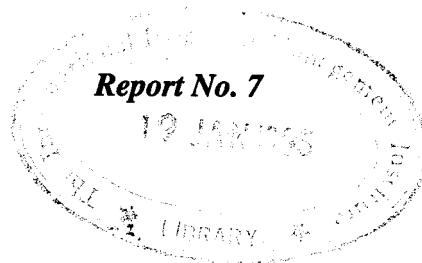
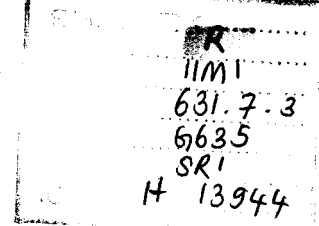


Short Report Series
on
Locally Managed Irrigation



IRRIGATION MANAGEMENT TRANSFER
AT PALIGANJ CANAL
BIHAR, INDIA

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and
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Program on Local Management

INTERNATIONAL IRRIGATION MANAGEMENT INSTITUTE

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Purpose of the Series

The *Short Report Series on Locally Managed Irrigation* is designed to disseminate concise information on the role of local management in irrigation and irrigation management transfer or turnover experiences and policies. The *Series* is distributed worldwide to a broad range of people—policymakers, planners, researchers, donors and officials in both public and nongovernmental organizations—who are concerned with the irrigated agriculture sector. IIMI's goal is not to promote policies such as irrigation management transfer, but to enhance the knowledge base available to decision makers and advisors as they face questions of policy adoption and strategies for implementation.

Locally managed irrigation can be of many types, such as traditional farmer-constructed diversion or tank schemes, indigenous and often new lift irrigation, government-constructed but farmer-managed irrigation systems and systems where management is or has been transferred from an outside agency to a local user organization.

By “irrigation management transfer” we mean some degree of transfer of responsibility and authority for irrigation management from the government to farmer groups or other nongovernmental entities. This generally involves contraction of the role of the state and expansion of the role of the private sector and water users in irrigation management. In other words, there is a shifting upstream of the point where management responsibility and control of the water supply are transferred from the irrigation authority to local management. This may involve changes in policies, procedures, practices and the performance of irrigated agriculture. It may or may not involve “privatization” of ownership of the assets of the irrigation system. The *Short Report Series* addresses questions such as the following:

What are the necessary conditions which support viable locally managed irrigation?

What socio-technical conditions, institutional arrangements and change processes lead to sustainable locally managed irrigation?

What is the range of different models that are being applied worldwide for turnover or transfer of responsibility for local management for recently developed irrigation?

What are the effects of management transfer on the productivity, profitability, financial viability, equity, efficiency and sustainability of irrigated agriculture?

What are the perspectives of farmers, managers, policymakers, urban consumers and other stakeholders in irrigated agriculture about irrigation management transfer?

What adjustments in government may be needed as a result of turnover to provide support to locally managed irrigation systems and to improve productivity in the public sector?

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Editors' Note

Common wisdom says that profitable agriculture, secure water rights, strong policy and political support, and organizing which starts from the lowest-level management unit and works upwards are necessary characteristics of successful programs to transfer management of irrigation systems to farmers. The experiment which this Short Report describes, of organizing farmer management of the Paliganj Distributary Canal in Bihar, India, challenges these assumptions. Few places would present more difficult conditions within which farmers could be expected to take over management of irrigation systems. The Government of India characterizes the area, located south of the city of Patna, as a "socially disturbed" area. Tensions are high between castes, between relatively large and small landholders and the landless. Profit margins for irrigated agriculture are modest at best; farming is a risky enterprise. Prior to the action research, irrigation supplies to field outlets were very unreliable. Considerable unofficial tampering with water deliveries was conventional. Many structures along the canal were in disrepair.

This Short Report describes how a local government-sponsored training and research institute and NGO implemented an experiment which successfully: 1) identified key constraints on irrigation management from the farmers' perspectives, 2) gained rapport with initially hostile farmers, 3) facilitated formation of a farmer organization at the distributary and field-channel levels, 4) facilitated development of an operation and maintenance work plan by farmers at the distributary-canal level, 5) monitored the implementation of the work plan and 6) partially assessed the results of the experiment for irrigation performance. The report identifies the ingredients in the process which helped make the experiment effective initially and extracts general principles for making management transfer successful in Bihar and elsewhere.

IRRIGATION MANAGEMENT TRANSFER AT PALIGANJ CANAL, BIHAR, INDIA

*L.P. Srivastava*¹
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Farmer Management of Irrigation above the Outlet

In South Asia, large-scale canal irrigation systems are conceptually and legally divided into two distinct parts:

- * *Above the outlet*—including the water acquisition system (river diversion or tank) and the main channels; normally, this part of the system is operated and maintained by a government agency, generally an Irrigation Department.
- * *Below the outlet*—including the channels and structures that distribute water to individual farms; this part of the system is usually operated and maintained by farmers.

The *outlet* is the point (structure) where both water and operation and maintenance (O&M) responsibilities are turned over to farmers. The channel leading from the outlet is often called the *watercourse*. Outlet commands vary; they generally serve from 8 to 100 hectares (ha) and from 5 to 50 farmers.

In almost all South Asian countries, government irrigation agencies have, until recently, felt that farmers have little or no part to play in system management above the outlet (Chambers 1988). Programs for farmer organizations for irrigation management have focused largely on the part of the system below the outlet and have dealt with water distribution among farmers, maintenance of watercourses, and settlement of disputes among farmers.

However, the effectiveness of farmer organizations below the outlet depends strongly on system performance in delivering water to the outlet. Farmers cannot manage water effectively if it is not properly delivered to them. Not surprisingly, there are many reports of group action by farmers above the outlet to secure water supplies (Uphoff 1986). In India, reported group activities above the outlet include:

- * Patrolling to prevent upstream villages from interfering with canal flow (Wade 1987; Pant and Verma 1983).
- * Collecting funds to pay bribes (Wade 1987).

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- * Lobbying politicians and administrators (Pundarikanthan et al. 1992).
- * Striking (Pundarikanthan et al. 1992).

Pathak (1991) and Sengupta (1991) report other farmer activities above the outlet. Chambers (1988) suggests that spontaneous group action above the outlet is to be expected wherever canal water is valuable, where the canal supply is not reliable or adequate, and where such action is likely to improve the situation.

This paper describes the case of the Paliganj Distributary in the Sone System in Bihar, India. In Paliganj, personnel from the Water and Land Management Institute organized farmers above the outlet to improve system management. Although organization above the outlet is not unknown, this case is unique in several ways and provides an example of the conditions under which farmer organizations work above the outlet that are likely to be useful.

Paliganj Distributary

Paliganj Distributary is part of the Sone Canal System in South Bihar (Figure 1). The Sone River flows northeastward from the Deccan Plateau before joining the Ganges not far from the city of Patna. The Sone Canal System diverts water from the river to irrigate a design command area of over 700,000 ha.

Paliganj Distributary (Figure 2) diverts water directly from the Patna Canal in the Eastern Sone System (Figure 3). The head gate is 74.4 km from the head of the Patna Canal in the middle reach of the system. The distributary has 40 km of main canal network, including the Paliganj Distributary itself and the Chandos and Bharatpura Subdistributaries (Figures 2 and 3). The official gross command area is 14,867 ha with a culturable command area of 12,197 ha.

The Paliganj command area lies wholly within the Gangetic Plain. About 1,000 mm of rain falls each year, mostly during the *kharif* season from June through October. Smaller amounts of rain fall during the *rabi* season from November to March. The hot season from March to June is generally rainless.

During *kharif*, the main crop is rice. During *rabi*, wheat is the main crop but various other crops, including pulses and oilseeds, are also planted. *Rabi* irrigation is limited to about 1,000 ha. Almost no crops are planted during the hot season, when the canals are closed for maintenance.

Paliganj Distributary serves 76 villages in Patna District. The villages include about 16,000 households and more than 114,000 people. Almost all the villagers are Hindu. Most villages are made up of mixed castes; no caste predominates in the area, although specific castes dominate some villages.

Irrigation Management in the Sone System before 1989

The Sone Canal System was completed in 1876, under British rule. The system was originally built to protect crops from drought, particularly the *kharif* rice crop. The canals were designed to provide a small fraction of the total water requirement for rice. The design duty was 133

acres per cusec. Also, it was assumed that no more than 50 percent of the command area would be under rice at any time.

A rising population, increases in the command area, and a demand for increased production caused the government to remodel the system in the 1960s to provide more water for both kharif and rabi crops. Yet, due to the small canal capacities, the available water is inadequate to meet the requirements of modern agricultural technology. High-yield rice and wheat varieties are very sensitive to water stress caused by lack of adequate and timely irrigation. Plans to modernize the system again have not been implemented due to a lack of funds.

Irrigation within the Sone System was managed initially under the Bengal Irrigation Act of 1876. Under this act, farmers had to make formal requests, called *satta*, to the canal officers for irrigation water. Double water rates were charged for unauthorized irrigation. One farmer per outlet was appointed as *sattadar*. The canal authorities were responsible for getting the water to the outlet and the *sattadar* managed distribution below the outlet. Generally, there was one outlet per village. Watercourses were constructed and maintained by villagers. Water could be denied to a village if the watercourses were not maintained properly. Assessment and collection of water rates was done by the revenue wing of the Irrigation Department with help from the *sattadar*. Informants claim that the *satta* system worked well.

Over time, particularly after independence in 1947, the situation changed radically. First, the growing population led to increased area under cultivation and thus to increased irrigation demand. Second, the independent government came to view irrigation not as a commercial venture but as a form of welfare. Irrigation was spread to more and more farmers while water rates were kept low, leading to inadequate revenue for operation and maintenance of the system. Third, as power became more centralized in state-level bureaucracies and political bodies, the power of the field-level officers were gradually reduced. This made it difficult for officers to control the system and to punish farmers who abused the system. The situation eventually became unmanageable and, in 1974, the government abandoned the *satta* system.

Under the system introduced in 1974, water delivery to the outlets remained the responsibility of the canal authorities and water distribution below the outlet the responsibility of the farmers. But application for water was not required. Assessment of water rates was based on a register of land actually irrigated. The position of the *sattadar* was abolished. This new system was not a success. Since permits were not required there was no definition of unauthorized irrigation. Farmers in the head reaches could take as much water as they wanted by obstructing canals to raise water levels. Higher patches of land were brought under irrigation in the head areas. The field recording of actual irrigation was never done properly. Instead, it was assumed that all farmers within the command received water and all were assessed water charges irrespective of water deliveries. In addition, the weak position of the canal officers encouraged abuse by farmers and made officers reluctant to inspect the canals. Farmers viewed the failure of officers to visit as neglect of duty.

In 1988, the government reintroduced the *satta* system. However, the root causes of the problems—increased water demands, inadequate government finances, and lack of viable local participation in management—remain. It is widely believed that the reintroduced *satta* system is not working effectively.

The WALMI Action Research Program

The Water and Land Management Institute (WALMI) was created in 1983 to train Bihar State irrigation engineers and others in improved irrigation management. In 1988, with support from

the United States Agency for International Development (USAID), WALMI staff organized an Action Research Program (ARP) at the Paliganj Distributary to improve the performance of the canal network so as to improve the productivity and profitability of irrigated agriculture in the area.

In their first visits to the field in June 1988, the ARP team used vehicles identifiable as belonging to the Water Resources Department (WRD). Farmers reacted with hostility; they jeered and threatened the team as they assumed they were WRD employees. Some farmers told them to leave and stay away. Even after the ARP team members identified themselves as researchers, farmers refused to cooperate. As a consequence, the ARP team confined initial activities to making hydraulic measurements and observations of the irrigation system. In addition, they collected baseline agricultural and socioeconomic data.

Within the first six months, the ARP team had identified the following irrigation problems:

- * Water supply at the head of Paliganj Distributary was unreliable because of variable flow in the Sone River and lack of capacity in the Patna Canal.
- * The Paliganj Distributary and subdistributaries did not function well. Head regulators were missing or not functioning, structures had inadequate waterway and reduced capacity, many sections of the canals had weak and eroded banks with breaches up to 40 meters long, seepage losses were high, and the canals were too small for the demand. Below the Paliganj Distributary head regulator, no operations were carried out.
- * There were no minor canals, so outlets drew water directly from the distributary and subdistributaries. Outlets were open pipes, often oversized. Many outlets were not installed properly. Cuts in the banks on the side of the outlet structures were common.
- * Outlets fed village channels; often 3 or 4 watercourses ran side by side to feed different villages. Channel capacities varied greatly in comparison with command areas. The channels had high seepage losses and water rarely reached the tail ends of the village channel commands. No structures existed in the channels and water was usually drawn by cutting the banks. Irrigation was by field-to-field flooding.
- * There were no regular channels for communication between system managers and the farmers. Although villages often acted as units for procurement of water, there did not exist an organized system for intervillage cooperation.

Over time, familiarity with the researchers caused the initial hostility to dissipate. A meeting of leading farmers from villages in the lower reaches of Paliganj Distributary was organized by the ARP team on 17 March 1989. At this meeting, farmers expressed anger at the workings of the Water Resources Department (WRD) and the Sone Command Area Development Agency (SCADA).³ Their management problems and grievances included the following:

3 The Sone Command Area Development Agency is a separate agency within the Bihar Government. It is a system-level agency created as part of India's program to improve the productivity of large-scale irrigation schemes by improving farm-level conditions. SCADA works with villages on watercourse improvement, land consolidation, soil testing, and other farm and village-level activities.

- * Farmers did not know when canal water would be available; it was as unpredictable as rainfall. Canal water was often not available when required and, when not needed, came in excess to damage crops.
- * Government officers were not concerned about the water supply to the lower reaches of canals and did not visit the areas.
- * Farmers in the upper reaches put obstructions in the canal to divert water, then wasted water by not removing the obstructions when they had completed their irrigation.
- * The canals were not maintained properly. Maintenance work was characterized by malpractices and corruption.
- * Water rates were charged and collected forcibly even if the land was not irrigated.

Farmers had lost confidence in government management of the canals and frequently expressed this to the research team. In addition, many felt that irrigated agriculture was not profitable. Some said that it was better to be a peon in a government office than to be a farmer.

Paliganj Distributory Farmers' Committee

Based on these findings, the ARP team decided to tackle three major deficiencies:

- * Lack of communication between users and system managers.
- * Lack of farmers' involvement in management.
- * Unattended operation of the system.

The strategy was to have farmers take over operation and maintenance of the distributory canal.

On 09 June 1989, ARP team members organized a meeting of about 75 leading farmers and responsible WRD personnel from the Paliganj Distributory command. At this meeting, ARP team members pointed out that system performance benefitted or harmed farmers rather than government personnel. Because senior Department personnel were transferred every 2-3 years, they could not have detailed knowledge of individual systems. In contrast, since farmers lived there for most of their lives, farmers themselves have the requisite knowledge and should take the initiative to solve their own problems. The ARP team therefore proposed that Paliganj farmers form an intervillage committee of 10-12 farmers to make decisions about canal operations. WRD officers stated they had no objection on an experimental basis and promised that lower-level WRD employees ("canal mates") would be instructed to carry out the decisions of the Farmers' Committee.

Farmers present at the meeting consented reluctantly, but pointed out that they could take this responsibility only if supported by other farmers. They proposed that committees be formed in each village to select representatives to the Farmers' Committee. Farmers identified

20 villages along the distributary that were well known for interfering with canal flow. These villages were included in the first round of organizing.

During July and August 1989, ARP team members visited the 20 selected villages. In each village, they gathered a group of available farmers and presented a letter asking them to form a Village Irrigation Committee (VIC) with 5-11 members. Inclusion of all segments of the village was stressed. Each VIC should send its leader as the village representative to the Farmers' Committee.

The ARP team organized the first meeting of the **Farmers' Ad Hoc Canal Operation Committee** on 5 September 1989. The Director of WALMI chaired the meeting. Fourteen of the 20 villages sent representatives to the meeting. In addition, the meeting was attended by the Chief Engineer, Patna, from the Water Resources Department, and by the Superintending Engineer, SCADA. All present realized that these officers had the authority and power to make changes in government activities.

The ARP team presented a draft of the duties and responsibilities of the Farmers' Committee and invited the farmers to respond. Instead, as usual when high-level officers are present, the village representatives complained about system operation and conditions. Officers usually respond by promising to investigate or fix the reported problems. On this occasion, the officers, particularly the Director of WALMI, suggested that the Farmers' Committee itself take action. Although the meeting ended without concrete decisions, most of the representatives left feeling the Farmers' Committee could serve as an effective way to communicate with the officers.

Shortly after the meeting, at the request of WALMI, the Engineer-in-Chief of the Water Resources Department issued a formal order for handing over operation of the system to the Farmers' Ad Hoc Canal Operation Committee. Also, soon after the meeting, the remaining six villages formed Village Irrigation Committees and nominated representatives to the Committee.

Three more meetings of the Farmers' Ad Hoc Canal Operation Committee were held during September 1989. The third meeting was the first organized by the farmers without help from the ARP team. Subsequent meetings, at different villages, were organized about every 15 days by both the ARP team and the farmers. Most of the time agency staff have been present. The farmers have used meetings of the Committee to discuss immediate problems with the Department engineers and to decide what actions the Department should take.

The ARP team focused its efforts on working with Committee members, generally at Committee meetings. This work included advising the Committee on particular issues, giving short lectures on technical matters, and passing out specially prepared technical literature in Hindi. Discussions focused initially on improving operations along the distributary, then, as the farmers took interest, on maintenance, organizational issues, and resource mobilization. WALMI staff also organized two-day training sessions on various aspects of irrigated agriculture for members of the Village Irrigation Committees, and members of the Farmers' Committee were taken on tours to other states in India to see irrigation management practices.

After a year and a half, the farmers and the ARP team decided to formalize the Committee. A meeting on 25 February 1991 adopted by-laws and changed the name of the Committee to the **Paliganj Distributary Farmers' Committee**. The following month, the Committee formally elected officers, including a chairman, two deputy chairmen, a secretary, and a treasurer.

To promote closer contact among Committee members, general farmers and the ARP team members, and to determine future directions for the program, the ARP team organized a two-day "Farmers' Camp" in April 1991. Participants included the 200 members of the 20 Village Irrigation Committees and others. The camp had formal sessions and small group

discussions of various agricultural and irrigation problems. A key feature was an address at the closing session by the Bihar Minister of Water Resource Development.

The ARP team used the occasion to evaluate the impact of the program. They found that almost all the participants were aware of the program and its actions, but many were confused about the objectives of the ARP. Farmers felt that the most important results of the program were improvement of relations between farmers and WRD officers, unity among farmers, and getting upstream farmers to pay attention to solving the problems of tail-end farmers.

At the camp, the farmers adopted three resolutions and presented them to the Minister of Water Resources Development. These were:

1. *All the farmers of the command area of Paliganj Distributary unanimously recommend that the newly created Paliganj Distributary Farmers' Committee should be registered under the Societies Registration Act, 1860, under the supervision of WALMI. The farmers are also in agreement for enforcement of rules and regulations included in the Memorandum of Association drafted for the Committee.*
2. *The Committee is now in a position to take up works related to water management such as canal operation, maintenance and collection of water taxes. It is, therefore, essential that there should be a formal agreement for participatory management between the Committee and the Water Resources Department for taking up such works ... It is requested that the Honorable Minister take time-bound action immediately in this direction*
3. *The works undertaken under Action Research in Paliganj are ... an experimental study, the results of which would be replicated in the entire Sone Command area after the success of the research. It has been found in many situations that the present Departmental rules and regulations are constraints to the works of this experimental study. The Farmers' Committee, therefore, expects that the Honorable Minister will issue an order for abeyance of the present rules and regulations which are constraints to future works...*

The Minister did not respond.

Following the publicity generated by the Farmers' Camp, 15 more villages organized Village Irrigation Committees and joined the Paliganj Distributary Farmers' Committee.

Soon after the Farmers' Camp, WALMI formally forwarded the three proposals from the farmers to the Water Resources Department, but no action was taken. Subsequently, the research team requested WRD to recommend the registration of the **Paliganj Distributary Farmers' Committee** to the concerned authority in the Government of Bihar. WRD sent the proposal with the recommendation. The proposal was returned pending finalization of a new state irrigation policy then under consideration. Since then the Farmers Committee has applied independently for registration under the Societies Act. At present, the application is still being processed.

The WALMI organized a second Farmers' Camp during 23-24 September 1993 attended by over 500 farmers and by many officers, including the Minister of Water Resource Development. Following this camp, the Minister agreed to:

- * Declare the Paliganj Distributary a pilot area for studying changes needed in organization and procedures for irrigation management.

- * Turn over management of the distributary to the Paliganj Distributary Farmers' Committee.

With the ARP teams help, a draft memorandum of understanding between the Water Resources Department and the Farmers' Committee, defining the responsibilities of both parties, has been prepared and is under discussion. Also, the changes in irrigation laws and regulations required to implement the agreement are being identified.

Improving Water Distribution

At the first meeting of the Farmers' Committee in 1989, the ARP team and farmers discussed the operational problems of the distributary. The main topic was the obstructions in the canal placed by farmers. Officers felt that the obstructions should not be tolerated, but some farmers felt that there is a need for the obstructions. Still, the farmers agreed that all farmers had an equal right to the water and that the obstructions should not be allowed to harm farmers further down the system. The ARP Team Leader pointed out that the obstruction placed at the first fall near the head of the distributary harmed everyone because its backwater effects reduced the amount of water entering the distributary.

After the meeting, farmers, WRD officers, and ARP team members traveled along the first six miles of the distributary and supervised removal of the existing obstructions. The results were dramatic. For the remainder of the 1989 kharif season, water reached the tail of Paliganj Distributary. Farmers said that this was the first time in ten years that canal water had reached the tail.

Subsequent seasons have not seen such dramatic changes but have seen small but real improvements in irrigation performance within the distributary command.

1. *Kharif Seasons*

For kharif 1990, the Farmers' Committee adopted a simple operations plan developed with the help of the ARP team. This plan rotated water among five reaches—Paliganj Distributary Reach I (head reach), Paliganj Distributary Reach II (middle), Paliganj Distributary Reach III (tail), Chandos Subdistributary, and Bharatpura Subdistributary—within the standard 10 day rotation for the whole distributary. WRD field officers agreed to carry out the plan.

Water for kharif was released into Patna Canal on 01 June 1990. However, the operations plan could not be carried out during June, July and August because necessary repairs to the Paliganj Distributary head regulator had not been completed by the agency. Also, a temporarily repaired syphon in the head reach of Paliganj Distributary gave way and about 50 percent of the canal flow was lost. Fortunately, demand during July was low because rains were heavy and much of the rice was still in the seedbeds. Repairs were made in August, WRD authorized an extra five days release into Paliganj Distributary to make up for lost water, and a revised operation plan was adopted. With the help of this plan, water was taken to the tail of the distributary command in September and October for the second year in a row.

For kharif 1991, the ARP team and the Farmers' Committee developed a more sophisticated operations plan calling for monitoring water distribution during each 15

day rotational period so that corrections could be made. The ARP team developed a computer program to simplify the necessary calculations. Unfortunately, kharif 1991 was unusually dry, particularly during the times of transplanting and flowering when water demands are highest. Land located in the extreme tail of Paliganj Distributary and of Bharatpura Subdistributary could not be irrigated.

Scarcity of water put heavy stress on the organization. Charges and counter-charges flew among farmers. However, several members of the Farmers' Committee took it upon themselves to patrol the canals requesting farmers to maintain discipline and to think of their fellow farmers downstream. As farmers realized later, although some farmers suffered, the overall results in Paliganj Distributary were far better than in areas under adjacent distributaries.

During kharif 1992 and kharif 1993, the Farmers' Committee, the ARP team, and the Water Resources Department continued to try to implement the operations plan, but had problems due to the overall condition of the irrigation canals. Delivery to the tail portions, although improved, is still not satisfactory.

Since 1988, equity of kharif distribution among the five major reaches of the Paliganj Distributary has improved. Table 1 shows that the tail areas now receive a significantly higher fraction of the water. Table 1 also shows that the tail-end section of Paliganj Distributary Canal serves 30.7 percent of the irrigable area. Before the action research, this portion of the canal received only between 10 and 12 percent of the water diverted into the canal. For three consecutive years after the Farmers' Committee became involved in managing the canal, 18 percent of the water has reached the tail portion. Water flows into the lower Bharatpura subdistributary canal increased from about 4 to 12.8 percent of the water. This was accompanied by relative decline in water diverted into head and middle-section blocks. Table 2 shows that irrigated area has increased significantly over the same period. Between 1990 and 1993, area irrigated by the Paliganj Distributary Canal during the kharif season rose from 8,929 acres⁴ in 1990 to 10,750 acres in 1992 and 1993.

2. *Rabi Seasons*

Water demand during rabi is only 60 percent of that during kharif. Because canal capacities are sufficient to meet demand, water shortage is not a major problem. Water is generally allowed to flow in all the canals continuously. As a result, the need for an operations plan is not felt. The major concern during rabi is to react to changing conditions. Occasionally, due to low demand, ungated outlets and poor communication, farmers are not able to control excess water leading to uncontrolled flooding of fields, and damaging of wheat crops and harvested rice.

Since 1989, the Farmers' Committee and WRD officers have worked out plans for gate operations to irrigate or to protect specific areas of the command. The Water Resources Department is supposed to carry out the operations. Cooperation has not been perfect and Farmers' Committee meetings have often been used to criticize WRD employees for failure to carry out Committee decisions. On a few occasions the Committee

4 1 acre = 0.40469 hectare.

members have praised actions of WRD employees. Over the years, cooperation has improved to the point that there are no longer verbal confrontations.

Attacking Maintenance Problems

Farmers have been aware that many water distribution problems are due to poor functioning of structures and weak canal banks caused by lack of maintenance. At first, farmers were not prepared to take over maintenance responsibilities from the agency. Maintenance activities are carried out on a schedule much different from operations. They are more laborious and require special technical knowledge. And most importantly, they are much more expensive. Mobilization of resources for repairs is the major problem.

The Farmers' Committee did not discuss maintenance problems during its first season. However, operating the canal during kharif 1989 revealed many structures that required immediate repair. Therefore, with the assistance of the ARP team, the Farmers' Committee conducted a walk-through survey of the entire distributary during February and March 1990. After completing the walk-through, the Committee identified and prioritized the maintenance needs, including rehabilitation of various structures. Based on these priorities, the ARP team developed a maintenance plan that classified needed works under three headings:

- * Repairs needed immediately.
- * Repairs which could be delayed for a year or two.
- * Repairs to be taken up under a rehabilitation or modernization project.

The plan was discussed and approved by the Farmers' Committee in May 1990. Repairs requiring immediate attention were estimated to cost Rs 1.1 million (about US\$35,500).

Through WALMI, the Farmers' Committee requested the Water Resources Department to carry out these repairs. Although the necessary funds were approved by the state government, they were not made available in time. During the 1990 closed season (March-May), WRD took up only repair of the Paliganj Distributary head regulator, repair of the damaged syphon, and installation of missing head regulator gates on the two subdistributaries. These repairs were not completed on time. They were finally completed on an emergency basis during August 1991, but only after the ARP team persuaded the Engineer-in-Chief to inspect the problems that occurred because of failure to complete the repairs.

Following the 1990 failure of the WRD to live up to its maintenance agreement, farmers began to feel that they had to take more responsibility themselves. One uncompleted repair was a breach in the upper reach of the canal. In December 1990, water from the breach began to damage the newly sown rabi wheat crop. The President of the Farmers' Committee asked laborers from the nearby villages to carry out the repair. After they did so, the Committee, with support of the ARP team, asked WRD field officers in charge of the system to pay the laborers for their labor. Based on measurement of the work, Rs 3,000 was paid to the President of the Farmers' Committee. The President then paid Rs 1,800 to the individuals who worked on the repair and the remaining Rs 1,200 was used to repair a nearby watercourse.

After much persuasion from the ARP team, WRD completed some of the work planned for the 1991 maintenance period. The work was carried out by regular contractors. The ARP

team discussed involvement of farmers in this work with the Farmers' Committee and with the WRD officers. It was agreed that Committee members would supervise the works near their villages and report problems in confidence directly to the Executive Engineer who would pay the contractors only when the Committee indicated its satisfaction. This system worked well and farmers expressed their satisfaction with the quality of the work.

However, only a portion of the planned repair work was completed. Throughout the work, middle-level WRD employees kept promising that they would complete the planned activities, but could not do so. A large part of the problem in getting work done lay in the rules under which WRD operates. These rules forbid having work done by WRD itself and forbid assigning contracts without a formal tendering procedure that excludes Farmers' Committees. In addition, work is constantly hampered by failure to release promised funds.

Frustrated by their experiences in getting the work done through WRD, the Farmers' Committee and the Village Irrigation Committees (VICs) began discussing raising their own maintenance funds. Farmers organized voluntary labor for some specific repair works. In 1991, one VIC in the Bharatpura area carried out work valued at Rs 40,000 (US\$1,290). One Bharatpura farmer commented, "If we waited for the government to repair our canal, we could be waiting forever. It is good we acted together." This approach continued in 1992 and 1993. Most of the work undertaken by farmers consisted of desilting and strengthening canal banks. With WALMIs help, the farmers have continued attempts to get WRD to make major repairs, particularly repairs to regulators and major concrete structures.

Financing Operations and Maintenance

One major complaint of the farmers was that they were forced to pay irrigation rates to the Bihar State Government without getting appropriate service. Farmers felt that the funds raised from the water rates should be directed to maintenance. As recorded in the minutes of Farmers' Committee meetings, farmers often said they would refuse to pay the rates unless particular maintenance activities were carried out. Once they began taking on maintenance works, some farmers declared that they would not pay the rates if they undertook the maintenance.

The present system is clearly not a long-term solution. The water rates are very low: Rs 36.20 per acre (about US\$1.20 per acre). Funds raised do not cover establishment costs (salaries of officers, rent of offices, etc.) of the Water Resources Department or costs of actual field operations. In fact, the cost of collection of the water rates often exceeds the amount collected. It is obvious that it will be necessary for farmers to collect and spend more than they currently pay in water rates to get the necessary maintenance work done.

Farmers began collecting cash contributions in 1991. In 1993 they decided to collect grain. At present the rate is one kilogram of grain for each bigha (about 1/4 acre) of land irrigated. So far, only small amounts have been collected.

The draft agreement between the Farmers' Committee and the government proposes that the Farmers' Committee and the Village Irrigation Committees will be responsible for collection of the government established water rates. Of the amounts collected, 70 percent will remain with the farmers and 30 percent will be paid to the government to cover costs of operation and maintenance of the main channels and headworks.

Village Irrigation Committees

Most of the successes described above are successes of the inter-village Farmers' Committee. Yet, the ability of the Farmers' Committee to resolve problems depends upon support within the villages mobilized through the Village Irrigation Committees (VICs).

In response to a request from the ARP, the USAID-funded Water Resources and Training Project provided the services of Carlos Isles, a pioneer of farmer organization efforts in the Philippines, as a short-term consultant. His report (Isles 1991) criticized the research teams efforts. He argued that the VICs were not strong organizations and did not provide a firm foundation for taking on irrigation management responsibilities.

In response to Isles report, the ARP team organized an evaluation of VICs in December 1991 and January 1992 with the help of the A.N. Sinha Institute of Social Studies in Patna. This study concluded Isles was correct in his contention that VICs did not provide strong base organizations. Findings included:

1. Most of the VICs were formed by a leading farmer simply by nomination of the members. One nominee was not even aware of his membership in the VIC. In most of the villages, nominees were relatives and friends of the leader. In only three villages did the VIC have a proportionate representation of castes. However, the age distribution of members and the distribution of land holdings among members reflected the distributions among the population.
2. Except in one village, VICs did not hold formal meetings. Not many meetings were held at all. In only 10 villages did average participation in meetings exceed 75 percent of the members and in 15 villages, average participation was less than 50 percent of the members.
3. Discussions at VIC meetings were dominated by decisions of the Paliganj Distributary Farmers' Committee. Unauthorized cutting of the canal banks in the upper reaches was intensely discussed. Occasionally, other matters, including ways to improve the system and other agricultural issues were discussed. Most of the discussions were dominated by finger pointing at the Water Resources Department or other villages as causes of problems.
4. Follow up to discussions at VIC meetings was casual, largely because the meetings rarely decided upon concrete action programs. Discussions were followed up only when specific situations were causing serious damage and immediate attention was needed. Even then, VICs generally could not elicit action by all villagers but only by VIC members and those immediately threatened.

However, the weaknesses in the VICs may not be a major problem. Unelected leadership is common in Indian villages (Maloney 1974). Villages in the Sone Command are not large, averaging 210 households and 1,500 persons. Thus a committee of 10 members drawn from different households is likely to be influential, even if not democratically elected. Also, reports from the area show that villages have long been able to mobilize villagers to solve irrigation problems even without formal VICs (Pant and Verma 1983; Sengupta 1991).

In May 1993, the ARP team asked Farmers' Committee members what they thought of their achievements. Members responded that it was only 25 percent of what they desired, mostly because they were not fully organized. Following the meeting, Committee members and others began moving among the villages reorganizing and strengthening existing VICs and creating new ones. Seventeen new VICs have been created, bringing the total to 52. At

the Farmers' Camp in September 1993, the Committee discussed and developed a plan for strengthening the organization as a whole, including raising funds and strengthening the VICs.

Conclusion

Action Research Strategy in Paliganj Command

As shown above, WALMI's intervention has demonstrated a promising approach for improving irrigation management in Paliganj in significant ways. There are several contributing factors:

1. WALMI staff chose to focus on the identified problems rather than plan their intervention on the grounds of theory or ideology. In the Sone System, the major irrigation management problem faced by the farmers has been delivery to the outlets. Therefore, WALMI staff focused their work on delivery to the outlets rather than on distribution below the outlet.
2. WALMI's chosen strategy was to develop an organization and transfer management responsibilities to this organization. Since independence, the ability of the Water Resources Department (WRD) to manage the system has been so reduced that transfer of management responsibilities to organized farmers is perhaps the only viable method for improving management performance.
3. In Paliganj, WRD officers offered no opposition to transfer of operations to the farmers. There was no evidence of corruption, hence the transfer of operations did not threaten the personal interests of any officers. Transfer of distributary canal operations simplifies their work since they were generally concentrating their efforts at higher levels anyway. Because the WRD officers retain control of the headworks and main canals, transfer at Paliganj does not threaten their jobs. WRD officers did offer opposition to transfer of maintenance responsibilities to the farmers largely because of the rules under which maintenance activities are to be carried out. Some farmers, however, asserted that the opposition is at least partly motivated by personal interests in controlling maintenance funds for contracting.

The end result of WALMI's program has been a partially effective transfer of management responsibilities to farmers. The program is not a complete solution because water deliveries on Paliganj Distributary depend upon the unreliable water deliveries in the Patna Main Canal.

The effort put in by WALMI staff has been small compared with other farmer organization programs, such as those of the National Irrigation Administration in the Philippines or similar programs in Sri Lanka. WALMI never fielded a large group of community organizers. The action research team of WALMI never consisted of more than a few persons. Team members did not reside in the area and they spent the largest part of their time working with the Farmers' Committee, mostly in formal meetings.

WALMI staff involvement, however, was crucial in three ways:

1. First, they served as the stimulus to farmers to take responsibility for canal management and suggested a way of doing so. In the Sone System, there were no inter-village or supra-village organizations of farmers. The Farmers' Committee is thus a major innovation.

2. Second, WALMI offered technical assistance and training that enabled farmers to make effective decisions.
3. Third, WALMI, as a recognized government body associated with the Water Resources Department, helped ensure that WRD officers would cooperate with the farmers. The WALMI Director holds the rank of Chief Engineer in the Water Resources Department.

WALMI staff not only provided key ideas and technical expertise, but their involvement also ensured that the innovations would be accepted by the government if farmers did their part. With encouragement from the state government, WALMI staff have taken up a similar program in another part of the Sone System.

General Principles for Irrigation Management Transfer in Bihar and Beyond

At first glance, Bihar seems an unlikely place for a successful experiment in transfer of irrigation system management responsibilities to farmers. Bihar is one of the poorest states in India; average incomes are the lowest in India and crop yields are very low. The Government of Bihar is chronically short of funds and is often unable to pay its bills. Bihar is also well known for its politically and economically motivated violence, including violence between villages.

Both farmers and government officers see transfer as perhaps the only way to improve an extremely bad situation. Mainly because of financial exigencies, the Government of Bihar has formally declared a policy of transfer of irrigation management responsibilities to farmers. This has been codified in the new Bihar State Irrigation Policy, adopted in May 1993, although the wording of the policy seems to focus on matters below the outlet.

The Paliganj experience offers clues to successfully and efficiently achieving irrigation management transfer in large-scale irrigation systems in Bihar and elsewhere:

- * Farmers need both local and supra-local farmer organizations to effectively take over irrigation management functions in a large-scale system. A supra-local organization is needed to give farmers some control over water distribution to the local organizations. Local organizations are needed to distribute water to individual farmers and to organize representation of the farmers within the supra-local organization. The Paliganj farmers themselves, when the WALMI team suggested forming the supra-local Farmers' Committee, pointed out a need for village-level committees to provide a link between the Farmers' Committee and individual farmers.
- * In Paliganj, the main problem faced by the farmers was water delivery to their outlets, not distribution below their outlets. The WALMI staff, correctly, chose to focus their attention on this problem and thus put their efforts into creating and strengthening the supra-village Farmers' Committee. This experience suggests that, if the key constraint is distribution to the local organizations, organizing work should focus first on the supra-village organization.

- * **Creating and strengthening a supra-local organization requires much less effort than creating and strengthening local-level irrigation management organizations in the same area. Where appropriate, as in Paliganj, an initial focus on a supra-local organization is likely to be much more cost-effective than an effort to create local-level organizations.**

- * **Members of the Paliganj Distributary Farmers' Committee have come to realize that strong Village Irrigation Committees will strengthen the Farmers' Committee. Thus they have put in place plans to strengthen the VICs. The lesson is that once the supra-local organization is in place and functioning, it can, in its own interest, take on the task of improving the performance of the local organizations. Even without explicit strengthening programs, a well-functioning supra-local organization, by increasing the assurance of water at the local level, makes the local organizations actions more valuable to its members, thus strengthening the local organization.**

The final lesson from Paliganj is that it may be neither necessary nor possible to create and sustain formal local organizations focused on irrigation management, such as water users' associations. In a society characterized by diversified livelihoods and marginally profitable irrigated agriculture, it may not be worthwhile for individual farmers to put in the effort needed to make a water users' association function well. In such societies, use of existing multipurpose local organizations, like the villages in Paliganj, to manage irrigation may be the most effective solution, or may be the only possible solution.

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Figure 1. Location of Sone Canal, Bihar, India.

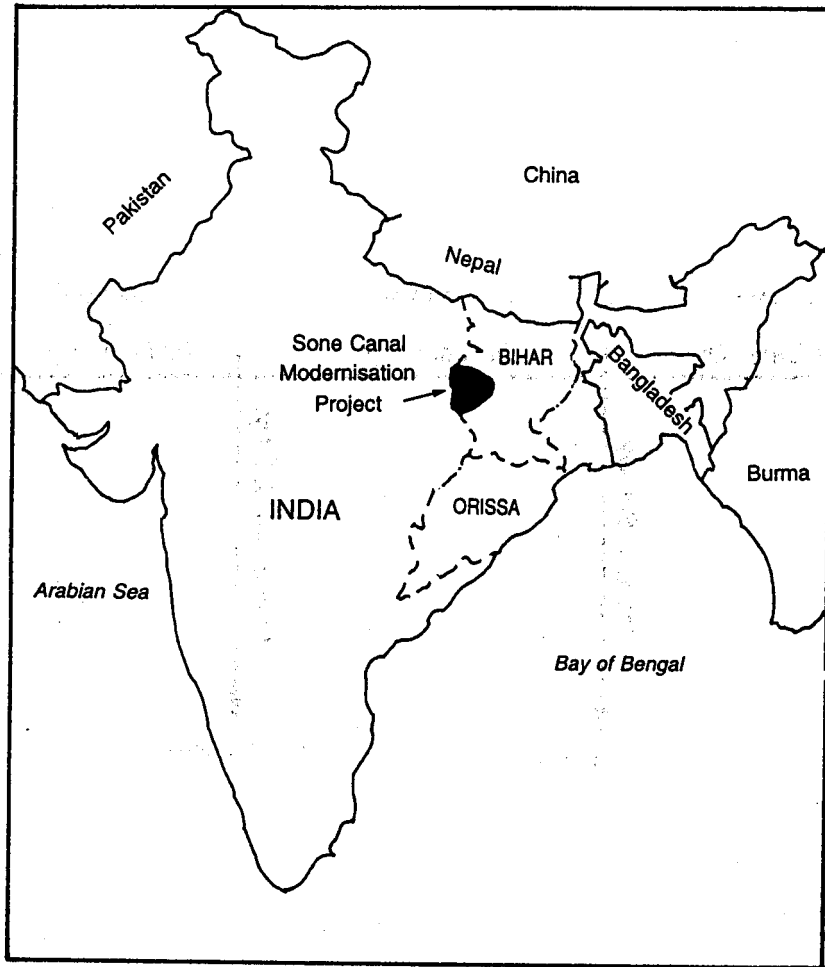


Figure 2. Paliganj Distributary Canal Network.

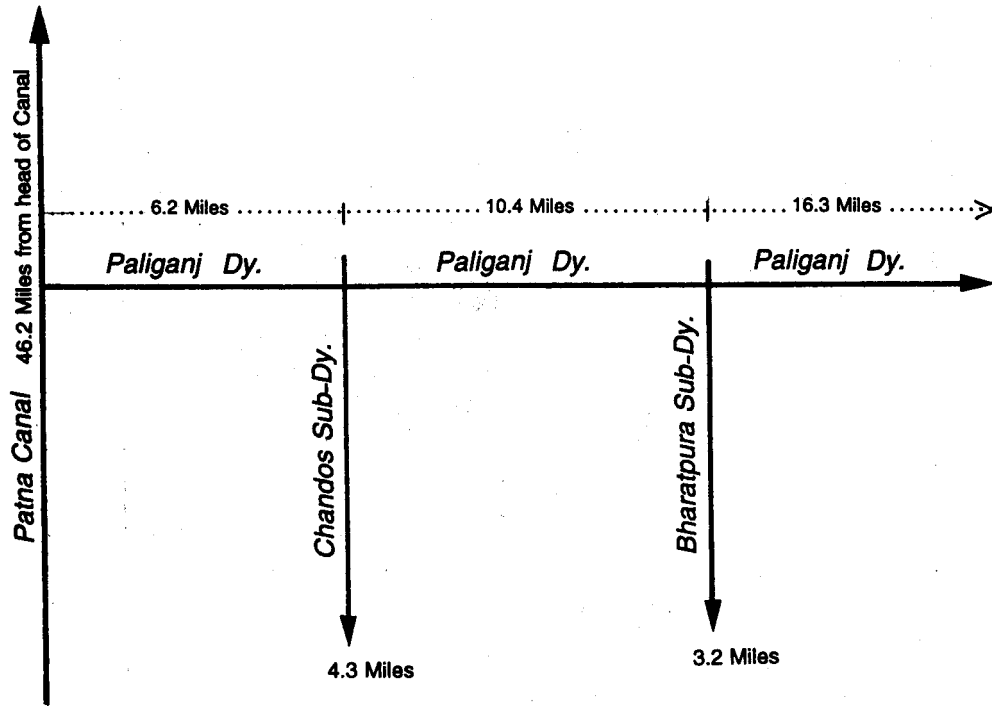


Figure 3. Sone Command, Bihar, India.

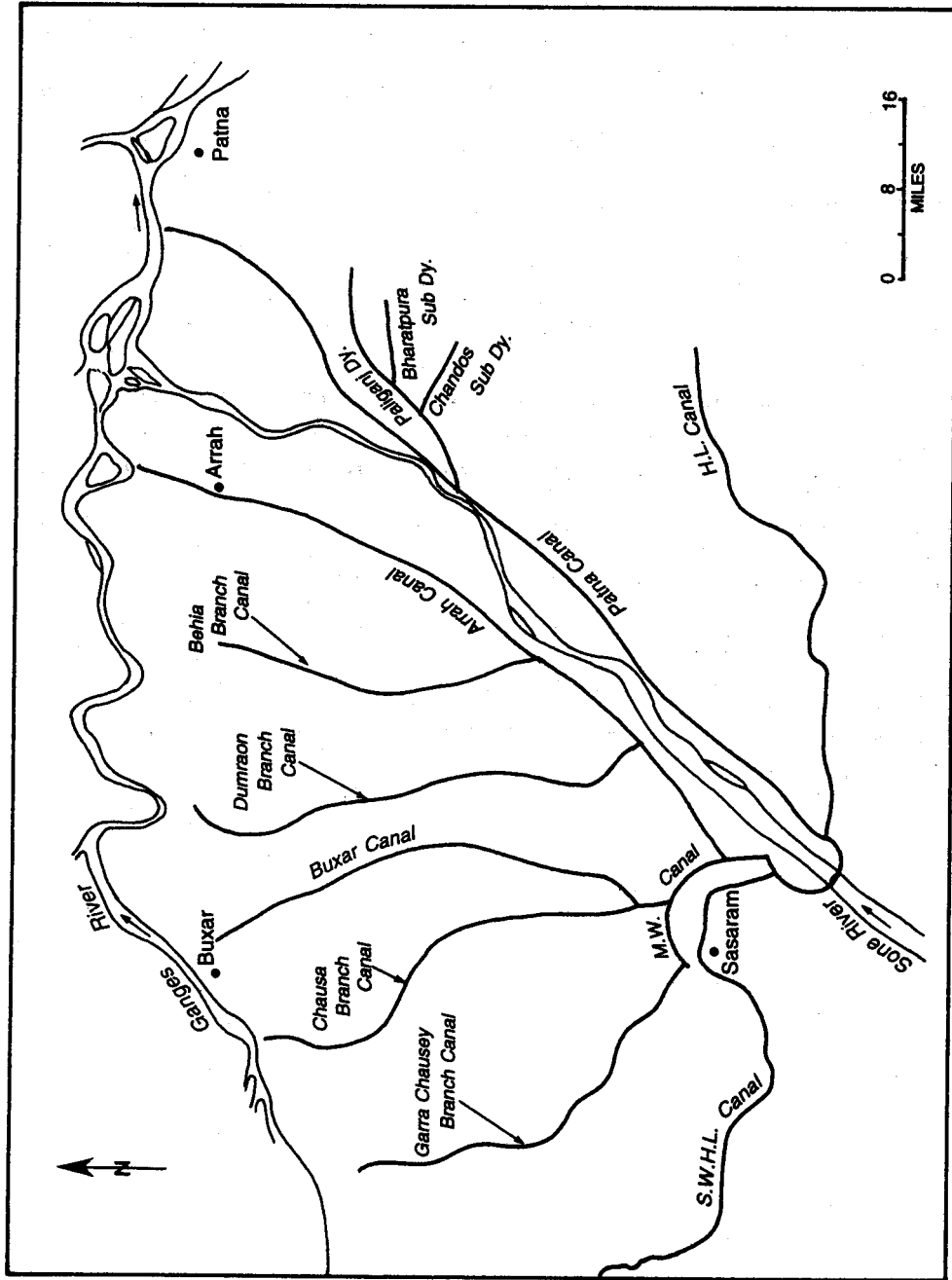


Table 1. Performance of Paliganj Distributary during kharif, 1988-1992. (percentage of kharif water delivery at Paliganj head regulator).

CANAL REACH	% Area	1988	1989	1990	1991	1992
Paliganj Distributary—Head	19.0	43.9	42.6	46.0	45.7	39.4
Chandos Subdistributary	19.9	14.2	11.9	10.9	10.2	13.4
Paliganj Distributary—Middle	16.1	24.7	30.9	21.0	13.8	16.2
Bharatpura Subdistributary	14.3	4.4	3.8	4.1	12.8	12.8
Paliganj Distributary—Tail	30.7	12.7	10.8	18.0	18.3	18.1

Table 2. Area irrigated during kharif seasons in Paliganj Distributary Command. (acres).†

CANAL	1955*	1985	1990	1991	1992	1993
Paliganj Distributary	6,638	8,918	8,929	8,750	10,750	10,750
Chandos Subdistributary	516	638	639	800	800	900
Bharatpura Subdistributary	764	868	868	700	600	600
Total	7,918	10,424	10,436	10,250	12,150	12,250

* These figures show the area that could be supplied until 1955 according to the Bihar Irrigation Manual.

† 1 acre = 0.40469 hectare.