

## BIHAR MODEL OF PIM IN INDIA – SOME ISSUES

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### ABSTRACT

Like other countries of the world, e.g. China, Sri Lanka, Philippines etc., Indian states have also developed Participatory Irrigation Management System as per their respective ground conditions. Bihar, an eastern state of India, has also developed a PIM model, as per its needs and ground conditions, which is popularly known as “Participatory Irrigation Management – Bihar Model”. In Bihar against 25.74 lakh ha created irrigation potential, management of nearly 1.67 lakh ha has been transferred to respective FOs under PIM programme. Farmers have appreciated the efforts of WALMI and think that much can be achieved if Water Resource Department officers also respond adequately. FOs at channel level are formally constituted less than 20 years back except for Paliganj distributary in Sone system, and most of them have conducted adequate meetings indicating that they are active and formed their village level committees also. In terms of water distribution, farmers have reported that irrigated area has also increased. Tail end areas now receive a significantly higher fraction of water. The tail-end section of the Paliganj distributary canal serves 30.7% of the irrigable area. Before the action research, this portion of the canal received only 10 to 12% of the water diverted into the canal. It has helped in enhancing the economic return of small farmers of the area. Therefore, in the present paper Bihar PIM model with special focus on the Paliganj distributary of the Sone irrigation system in south Bihar has been described and discussed.

**Keywords :** Participatory Irrigation Management, Water Users’ Association, Farmers’ Participation.

### 1. INTRODUCTION

PIM refers to the involvement of irrigation users in all aspects of irrigation management and at all levels. ‘All aspects’ includes the initial planning and design of new irrigation projects or improvements as well as of construction, supervision, financing, decision rules, operation, maintenance, monitoring and evaluation of the system. ‘All levels’ refers to the full physical limits of the irrigation system’

While pre-19<sup>th</sup> century rulers often financed the construction of irrigation, levied by tax and exerted varying degrees of political control over it, they rarely managed the systems directly on day to day basis. Management was left to local users of the systems. The 19<sup>th</sup> century witnessed the emergence of irrigation bureaucracies as government departments. These agencies not only designed and built but also governed the systems. They also assumed responsibility for day to day operation and maintenance. Recent history has seen enormous expansion of irrigated area, mostly through the construction of large-scale irrigation systems. This happened in the period roughly from the 1950s to the 1980s in India and was strongly supported by international development loans. There was a naturally accompanying expansion in size, importance and power of the government agencies that designed, built and managed these systems i. e. the state Irrigation Departments.

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## 1.1 Conventional Irrigation Management Versus PIM

In conventional Irrigation Management system all the activities of irrigation management i.e. maintenance, operation, assessment and irrigation rate collection are conducted by Government Agencies and when water reaches to fields, farmers utilize it, whereas under Participatory Irrigation Management system, irrigation schemes are jointly managed by government personnel and farmers together. The main roles of Farmers' Organizations are as follows:-

- To assume responsibility for equitable, economical and efficient distribution and optimal utilization of water made available to them and thereby give better services, increase irrigated area and increase water use efficiency.
- To maintain distribution system under their control and prevent damage and wastage henceforth with the money available to them under the provision of MoU;
- To collect water charges from farmers for maintenance of the system and for payment to the WRD as per provisions of MoU. They can also mobilize local resources in cash or labour towards O & M; and
- To inculcate the real sense of ownership and responsibility among the farmers.

## 1.2 Status Of PIM In India

In India by the end of IXth plan (1997-2002) 94 million hectares of irrigation potential has been created. However, there is a gap of about 10 million hectares between the irrigation potential created and that being utilized. Taking the average cost of Rs. one lakh per ha for creation of irrigation potential, an investment of Rs. one lakh crore thus remains unutilized. The reason for under-utilization of the created irrigation potential can be traced to rigidity in planning, improper funding, non-participation of the beneficiaries and poor upkeep of the system by the administrative and development machinery of the Government at various levels. This has compelled to appreciate the urgent need of "Participatory Irrigation Management (PIM)". However, there are a few historical evidences of management of irrigation systems by farmers as described below.

In AD 4th century, Chanakya, the author of Arthashastra, a treatise on political economy, urged the then rulers to assist the farmers in the construction of irrigation works and give them various incentives.

In Vijayanagar Empire during AD 13th to 16th century, now part of modern Karnataka, a series of diversion weirs and canals were built by the then rulers, in which farmers participated voluntarily. Resolution of conflicts and routine maintenance were achieved through voluntary participation.

In Tamil Nadu, the Chola king, Karikala, built an anicut across the river Cauvery, which was popularly known as the Grand Anicut. Certain parts of the irrigation system were maintained by the Government and were known as 'Sarkari' and the lower parts were maintained by farmers which were known as - Kudimarammat' (based on farmers' maintenance).

Himachal Pradesh state had an ancient irrigation system called 'kuhl', in which irrigation was managed by the community.

In the hilly regions of Uttar Pradesh also there was a tradition of farmers managing diversion streams. However, these were very small systems.

Maharashtra had/have a 'Phad' system in which irrigation is managed by a group of beneficiaries. Such a system of maintenance had been practiced for management of

small irrigation works in North - Western parts of Maharastra. This system still exists in the state.

In Bihar traditional farmers' participation in water distribution from Ahars, pynes and tanks still continues, though with less effectiveness, especially in the districts of Gaya, Nawada, Bhagalpur, etc. (Pant, 1998) Bihar has experience of organizing small farmers for construction of community tube wells and their management under the Food for Hunger program (1968) with Indo-Norwegian solidarity fund support through Vaishali Small Farmers Association (VASFA). In this project 36 tube wells of medium capacity in 14 villages are still functioning. VASFA functions have expanded to number of other activities such as integrated agricultural development, procurement, storage and distribution of purchased inputs, service center through a mechanical workshop undertaking repair of diesel engines, pump sets and other agriculture equipment and undertaking various government sponsored activities and programs of rural developments (bio-gas, sanitary latrines, drinking water tub-wells, rural houses) training programs for upgrading of cattle, social forestry, etc.

### 1.3 Status Of Irrigation And PIM In Bihar

Bihar, with a geographical area of 94.163 Lakh Ha and a population of 10.41 crore (as per 2011 census), is the seventh largest state in respect of area and the third biggest state in respect of population after formation of Jharkhand state in November, 2000. The density of population is 1106 persons per Sq.km against 382 persons per Sq.km for the country as per 2011 census. The state's economy is predominantly agricultural as it contributes about 47.6% towards GDP, against 25% for the country on the whole. The State has plenty of plain and fertile cultivable land of 64.41 Lakh Ha which is almost 70% of the geographical area. The soil is mostly alluvial and very fertile, most suitable for multiple cropping under irrigated agriculture. The climatic factors are very favourable to agricultural practice. The State has to support about 8.6% population on 2.86% area of the country with 16% of surface water and 6.8% ground water resource of the country. About 73% of the geographical area is flood prone, about 10% area is affected by drainage congestion and about 17% is drought prone. Most of this is accounted for by the development of additional large river diversion systems or expansion of existing ones.

Ninety percent of the crop area in the state is still devoted to food grains and productivity is low. Urbanization is low and percentage of people dependent upon agriculture is high. There is both economic and social backwardness. Till independence only 4.04 lakh ha was brought under irrigation in the state. However, Bihar's irrigation potential in major and medium irrigation is 66.295 lakh ha, of which 27.828 lakh ha has been created. Utilization is only 21.96 lakh ha as per records. This is partly due to incomplete systems and distribution networks, and partly due to increasing deterioration of systems due to poor maintenance. There are serious resource constraints. Farmers are dissatisfied with the performance of the systems and are contributing to poor physical conditions by damage and obstructions.

Prior to construction of the first major canal system in the State, namely, the Sone Canal System in 1874, Bihar had traditional irrigation systems of ahars, pynes, tanks and dugwells for irrigation. These systems were constructed with the leadership and support of local landlords, popularly known as zamindars. Management of these systems was done by the farmers themselves. With the construction of the Sone Canal System a new era started. Government entered into creation and management of large irrigation systems. During British rule, the irrigation systems were considered as an economic enterprise. The water charges were as high as five times that prevailing today. Thus, the economic sustainability of the system was more or less guaranteed. The acts, rules and regulations for management of systems were severe

and their implementation was strict. But farmers' participation was sought in the form of Lumberdars or Sattedars who helped the department in the management of canal system on nominal remuneration as percentage of canal revenue collected. Farmers were more or less satisfied with the irrigation service.

During this development, large numbers of farmer-built and managed ahar - pyne systems were incorporated into the new systems. In 1968, the then Irrigation Department suggested that they take full operation and management responsibilities for the remaining ahar - pyne systems. This was resisted and ultimately dropped. Hence, many of these systems continue to be managed by farmers' communities, particularly in South Bihar.

The "Satta" system has been partly restored through a 1988 amendment to the Bengal Irrigation Act permitting the state to receive applications in some irrigation systems. The Second Irrigation Commission has also recommended that this modified system be extended to the rest of the state. However, this application is not applied in any major surface irrigation system, including the Sone system where it originated (Raju, 2006).

#### **1.4 Reasons For Poor Progress Of PIM**

Although PIM has been introduced and promoted in India for more than three decades, the acceptance of the concept has been, 'sluggish, scattered and site specific', according to Navalawala (1995). There are no authentic figures available regarding numbers of WUAs in existence. This is both the problem and the symptom. A full census is not available and we don't know the size/nature of the FOs and whether they are indeed functioning, and if so, how. In Philippines, which began its PIM programme in 1983, has transferred 58 per cent of its irrigated area; China 26 per cent. Brazil has gone to the extent of abolishing the Dept. of irrigation and forming co-operatives for managing the systems. Introduction of PIM is a win-win situation. Why then is progress poor in India? These are the important reasons:-

- PIM is not a national programme. No target has been fixed.
- Inadequate staff support for PIM both in Centre and States.
- Legal support lacking.
- Lack of clear accountability in supply of water and
- Not enough water pricing to meet O & M expenditure

#### **2. RECENT DEVELOPMENT OF PIM AND ITS STRATEGY IN BIHAR**

- Water use efficiency is presently very low. It is estimated to be only 38 to 40 per cent for canal irrigation. This is due to several reasons:
- Defective designs;
- Incomplete works and structures;
- Incomplete development of field channels and land levelling in surface systems;
- Concentration of use of water leading to adoption of water intensive cropping patterns at head levels as also over-irrigation in those areas of the command;
- Lack of water conservation practices.
- Poor operation of canal systems;
- Lack of communications for rational distribution of water in the system;
- public interference;
- Over or improper exploitation in some areas and systems leading to substantial losses due to waterlogging, salinity and deepening of water table; and
- Insufficient maintenance leading to further deterioration of irrigation systems.

It is estimated that with a 10 per cent increase in the present level of water use efficient in irrigation projects, an additional 14 m. ha area can be brought under irrigation from the existing irrigation capacity (www.iipa.ernet.in). Therefore, effective implementation of PIM is urgently required in Bihar.

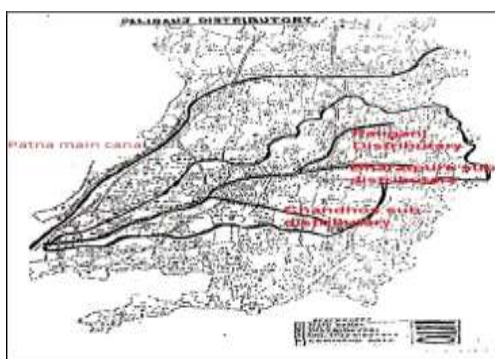
Bihar's claim to fame is the success story of PIM in Paliganj Distributary in Patna district where for the first time, management of a distributary with a huge command area was transferred without first doing rehabilitation work. The experiment is reported by IIMI, Sri Lanka (1994). This seed of participatory approach has become a unique experiment. It has also served as a guide for further action to achieve PIM in the state. Paliganj shows the success of the macro-to-micro approach which is not the traditional bottom up approach. The river system of Bihar and the present study area i. e. command area of Paliganj distributary are shown in Figure 1 and 2 respectively.

In January, 1996 a State Conference was organized at Patna with MOWR assistance, where it was decided to initiate PIM in the State 'in right earnest' and 'as a mission'. The fact that the farmers accepted that 'they were prepared to take systems as they were' was a big boost, although it also reflected their non-confidence in the ability of Irrigation Department to provide proper services.

While extending the PIM programme slowly in the entire state, the strategy was that it should be implemented basically by grass root field engineers (AEs and JEs) with support from their senior officers of WRD. WALMI will help WRD in motivating, training and documenting the process and experiences, drawing lessons and bringing constraints in implementation to the notice of the Government. PIM implementation was taken up with whatever meager funds were available with WRD without waiting for external help. In PIM more reliance was to be placed on the capability of farmers. Farmers were to be made to realize that they had to solve their problems themselves. External agencies and government can only support their efforts.



**Figure 1.** River System in Bihar  
(Source: FMIS, GOB).



**Figure 2.** Index Map of the Study Area

Chief Engineers were requested to select at least one suitable distributary in each system and also identify the grass root field officers and post them in charge of the selected channels. The grass root officers were called to WALMI at Patna and given an orientation training on PIM. They were motivated to participate in the program. WRD gave some funds for PIM software in 1996-97 and this continued in 1997-98 also. Under the programme concerned, field officers come regularly to WALMI (sometimes with farmers' representatives also) to share their experience, formulate future programmes, discuss their constraints and seek guidance. Farmers are also separately called for training. Experts and faculty of WALMI often visit PIM area to

have first-hand assessment of the area and the impact of the programme. Local officers were asked to make a joint walk through and diagnostic survey of the distributary network. Special funds were allocated for maintenance and start of rehabilitation work as prioritized by farmers. The results so far seem to be good, in spite of the various constraints in implementation of the programme which still exist. Therefore, it can be concluded that there is good response from farmers.

### 3. ACHIEVEMENTS OF PIM IN PALIGANJ DISTRIBUTARY

The Sone Scheme diverts water from the river to irrigate the command area of over 700 000 ha. The Paliganj Distributary diverts water directly from the Patna main Canal of the Eastern Sone System. The head gate is 73.9 km from the head of the Patna Canal and 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 sub-distributaries. 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. The mean annual rainfall in the area is about 1000 mm, mostly during the kharif season between June and October. There are smaller amounts of rainfall during the Rabi season from November to March. The hot weather season from March to June is generally without rain. During kharif, the main crop is rice. During Rabi, the main crop is wheat but many other crops, including pulses and oilseeds, are also grown. Rabi irrigation is limited to about 1000 ha. Almost no crops are planted during the hot weather season. During this season the canals are closed for maintenance. The distributary serves 55 villages. The villages include about 16 000 households and more than 114 000 people. The land holding size of the Executive Committee members are as given in Table 1.

**Table 1.** Land holding size of EC members in Paliganj WUA

Land holding size in acres	Number of Executive Committee Members
0-2	2
2-5	5
5 – 10	2
10 – 20	2

An action research programme was taken up in the area in 1988. Between 1988 and 1993, the equity of kharif season water distribution among the five blocks of the Paliganj distributary improved significantly. Tail areas received a significantly higher fraction of the water. The tail-end section of Paliganj distributary canal serves 30.7% of the irrigable area. Before the action research, this portion of the canal received only 10 to 12% of the water diverted into the canal. For three consecutive years after the Farmers' Committee became involved in managing the canal, 18% of the water reached the tail portion. Water flows into the lower Bharatpura sub-distributary canal increased from about 4 to 12.8%. This was accompanied by a relative decline in water diverted into head and middle-section blocks. Irrigated area increased significantly over the same period. Between 1990 and 1993, the area irrigated by the Paliganj distributary Canal during the kharif season rose from 3614 ha in 1990 to 4350 ha in 1992 and 1993.

Farmers reported in the camps and other meetings that, in their view, the most important results of the Action Research Programme in Paliganj Distributary were the following.

- Improvement of relations between farmers and WRD officers;

- Some unity among farmers about solving the water problem.

The IIM-IIMI study (1995) identifies the constraints to Irrigation Management Transfer in Bihar, thus: "It is clear that Bihar government officials are thinking out various aspects of irrigation management transfer for large surface systems and for state lift systems. However, it is also clear that while irrigation management transfer is recognized as perhaps the only solution to the desperate situation, there is resistance to wholesale transfer." It is unfair, but not wholly untrue. But there is an urge amongst many officers and farmers to try it. With a little help Bihar can show the way in PIM. This study does note that Bihar's actions so far have been the most radical i.e. transfer of huge areas, macro to micro approach and retention of 70 percent farmers of fees for O and M work. WALMI has done very useful work in PIM but it badly needs strengthening. In 1998 the process of giving it autonomy and strengthening it with multi-disciplinary academic faculty was started. There are state institutions which need further support from GOI. Bihar also does not have many NGOs and not much academic support except for the Centre for Water Resource Studies (CWRS) at NIT Patna, which is more on the technical side. Therefore, outside resource support is minimal. Bihar has also not been able to make use of central funding for CAD activities such as subsidy to WUAs because the state share has been wanting. CAD was essentially restricted to lining of water courses as elsewhere and little else. The CAD Department has been separate from Irrigation Department. Heavily overstaffed, its activities are very few. It has, therefore, been a greater failure here than elsewhere in India.

#### 4. BOTTLENECKS EXPERIENCED AND THE REMEDIES

These are as described below.

**Lack of Willingness:** Because of poorly maintained canal system, farmers are reluctant to take over the management of irrigation system. To motivate them on spot, training camps were organized by WALMI. Some motivational films were also demonstrated. Paid advertisements were broadcasted through radios at regular intervals.

**Collection of Water Charges:** Some farmers are habitually reluctant towards payment of water charges. To overcome this difficulty, FOs have been made agent of FCI for procurement of food grains. This system helped the committee to realize water charges from members while making payment of food grains to farmers.

**Resource Generation:** The Government of Bihar has made provision to nominate chairman/ secretary of the Irrigation Management Transferred committee as permanent invitee in Local Body Government. This system would help in generating extra resource for the maintenance of canal system from local bodies' fund.

**Healthy Competition:** The Government has announced to award three best performing FOs at every year Republic Day and Independence Day, State Level celebration programme. This system has created healthy environment of competition among FOs.

#### 5. LESSONS LEARNT FROM PALIGANJ

The Paliganj experiment in Bihar differs in many ways from the experiments conducted in other states (IMM-IIMI 1997). Developments in PIM in Bihar provide some important lessons:

- Management of a larger area than the present perception in India of about 500 ha can be entrusted to FOs. This is of path breaking significance.

- Farmers' representatives can be selected and trained for promoting PIM and effectively motivating other farmers. Some of them become community organizers.
- Though a multi-disciplinary team is needed, even the field level engineers can do the work satisfactorily, if these officers are properly trained and motivated.
- Canal revenue can be directly shared between FOs and WRD to meet the cost of annual maintenance of the system under their management. This must be substantial too. Therefore, Bihar has given them 70 per cent share.
- It is not necessary to restore the irrigation system prior to transfer i. e. it is better to take up restoration by department through the FOs. Further, early and limited improvement in canal maintenance leading to improved water distribution can be achieved without much physical improvement in the system.
- The new approach of macro-to-micro appears to be very successful.

## 6. IMPACT ASSESSMENT OF EFFORTS ON PIM IN BIHAR

Under the annual programme of PIM undertaken by WALMI, Patna, a State Level Conference was organized on November 10-11, 1998. Representatives of FOs of about 37 channels (including 6 women farmers) and field officers of WRD, who were the implementers of PIM at grassroot level in Bihar, were requested to contribute papers based on their perception and experience of the program in their operational area. It is to be noted that all the received papers were mostly from large commands. All were from the command area above 1000 ha; with 6 from greater than 2000 ha; 4 from greater than 3000 ha; 3 from greater than 5000 ha and 1 from greater than 10,000 ha command areas.

The then Minister for WRD, Bihar, in his inaugural speech, told that farmers should be involved in preparing plans for repair of canals and the execution of works should be done by engineers and farmers in a participatory way. Contractors are not required for such works. These works should be done with the cooperation of farmers' committees and, if necessary, rules of the department may be amended. He also suggested that appropriate recommendations be made in the conference so that government can take action in this regard.

Altogether, twenty-eight farmers and two members of a field implementation team (FIT) contributed papers in the conference. The impact of the PIM programme as perceived by farmers and ground level officers is briefly described below.

- In 3-4 cases, it was reported that water has been supplied to additional lower parts of the canal but corresponding increase in irrigated area is not reported. This is difficult to explain. It requires an accurate measurement and monitoring system in the field, which the FOs has not yet started. However, it is clear that quality of irrigation has certainly improved.
- In most of these area O&M work is being done jointly by WRD and FOs. Some areas were also given funds for rehabilitation. More funds need to be released as the process goes on. At that time 12 FOs had filed for registration covering an area of 27000 ha. Also 27 FOs were gearing up to do the same.

## 7. Bihar Model of PIM

Water charges were very low in Bihar. After 1983 they were revised only in 1995, when these rates were doubled (currently these are Rs. 152.40 per ha Rabi, Rs.

177.80 per ha for paddy). This policy of low water charges of the state was on the plea that Bihar farmers are poor and unable to pay higher water charges. However, it has ultimately gone against farmers' own interest. Revenue collections have been poorer still. There is a separate collection machinery. From 1986-87 to 1990-91, revenue collected was less than cost on revenue establishment. In this situation, Govt. of Bihar came out with its own model of PIM, which is popularly known as Bihar Model of PIM. Its salient features are as described below.

**Organization:** As per the Guidelines, the organizational structure required for the implementing PIM would be at two levels namely State Level Organization and Farmers' Level Organization as described below.

**State Level Organization:** This will include the following committees at different levels.

**State Level Steering Committee (SLSC):** This committee shall be responsible for policy decisions to be taken during implementation of PIM in the State. This committee is headed by the Development Commissioner of the State. Composition of SLSC is:

- |  |   |          |
|--|---|----------|
| 1. Development Commissioner, Bihar, Patna                              | : | Chairman |
| 2. Secretary, WRD, Bihar, Patna<br>Secretary                           | : | Member   |
| 3. Secretary, Minor Irrigation Department, Bihar                       | : | Member   |
| 4. Secretary, Finance Department, Bihar                                | : | Member   |
| 5. Secretary, Agriculture Department, Bihar                            | : | Member   |
| 6. I.G. Registration, Bihar, Patna                                     | : | Member   |
| 7. Secretary, Agriculture (Special Programme) or<br>his Representative | : | Member   |
| 8. Regional Director, Agriculture Research Institute                   | : | Member   |
| 9. One number as farmers' representative                               | : | Member   |
| 10. One number Retired Engineer-in-Chief, WRD<br>Member                | : | Expert   |
| 11. One number NGO Representative                                      | : | Member   |

**PIM cell in WRD:** This cell will function under an officer of the rank of the Superintending Engineer of WRD, Govt. of Bihar.

**PIM units at Chief Engineer Level:** At every Irrigation Chief Engineer's level there is a PIM Unit, headed by the Chief Engineer. Composition of PIM Unit is as given below. This unit is responsible for planning and implementation of PIM in the Chief Engineer's zone.

- |   |   |                  |
|---|---|------------------|
| 1. Chief Engineer                                 | : | Chairman         |
| 2. Executive Engineer (Quality Control or Design) | : | Member Secretary |
| 3. Secretary (Technical) to Chief Engineer        | : | Member           |
| 4. All Irrigation Superintending Engineer         | : | Member           |
| 5. All Irrigation Executive Engineer              | : | Member           |
| 6. Suitable no. of Farmers' representative        | : | Member(s)        |

7. Suitable no. of NGO representative : Member(s)

**Field Implementation Team:** Field implementation team at the Executive Engineer level shall be responsible for implementation of the programme at grass root level.

**Farmers Organization:** This organization of the farmers will be two tiers i.e. Village Level Committee and System Level Committee. The system stands for Distributary, Sub-distributary or Minor.

**Village Level Committee:** Every village of the distributary, sub-distributary or minor, which is proposed to be included under PIM, shall have a VLC which shall be responsible to the system level committee.

**System Level Committee:** All the Chairperson of the village level committee shall form the System Level Committee. The System Level Committee shall be a corporate body registered under Society Registration Act 1860. This committee shall be a non-profit service organization responsible for overall management of irrigation related activities under its command. It may be an umbrella organization for all the Village Level Committees. It will try to establish strong linkages with allied Departments/ Agencies, outside/ within the command to promote the interest of farmers.

## 8. STATUS OF IRRIGATION SYSTEMS HANDED OVER TO WUAS

Irrigation Potential covered under PIM Programme in Bihar, the management of which has been handed over to respective Farmers' Organization, (command Area wise) till 2015 are as given in Table 2.

**Table 2.** Abstract of Irrigation Systems Handed over to WUAs

SL. No	Name of Command Area Agency	No. of Irrigation systems turned over under PIM	CCA of Irrigation systems turned over under PIM in ha
1.	SCADA	33	109520
2.	GADA	20	52473
3.	KADA	1	5200
4.	KBCADA	-	-
	Total	54	167193

## 9. CONCLUSIONS

Based on the above results and discussion the following conclusions are drawn.

1. The strategy of Govt. of Bihar to extend the PIM to other distributaries has the potential of success on sustainable basis.
2. Patna WALMI needs strengthening so as to replicate the success of action research and PIM in Paliganj distributary to other canal systems in the state.
3. Irrigation system transfer is not possible only by issuing an order. It needs adequate consultation with and motivation of farmers in the area
4. The efforts for implementation of PIM in Bihar are largely unnoticed and not adequately supported, but perhaps it is the one of the soundest strategies of all.

5. Unlike many other states. Bihar has not been able to make use of central funding for CAD activities such as subsidy to WUAs as the straight share has been wanting.

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