IMPACT ASSESSMENT OF INSTITUTIONAL REFORMS IN IRRIGATION SYSTEM OF THE PUNJAB

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ABSTRACT

For equitable and reliable water distribution, institutional reforms were introduced by the Government of Punjab at Lower Chenab Canal (East) Circle, Faisalabad during 2000 as pilot project. Under reforms these participatory irrigation management (PIM) activities were started. Impact of these Institutional reforms was assessed in the Faculty of Social Sciences, UAF, Pakistan during the year 2010-11 to see farmer,s perception and satisfaction about PIM activities. For this purpose 480 respondents were selected through multistage sampling technique for data collection. According to farmers' perceptions, more than 66 percent of farmers reported repair of "*nakka*", while recalibration of outlet was reported by 56.5 percent farmers in ranking analysis, satisfaction about water turn (warabandi) topped with mean score of 2.72 followed by Khal Panchayat reporting of water theft cases to farmer,s organization with mean score of 2.34. The regular participation of farmers in maintenance was more than 92 percent. After implementation of PIM activities, the cropped area increased by 4.98 percent in rabi season and 5.42 percent in kharif season. The results indicate that equitable water distribution as a result of PIM activities increased. The satisfaction level of farmers was good but not upto the mark which suggests more strict action and enforcement of Punjab Irrigation and Drainage Authority (PIDA) laws to have equitable and reliable water distribution for betterment of farming community.

KEYWORDS: Participatory irrigation management; institutional reforms; equitable water distribution; Punjab; Pakistan.

INTRODUCTION

Pakistan's agriculture mainly depends upon irrigation system as more than 90 percent of agricultural production is engaged with irrigated lands (1). Agriculture is the major source of food grains, rural livelihood, raw materials for major domestic industries and exports. In order to meet the future challenges of food requirement and development in agriculture, adequate and timely availability of irrigation water is an essential pre-requisite.

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However, a large portion of irrigation water is wasted during the process of irrigation due to improper water management practices. It has also been observed that the state owned irrigation systems have not been performing well and are deteriorating day by day, especially in developing countries due to financial, managerial and socio-political factors (3). This situation has resulted in inequitable and unreliable water distribution among all farmers as the influential farmers and farmers at head generally used illegal means to have regular supply of irrigation water for better crop production. The agriculture sector of the country is currently facing dual challenge of irrigation water scarcity and increasing food demand by the rapidly growing population. The country's population was estimated at 180.71 million during 2011-12 (2). The projected population for 2015 and 2025 is 191.72 and 227.26 million, respectively. According to available estimates, the irrigation water requirements for the years 2015 and 2025 would be 111 and 119 million acre feet (MAF), respectively (11).

The overall water availability has become less during last few years from the normal delivery ranging from 2.5 to 20.5 percent. The water availability for kharif crops during 2012 remained 14 percent less than the normal supplies and 4.4 percent lower than last years kharif season. Similarly in rabi season 2012-13, water availability was 12.4 percent less than the normal availability and 8.5 percent more than last year's rabi season (2). This situation of water scarcity is major cause to use illegal means of irrigation to fulfil the crop requirements. These farmers also try to bribe the officials of irrigation department to get more water than their allocation. In this situation, small farmers and the farmers at tail are severely disadvantaged in terms of equitable water distribution for their crops. Realizing the need for reliable and equitable water distribution, Government of Punjab promulgated the Punjab Irrigation and Drainage Authority (PIDA) Act in 1997 to introduce major institutional reforms for improving the performance of irrigation sector. The reforms involve participation of farmers at all levels of decision making and later on transfer of management of the irrigation and drainage system to a three-tier system i.e. Khall Panchayat (KP), Farmer Organization (FO) and Area Water Board (AWB) of autonomous entities with clearly defined roles and responsibility within the system. The new system has the potential to address the problems of the farmers regarding bridging head-tail equity in water distribution and hence improving the productivity and income of the farmers (9).

The present study was designed to find out the perception, participation and satisfaction of farmers about PIM activities and impact of these activities on cropped area.

METHODOLOGY

The present study was conducted in the Faculty of Social Sciences, University of Agriculture, Faisalabad during 2010-11. The Lower Chanab Canal (East) Circle, Faisalabad command area comprises main line lower canal, Upper Gugera Canal, Lower Gugera Canal and Burala Canal where participatory irrigation management activities under new institutional reforms were started in 2000. The data were collected from randomly selected two link canals (Lower Gugera and Burala). Four distributaries (Janiwala, Yakkar, Rassiana and Pauliani) from Lower Gugera Canal and four distributaries (Tandlianwala, Dulchi, Kamalia and Kilianwala) from Burala Canal were randomly selected. Three villages from each distributary located at head, middle and tail were randomly selected. Twenty farmers from each village located at head, middle and tail of water course were randomly selected as sample of study making a total of 480 farmers. These farmers were personally interviewed for collection of requisite information. Descriptive statistics were performed using SPSS statistical package for drawing inferences.

RESULTS AND DISCUSSION

Perception about PIM activities under institutional reforms

Water theft was the major problem in the area before implementation of institutional reforms (PIM/IMT) in the irrigation system against equitable water distribution. Different steps were taken by the Farmer Organization (FO) in consultation with Khal Panchayat (KP) to control this evil. These steps include recalibration of outlets, repair of "*nakkas*", registration of water theft cases, registration of first information report (FIR) against theft and imposing fines on water theft. Farmers' perceptions were taken on these steps one by one to see the improvement in equitable and reliable water distribution. For improving equitable and reliable water distribution majority of the farmers (66.3%) reported repair of "*nakka*" and ranked first in order followed by recalibration of outlets (56.5%) for having equitable and reliable water supply from head to tail for all irrigators (Table 1). In case of registration of water theft cases (29.6%), FIR against water theft (20.6) and imposing fines against guilty members (19.4%), farmers ranked these activities 3rd, 4th and 5th, respectively for having equitable and reliable water distribution. These results imply that there is need to take more strict decisions for control of water theft evil and ensured equitable and reliable water distribution among all share holders as per specified procedure.

Table 1. Farmer perception about steps taken for water theft control.

Activities/Items	Response				
	Yes		Rank	No	
	Frequency	Percentage (%)		Frequency	Percentage (%)
Repair of Nakkas	318	66.3	1	162	33.7
Recalibration of outlets	271	56.5	2	209	43.5
Registration of water theft cases	142	29.6	3	338	70.4
Registration of FIR against water theft	99	20.6	4	381	79.4
Fine against guilty members	93	19.4	5	387	80.6

Satisfaction about water theft control activities

The satisfaction level of farmers regarding main steps for equitable and reliable water distribution is presented in Table 2. A large majority of respondents (368) was satisfied with current "*warabandi*" issued by Farmer Organizations. In ranking analysis, satisfaction about "*warawandi*" stood first. The farmers ranked KP reporting of water theft cases as second as more than 63 percent of farmers reported satisfaction about this step. However, more than one fourth of the respondents were still not satisfied with KP in reporting water theft cases to FO for proper decision. As far as farmers' satisfaction with FO working regarding control of water theft is concerned, a fair majority (56%) was satisfied with FO decision about water theft cases and ranked 3rd order in satisfaction. Water turn locally called "Warabandi" was major issue before institution reforms in Punjab. Under PIDA act, full authority was given to FO for the issue of "Warabandi" and make adjustments according to the need of the day. However, 21 percent of the farmers were still not satisfied with measures taken by FO for control of water theft. This situation implies that there is need to put more efforts by KP and FO to control water theft evil for increasing equitable water distribution among all farmers from head to tail reaches.

Table 2. Farmers' satisfaction about Water Theft Control.

Water theft control steps	Satisfaction Level				Rank	Mean	SD
	No Response (0)	Not at All (1)	To some extent (2)	To great extent (3)			
Watercourse warabandi	23	40	49	368	1	2.72	0.62
KP reporting of water theft cases to FO	74	101	65	240	2	2.34	0.85
Measures taken by FO for control of water theft	110	101	64	205	3	2.28	0.87

Participation of farmers in PIM activities

Farmers' participation in water management activities under new institutional reforms in irrigation system is the key for equitable and reliable water distribution at all levels from head to tail. The data (Table 3) reveal that majority of the respondents reported regular participation in maintenance of water course and ranked 1st in participation of farmers in PIM activities with mean value of 3.89. The participation of farmers in maintenance of distributary and KP meetings ranked 2nd and 3rd, respectively. However, in case of participation in selection of office bearers and capacity building trainings, farmers ranked these activities at 4th and 5th, order respectively with mean value of 2.27 and 1.78. These results clearly indicate the lacking of farmers interest in the process of office bearer selection and capacity building trainings.

Table 3. Distribution of respondents regarding Participation in KP network.

PIMs Activities	Participation Level				Rank	Mean	SD
	Never (1)	Rarely (2)	Some times (3)	Regularly (4)			
Participation in maintenance of water course	6	6	26	442	1	3.89	0.45
Participation in maintenance of Distributary	84	88	56	252	2	2.99	1.19
Participation in KP meetings	150	27	85	218	3	2.77	1.31
Participation in selection of office bearers	225	41	75	139	4	2.27	1.31
Participation in capacity building trainings	313	50	28	89	5	1.78	1.19

Impact of PIM activities on cropped area

Farmers participation in irrigation management resulted in the increase availability or supply of canal water at tail fields and which has changed the cropping pattern. The data (Table 4) reflect that wheat was the major crop in rabi season covering more than 54 percent area of the farm. The area under wheat before PIM activities was 49.88 percent of the total farm area showing more than 4 percent increase. Sugarcane, berseem and rabi fodder were the other important crops in the area. However, there is not significant change in cropped area. The results further reflect that fallow area in rabi season has decreased from 16.07 to 11.09 percent, indicating that cropped area has increased about 5 percent as result of PIM activities. Raza *et al.* (8) reported 12 percent increase in cropping intensity after implementation of institutional reforms in the Lower Chenab Canal (East) Circle, Faisalabad.

Table 4. Change in cropping pattern after PIM/IMT activities.

Crops	Current	Before PIM	Change in area (%)
Rabi Season			
Wheat	54.02	49.88	4.14
Rabi Sugarcane	17.80	18.23	-0.43
Barseem	12.69	11.78	0.91
Sunflower	0.04	0.00	0.04
Rabi Vegetables	2.70	2.36	0.34
Rabi Others	1.66	1.68	-0.02
Fallow	11.09	16.07	-4.98
Kharif Season			
Rice	8.81	8.30	0.51
Maize	9.43	8.67	0.77
Kkarif Sugarcane	22.94	21.50	1.44
Kharif Fodder	15.05	14.21	0.84
Cotton	17.07	15.79	1.29
Kharif Vegetables	1.60	1.14	0.46
Kharif Other	1.84	1.72	0.12
Fallow	23.25	28.68	-5.42

In Kharif season, sugarcane, cotton, kharif fodder, maize and rice were the important crops. The results further reflect that percent area under these crops after PIM/IMT activities has increased. However, intensity of change was comparatively low ranging from 0.51 to 1.44 percent. The fallow area under kharif season has decreased from 28.68 to 23.25 percent indicating 5.42 percent increase in cropped area. According to the majority of the farmers (82.1 %) increase in canal water availability as a result of PIM/IMT activities was the main reason for increase in cropped area. Efficient and judicious use of water could also lead to grow more crops per drop of water (6). These results are in accordance with Raju (7) who reported 10-15 percent increase in irrigated area due to PIM implementation. Similarly, Latif and Pomee (5) reported 6-7 percent increase in irrigated area in Hakra-4 distributary. Restrepo *et al.* (10) also reported increase in irrigated area in 25 case studies of irrigation management transfer out of 39 case studies. Jairath (4) also reported increase in irrigated area in Andhra Pradesh, India as a result of PIM activities.

CONCLUSION

It is concluded that different steps like recalibration of outlets, repair of "*nakkas*", registration of water theft cases, registration of FIR against theft and imposing fines on water theft were taken for control of water theft. Still reasonable percentage of farmers was not satisfied with the steps taken by

Farmer organization (FO) and Khal Panchayat (KP) indicating shortcomings in the irrigation management process. There is need to put more efforts by FO and KP to take strict decisions for control of water theft and ensured equitable and reliable water distribution among all farmers from head to tail.

Due to participatory irrigation management, cropped area in rabi and kharif seasons has increased upto 5 percent. However, about 11.09 and 23.25 percent area is still fallow in rabi and kharif seasons, respectively which needs to be converted into cropped area.

The participation of farmers in KP meetings for selection of office bearers, capacity building trainings and distributary maintenance was not up to the mark indicating lack of interest in KP activities.

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