

Farmers' Perceptions and Strategies Regarding Basin Irrigation Method

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ABSTRACT

This research focused on the one hand, on the farmers' perceptions and strategies regarding the basin irrigation method and on the other hand, it focused on farmers' interest in implementing furrows irrigation method and practices within the current socio-economic environment and physical setting. The research had its short and long term objectives: (i) the application of the basin irrigation simulation technology to the banded fields; (ii) the assessment of irrigation performances at field (farm) level. The research area is within the Fordwah- Eastern Sadiqia (FES) irrigation system. The sample farmers were selected in the command areas of watercourses of the Fordwah distributory w/c (14-R); w/c (62-R) and Azim Distributory w/c (111-L). From each watercourse 6 farmers were selected randomly. Thus total 18 farmers were selected for this research. The data were collected with the help of interviewing schedule. All the respondents were interviewed personally. Conclusions were drawn on the basis of characteristics and attitude of the respondents. And the result shows the reasons for using basin irrigation method such as (i), saving of water (ii) To save money (iii) land topography (iv) easy to apply.

Key Words: Farmers; Basin; Furrows; Irrigation method; Agriculture practices; Irrigation strategies

INTRODUCTION

Historically, irrigation has meant application of water to the soil surface, using the soil surface itself as the water carrier to the entire field. This type of irrigation has always required large inputs of physical labor and attention as well as elaborate dams, canal and on-farm distribution system. Too frequently it has meant a shovel to turn the water from the distribution system on to the field. Such control of the water resulted in the low irrigation efficiencies, ranging from 30 to 70% and averaging about 60% (Dedrick *et al.*, 1978).

Rainfall in Pakistan is deficient for agriculture. The country has the largest contiguous irrigation system in the world. Irrigation is an ancient practice dating back 3,000 years but the modern system of large perennial canal started to develop at the beginning of the present century. In Pakistan the irrigation system has been greatly expanded since its independence. Irrigation water stems from canal water supplies diverted from the main rivers of Pakistan and ground supplies, pumped by public and private tube wells. The canal command areas together account for 80% of the food crops and virtually all the cash crops are grown in Pakistan (Kureshy, 1995).

To irrigate without adequate drainage in environment like the Indus basin, which has a flat topography, poor natural drainage, porous soils, and a semi-arid climate with high evaporation will lead to high water table levels and salinity. At present 2.2 million hectares are under threat of high water table by seepage from irrigation channels and percolation from irrigated areas. In addition, 2.4 million

hectares affected by moderate to high salinity levels. (Pakistan National Committee of ICID, 1991). In these circumstances, there is a definite need to improve irrigation practices (Ahmed, 1996).

Basin irrigation is suitable for many field crops. Paddy rice grows best when its roots are submerged in water, so basin irrigation is the best method to use for this crop. Trees can also be grown in basins, with one tree usually located in the center of a small basin. Other crops that are suited to basin irrigation include pastures (Alfalfa & Clover), fodder crops (berseem & Shaftal), and cereals (Brouwer *et al.*, 1988).

In case of basin irrigation, evaporation from surface goes on continuously from water surface is more than that from a moist surface, a greater quantity of water is required in basin irrigation and hence duty is less (Khushalani & Kushalani, 1984).

Due to lack of basic knowledge of farm management principles a large volume of water is being wasted in the third world countries in general and Pakistan in particular. Further the distribution system of irrigation water in Pakistan is also such that is not possible for an enlightened and educated farmer (and they are few) to practice correct application of water even if he desires so. In Pakistan, out of total irrigation supplies of 91.5 maf per year available at the outlets, the production losses amount to 12.0 maf (13.1%) due to over irrigation, which contributes to water logging and salinity. There are various methods used in applying water to the soil, which vary from crop to crop and inefficiency from as high as 80% to as low 20%. Unfortunately, the method generally used in Pakistan

(controlled flooding) offers the lowest efficiency and maximum wastage of water (Ali, 1993).

Disadvantage of basin irrigation is that leaves interfere with the movement of equipment drawn by animals or tractors to cultivate or harvest the crops. Because of their flat surface, it is sometimes difficult to drain excess water rapidly from the basins. This can be a particularly serious problem on clay soils with very slow infiltration rates, where standing water reduces soil aeration or creates a favourable environment for the breeding of mosquitoes, these conditions may require a drainage ditch for each basin to provide an outlet for excess of water (Booher, 1974).

Main difference between furrow and bed – and – furrow irrigation system is the furrow spacing. A furrow spacing figure that is larger than the top width of a furrow implies a bed between two furrows. A bed is created in order to cultivate two rows of crops (i.e. on the left and right side of the bed). The use of furrows or bed – and – furrows irrigation methods has considerable advantages over basin irrigation systems, because they provide better on-farm water management, evaporative losses can be reduced, and higher efficiencies are in general achieved as compared to the basin irrigation method (Walker & Skogerboe, 1987).

This research was carried out to study the perceptions and strategies on the used basin irrigation method with following objectives:

- 1- To identify farmers perceptions and strategies on the used basin irrigation method.
- 2- To identify the main socio-economic environment and physical setting factors related to basin irrigation method.
- 3- To identify the possibilities (along with constraints) for small farmers of switching from basin to bed and furrow irrigation method.
- 4- To identify the main constraints/problems of the farmers in the light of present used of basin irrigation method.

METHODOLOGY

This study entails on the farmers' perceptions and strategies on the basin irrigation method with in the current socio-economic environment and physical setting. The research area is within the Fordwah Eastern Sadiqia irrigation system. This system lies in the Fordwah and Hakra Division of the Bahawalnagar circle Irrigation Zone, in the south of the Punjab. The sample farmers were selected from three watercourses of two distributaries, two from Fordwah Distributary i.e. w/c (14-R), w/c (62-R) and one from Azim Distributary i.e. w/c (111-L). The data was collected in two steps. At 1st step total 18 farmers were selected from the three watercourses (6 from each watercourse). At 2nd step 6 farmers were selected from above 18 farmers (2 from each watercourse) for an in-depth study related to irrigation practices. A semi-structured questionnaire was constructed and interviews were conducted by using Participatory Rural Appraisal (PRA)

techniques, known as type of participatory method. The collected data were analyzed and interpreted. And the results are presented on the following pages.

RESULTS AND DISCUSSION

Traditionally, farmers always have been using basins for irrigation purposes, and still this is the most common irrigation method in Pakistan. In this study, the focus is entirely on those farmers who have always been using the basin irrigation method.

Table I shows the size of the family either represented by a single family or combined family. Family size varies from 4 to 20 people. Farmers indicated that their family members are involved in agriculture, either fulltime or part-time, and they hire labor according to the demand. Five farmers mentioned that women are helping them in fields, especially during the period of harvesting and picking of cotton. Additional (hired) labor used by the farmers per acre varies widely. Only one farmer has 3% of labor per acre. Almost all farmers have their own land, from 2.25 up to 25 acres. Out of the eighteen selected farmers, seventeen farmers were landowners; nine farmers have land on lease (some times in addition to their own land).

The results in Table IV shows that 72% of the total farmers have their own tube wells and 28% do not have. While the 38% have tractors and 62% do not have their own tractors.

Table III shows the irrigation timings, interval and

Table I. Labor and access for the farmers

Farmer #	Total Family Members	Full-time Labor	Part-time Labor	Own Land (Acres)	Lease land (Acres)	Total Land (Acres)	Labor per acre %
1	6	1	2	16	17.5	17.5	9.3
2	9	3	3	3	3	6	50
3	4	4	-	9	-	4	45
4	13	3	1	7	16	23	14
5	8	2	4	19.5	-	9.5	10
6	10	2	4	5.5	-	5.5	36
7	20	3	1	6	-	6	50
8	14	4	-	25	-	25	16
9	5	7	-	12.5	-	12.5	50
10	9	1	1	16	-	16	6.5
11	11	2	6	15	6	21	9.5
12	8	2	4	2.25	6.75	9	22
13	9	Some	-	22.5	-	22.5	13.3
14	10	4	Women	18	8	26	15.3
15	10	2	-	8	8	16	12.5
16	8	3	Women	8	4	12	25
17	12	4	Women	3	-	3	133
18	4	2	Women	-.43	11,-	15	13

Table II. Distribution of the farmers according to their access towards inputs

Category	Tube well		Tractor	
	F	%	F	%
Yes	13	72	7	38
No	5	28	11	62
Total	18	100	18	100

number of irrigation for the furrows and basin irrigation methods as mentioned by the farmers. The majority of the farmers expect that with furrows and bed and furrows irrigation method, the duration of water application per acre is about half as long as on basin. And furrows take less time to irrigate one acre as compare to basin.

Table IV shows that how many times the farmers are applying irrigation practices to their fields according to the demand of the crops and approximately all farmers have different statement about total number of irrigation that applied to the field crops.

Table III. Farmers' expectations towards irrigation application from furrows and basin irrigation method

Farmer #	Irrigation Hr/acre		Irrigation Interval		No. Of Irrigation	
	Furrows	Basin	Furrows (Days)	Basin (Days)	Furrows	Basin
1	1	2	20	15	3	4
2	3	3	15	10	-	-
3	1.5	2	7	15	-	-
4	1	2	14	14	-	-
5	1	2	15	15	-	7-8
6	1	2	7	15	7-8	6
7	1.5	2	7	15	8-10	-
8	1	2	7	15	-	-
9	1	2	15	15	-	5-6
10	1	0.5	15	15	4-5	-
11	1	2	20	15	-	-
12	1-1.75	2	7	10	-	4-5
13	1.5-2	4	15	12	10-12	-
14	2	3	7	15	5	-
15	1	2	15	15	8	4
16	2	3	14	15-20	7	-
17	1	2	20	14	8	7
18	3	2	15	15	5	6

Table IV. No of irrigation applications for Major crops (wheat & cotton)

Farmers #	Cotton	Wheat
1	6-8	4
2	8	4
3	7-9	5-6
4	6-7	4
5	7-8	6
6	5-6	5
7	6	4-5
8	6	6-7
9	6-7	5-6
10	8-10	4-5
11	10-11	6
12	10-11	5
13	6-7	6-7
14	7-8	5
15	4-5	5-6
16	5-6	7-8
17	20	6
18	5-6	3-4

CONCLUSIONS

Basin irrigation method is most familiar to the farmers, based on many years of experience. The farmer face it when it comes to on-farm investment, and, therefore, the traditional basin irrigation method provide them the opportunity to limit expenses. With basins, a farmer knows how the crops are grown and when the irrigation application takes place and the associated constraints, and expected yield from the crops. Farmers expected that furrows required additional implements for creating furrows, sowing seeds, and hoeing. It is expected that a large number of labor is required for modern irrigation application, as they can't afford that.

SUGESIONS

- 1- Agri Extension services are there but their capacity is very limited, approach of all farmer to them is very difficult so Extension should focus on-farm related irrigation activities and informative sessions can be held to provide knowledge and awareness raising among them to make better irrigation practices.
- 2- The concept for having common properties among the farmers can facilitate this change process by eliminating many of constraints. Loans should be provided on a very easiest process for the farm equipments

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(Received 12 March 2005; Accepted 10 May 2005)