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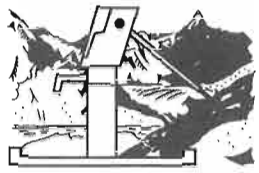
WATER, ENVIRONMENT AND MANAGEMENT

Community management in farmer managed irrigation



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1. INTRODUCTION

A total of 943,00 ha of land is now estimated to be irrigated in Nepal. Out of this, about 726, 267 ha under farmer management in Nepal establishes the importance of increasing agricultural production thru improving performance of farmer managed irrigation systems (CIWEC, 1990). And Terai systems under farmer management with command area greater than 1,000 ha, total nearly 100,000 ha.

Paper presented is a part of the research study that was undertaken by the International Irrigation Management Institute, in order to assess the potential and need of large farmer managed irrigation systems (FMISs). The purpose of the study was also to extend the study findings to be of use to assist other large systems in Nepal. Findings on the various aspects of resource mobilization observed and examined for water allocation and distribution are presented. Conclusions are drawn on resource mobilization procedures brought in effect by decision-making thru four-tiers of organization for allocation and distribution of scarce water among its beneficiaries at the CMIS.

2. BACKGROUND

The Chhattis Mauja Irrigation System

General

The Chhattis Mauja Irrigation System (CMIS) is one of the large farmer managed irrigation systems located in the plains of Nepal. This system has 3,500 ha command area and is located in Rupandehi district. This system was initially constructed in the years 1846-63 by the local Tharus.

Distribution System

The distribution network at CMIS is complex to operate and consists of earth canals mostly made in loose and gravelly soils.

Management System

The daily management at different levels of system is controlled by functionaries who are elected at the respective level or tier in the system.

Climate

Rupandehi district where CMIS is located is within the monsoon belt. Consequently, its climate is sub-tropical to tropical.

Features of the Three Sample Study Branches

For the performance study of the Chhattis Mauja Irrigation System three sample branches one each in head, middle and tail of the system were selected. The salient features of the three study branches are given in table 1.

Table 1 : Summary features of the sample village branch canals

Nature of O&M	Head	Middle	Tail
Village Name	Sardarnagar	Char Number	Makrahar
Households	45	69	56
Distance from intake (km)	4.9	8.8	11.0
Distance from outlet to the starting point of command area (km)	0.2	0.7	2.3
command area (ha)	50	70	92
Water allocation and labor responsibility for main system (Kulara)	5	4	2
Land area per water allocation (ha/kulara)	10	17.5	46
Average land holding (ha/household)	1.0	1.0	1.6

Table 2 : Total O&M cost of three sample branches

Nature of O&M	Head	Middle	Tail
Main canal desilting (person-days)	186	174	74
Main canal emergency repair (person-days)	443 27*	339 25*	158 16*
Branch canal desilting (person-days)	138	198	162
Cash paid in lieu of labor contribution (in Rs.)	4,600	9,800	6,200
Remuneration of executive committee officials (in Rs.)	275	220	110
Remuneration of village level committee officials including torch light batteries (in Rs.)	3,900	2,032	0
Total (in Rs.)	28,625	30,452	16,560
O&M cost per ha	572.50	435	180

*Person-days are incurred by Rs. 25 Absent person-days for which fine was paid.

Water Distribution

Rice Crop

Irrigation water delivery on per hectare basis was less than 4 1/sec/ha in the head and 2 1/sec/ha in the middle branch. At evapotranspiration, seepage and percolation rates observed at 100 mm/day for the head branch, 70mm/day for the middle branch, and 20 mm/day for the tail branch observed differences in actual delivery of water compared to allocation seemed justified for high water delivery in head and middle branch to meet the local perception of equity to meet the crop water requirements and other losses.

Average stream size made available for seeding and transplanting (1989 season) was 45 l/sec for head branch, 49 l/sec for middle branch and 46 l/sec for tail branch.

Winter Crops

Average discharge of a 1 l/sec/ha (based on total command area of study branch) was made available for the head branch for the length of period winter crops were grown. Similarly, average discharge figure is 0.14 l/sec/ha for middle branch and 0.02 l/sec/ha for tail branch. Based on the actual areas cropped in winterseason average discharge figures for all three branches were much higher. Average discharge based on actual area cropped is 2.83 l/sec/ha for head, 0.60 l/sec/ha for middle and 0.23 l/sec/ha for tail branch.

Head branch and middle branch had access to water as much as what the beneficiaries liked to have for irrigation on wheat and other crops.

Agricultural Yields

In 1988-89 season the actual areas cropped by the farmers area given in table 3 and the respective average crop yields from crop cut observations in study areas are given in table 4.

Table 3 : Percentage of the Area Under Major Crops in the Sample Branches in 1988-89

Crop	Head Branch	Middle Branch	Tail Branch
Rice	100	100	100
Wheat	35	24	12
Lentil	31	53	17
Mustard	24	5	5
Maize	34	15	0
Mixed (Lentil & Mustard)	10	18	6
Fallow	66	85	160
Cropping Intensity (%)	234	215	140
Total area (ha)	50	70	92

NB : In winter season 60 percent of the land was left fallow at the tail end and in maize season 100 percent of this land was left fallow. In maize season, 66 percent was fallow in the head branch, and 85 percent fallow in the middle branch.

Table 4 : Average Yields in Tons per Hectare of the Major Crops Grown in the Sample Branches Compiled from Sample Crop Cuts for 1988-89

Crop	Head Branch	Middle Branch	Tail Branch
Rice	3.75 (7)	4.00 (8)	2.88 (11)
Wheat	3.69 (6)	3.10 (6)	2.07 (7)
Lentil	1.27 (3)	0.91 (2)	0.98 (2)
Mustard	0.75 (5)	0.81 (4)	0.95 (2)
Maize	2.19 (6)	2.17 (7)	-

NB : Rice, maize, and wheat yields are reported at standard MC of 14 percent. Yields of lentil and mustard refer to field moisture at harvest. Figures in the parenthesis represent the numbers of samples of each crop that were harvested for yield sampling.

CONCLUSIONS

Given below under specific headings are some of the conclusions that can be established based on Resource Mobilization and Water Distribution observations made in a large farmer managed irrigation system at the CMIS in Nepal.

Agricultural Yields

It will be desirable that large numbers of farmers in CMIS obtain the highest yields as observed in CMIS. Irrigation Master Plan document (CIWEC 1990) establishes the present irrigated yield levels for western Terai stratum of Nepal at 2.5 metric ton (mt)/ha for rice, 1.8mt/ha for maize, 2.2 mt/ha for wheat, and 0.7 mt/ha for mustard. Performance of crops observed establishes the potential of the CMIS in within system and national context both.

Resource Mobilization

Ability to mobilize cash, labor, and materials is clearly established in the CMIS. In fact, beneficiaries of the CMIS depends on the resource mobilization ability of the system itself which is well executed by the executive committee of the CMIS. Farmers in CMIS have established unit of kulara for resource mobilization for O&M of the system. As system expanded, the water has become scarcer and the present notion behind kulara is tied up to actual O&M need for water acquisition and distribution. Initially, one unit of kulara was equivalent to 1 man-day of labor for fixed-land area of 17 ha when water was abundant, and proportional allocation on land area basis was tried.

Water Distribution

Ability to divert and distribute water from river source (specially in monsoon) is established in the CMIS at a tremendous cost of high number of labors. Fairness in equity of water distribution is attached to the extent of resource mobilization need. Branch requiring more water has to mobilize resources in proportion or higher.

Use of Study

It is in the interest of the government in Nepal to promote participatory management (PM) in large agency managed systems (AMISs). It has been accepted now that to promote PM effective farmer irrigation organizations at levels required in large AMISs must be established in parallel with required physical improvements and O&M procedures. Much can be learned from the resource mobilization and the related O&M procedures prevalent in the CMIS and could be of direct use in AMISs. Specially, the concept of kulara and organizational model have direct relevance. Crux of the problem in other large systems (both under farmer and agency management) which are not performing well is the lack of effective water allocation and resource mobilization for system O&M.

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