Investigations on the Hydro Energy Projects on the Economic Development

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Abstract

Irrigation sector has received considerable attention during the last many years and huge investments had been made in that sector. In Kerala, ten out of the eleven projects completed are meant exclusively for paddy. However, statistics show that during the last 15 years, there was a reduction in total area under paddy. There is a common feeling that even though huge investment was made for implementation of the irrigation projects, the expected benefit could not be achieved. Hence a study was initiated in one of the irrigation projects of Kerala to evaluate the agricultural performance.

Keywords: Hydro power energy, Economic Development, Technology Transfer.

Introduction

The irrigation project selected for the study is the Pazhassi Irrigation Project (PIP) which is the first major scheme conceived for supplying irrigation water to the paddy lands of Kannur District of Kerala. It was intended to benefit paddy fields in the basins of Kuppani, Valapattanam, Anjarakandy, Telicherry and Mahe rivers. The physical system consists of head works, canal network and control structures. The headwork consists of a diversion structure and the canal network includes the main canal, branch canals, distributaries and field boothies. The project envisaged to irrigate 16500 ha of paddy; however, the ayacut area achieved is only 3400 ha. The physical system includes the main canal and six branch canals, but only four branch canals (ie Mahe, Azheekal, Edakkad and Kattampally) were commissioned at the time of study.[1-4]

Methodology

The study was conducted during 1999-2002 and was focused was to evaluate the change in agricultural performance due to the implementation of the project. The relevant information were collected by structured questionnaire survey and participatory rural appraisal techniques. Information available from secondary sources also were collected. The aspects such as extent of irrigation coverage, increase in cropped area, change in cropping pattern, technology transfer, support from service departments, etc were studied in detail [5-9]. The results of the study gave an insight into the drawbacks that had crept into the system management and suggestions are provided for the betterment of the performance. The irrigation project was expected to improve agricultural production by way of adequate water supply and water management, increased area, increased cropping intensity, application of improved technology and scientific interventions. Hence the actual situation with respect to the above indicators was analyzed [10-12]. For all the purposes, command areas of the main canal and the four commissioned distributaries only were considered.

Results and discussion

Irrigation water supply in the command

The extent of irrigation supply as percentage of the total demand was analysed and the results are presented in Table 1. On an average about 22% of the farmers receive more than 50% of the irrigation need. Irrigation supply is less than 50% for the majority of the farm holdings. As far as High Yielding Varieties are concerned, shortage of water at any stage will adversely affect the yield. Hence the low production noticed in the area can be attributed to a great extent to the insufficient water availability [13-17].

Table 1. Extent of irrigation need met (in percentage of the total need) by the respondents from PIP (expressed as percentage of the total respondents)

Branch Canal	0%	<25%	25-50%	50-75%	75-100%
Mahe	58.42	10.00	19.21	10.13	2.24
Edakkad	67.55	8.55	14.45	5.60	3.83
Azheekkal	24.08	11.85	35.51	25.31	3.27
Kattampally	10.06	17.32	17.88	42.46	12.29
Main Canal	18.76	23.09	24.92	27.69	5.54

Change in cropped area and cropping intensity

The study revealed that there was no marked increase in the cropped area after the implementation of Pazhassi Irrigation Project. The project had envisaged to increase the area under cropping through crop stabilisation and by raising additional crops. Hence these aspects also were studied in detail. The different cropping patterns adopted in the command areas are presented in Table 2.

Table 2. Area under different cropping patterns in the command (ha)

Cropping pattern	Mahe	Edakkad	Azheekal	Kattampally	Main Canal	Total
PPP	29	67	—	—	20	116
PPF	950	1286	526	607	416	3785
PPV	254	216	262	383	53	1168
PFF	457	197	95	73	37	859
VEG.	—	—	33	—	—	33
Other Crops	786	698	354	317	44	2199

PPP : Paddy-paddy-paddy PPF : Paddy-paddy-fallow
PPV : Paddy-paddy-vegetables PFF : Paddy-fallow-fallow

It could be noticed that the total area under paddy-paddy-fallow dominates in the PIP command. In the paddy based system, the maximum area is under double crop paddy followed by paddy – paddy - vegetables. Coconut, banana etc are raised in 2199 ha in the command and these crops also enjoy the irrigation supply. A comparison of the cropping intensities in the main canal and four branch canals revealed that 300% cropping intensity is achieved only in 116 ha. Single crop of paddy is raised in 859 ha and 2 crops are raised in 4953 ha. This clearly indicates that there is more scope for stabilizing and improving the technologies for better production[18].

Technology Transfer

The further increase in cropping intensity, better agricultural practices and scientific input use are to be achieved through the transfer of improved available technology to farmers. It could be revealed that farmers in the command of the PIP did not get adequate training in any of the technology developments pertaining to cultivation (Table 3). This has happened in spite of the fact that there are 27 Krishi Bhavans (Extension Officers of Agricultural Department) functioning in the project area. Majority of the farmers do not even feel that training is important; most probably since they had been anchored in the traditional methods/practices and since they are not conscious of the benefits of improved technology. Hence sincere attempts will have to be made to bring forward the farmers to participate in technological interventions which will improve the agricultural production in the command area.

Table 3: Training received and training aspiration shown by the farmers in the command area (expressed as percentage of total respondents)

Branch canal	Respondents trained	Respondents desirous of getting trained	Not aware of the training need/benefit
Mahe	1.05	2.37	96.58
Edakkad	0.89	3.24	95.87
Azheekal	2.45	9.39	88.16
Kattampally	0.01	11.73	88.26
Main Canal	0	0.62	99.38

Similarly scientific water management practices will help to reduce the water loss, increase area under irrigation and increase the water use efficiency. High yielding varieties perform better only through the adoption of improved technology measures. Scientific irrigation management is necessary for making the other technologies perform well. Even with limited quantity of irrigation water, better management will assure reliability in the irrigation season. Such technology transfer has not happened in the area (Table 4) and hence farmers follow their own methods and schedules. This is pointed out as an important reason for the very low yield of rice in this area. Field to field irrigation which is practiced at present results in considerable wastage of water. If channel to field irrigation is practiced, water use efficiency can be improved.

Table 4. Technology transfer (TT) on irrigation (expressed as % of respondents)

Branch Canal	From Irrigation officials	From Agricultural officials	From other farmers	No. Source of IT
The	0	1.84	9.63	88.53
Edakkad	0	4.42	7.67	87.91
Azheekkal	0	2.5	15.83	81.67
Kattamppally	0	0	26.26	73.74
Main Canal	0	0.62	5.56	93.82

Suggestions for improving the agronomic performance

During the course of study, detailed survey, group meetings and participatory rural appraisal exercises were conducted for drawing suggestions to improve the performance of the irrigation system. Suggestions from farmers and agricultural officers were analyzed and prioritized and the major suggestions are given below:

Suggestions from farmers

- Operation plan should be prepared in consultation with farmers and strictly implemented. Sluices (wherever not available) should be provided, to regulate the water from field *bothies* to the rice fields (this problem is noticed in many places)
- Water should be let sufficiently high into the canals, since in certain places the distributaries and canals are running at very low elevations in comparison to the fields.
- The release of water at the time of maturity of the crop should be stopped; farmers can inform the Irrigation Department when the water release has to be stopped.
- The operation of the canal should be flexible and there should be healthy interaction between the officers of the irrigation department and the farmers.
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- The farmers will have to be provided with necessary incentives and the essential inputs right on time; otherwise, they expressed a desire to switch over to other upland crops like coconut, arecanut, banana, tapioca, vegetables etc. or even to leave the land fallow to avoid loss. There is a strong suggestion that the maintenance of the canals should be done by the farmer associations and not by the contractors, and that this should be planned in consultation with the local farmers

Suggestions from agricultural officers

- The water storage in the barrage has should be properly ensured during the collection period.
- The quantum of water available for distribution in the command areas, if informed timely to the Krishi Bhavans (Extension offices of the Agriculture Department) and the farmers by some means will help the agricultural officers to advise the farmers on the cropping pattern to be followed, crop area (crop zoning), crop variety etc. The inability of such a planning results in unscientific practices and crop loss, which leads to dissatisfaction among the farmers. This also leads to reclamation/filling up of paddy fields in view of the upcoming increased opportunity cost of the area.
- The operation plan has to be formulated well in advance of cropping season, in consultation with the officers of the Agricultural Department and farmer representatives and this may be published.
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- The operation plan has to be strictly adhered to by the irrigation department and to start the operations in time, the maintenance of canals will have to be done well in advance and the entire physical system made fit for the purpose.
- The repair and maintenance activities should be done during off-season, which will help in timely water releases (the present practice is not so).

SUMMARY

The study conducted to evaluare the agricultural performance due to the Pazhassi Irrigation Project revealed that even after commissioning of the, the desired objectives could not be achieved. The major reasons for not achieving a better agronomic performance were both technical and social. Ensuring maximum water collection in the barrage, adoption of a scientific operation plan, timely and adequate extension services from the service departments, technology transfer to the farmers etc will lead to an improved agronomic performance of the Pazhassi Irrigation Project. Water should be considered as an **"economic good".** Sustainable water resources management requires political will and public awareness, competent organization, appropriate legislation, recovery of operation and maintenance with the active involvement of water users at all levels and enhanced emphasis on water management research. Such evaluation should be done for all the completed projects so that their performance can be improved based on the findings.

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