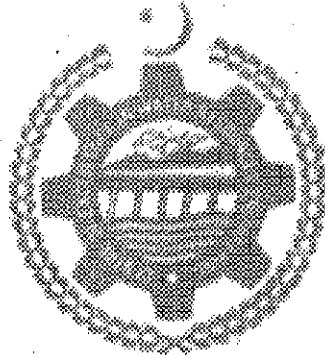


THESIS

PERFORMANCE AND SOCIO-ECONOMIC IMPACT ASSESSMENT
OF LINING OF SMALL IRRIGATION CHANNELS



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ABSTRACT

Pakistan, which is an agriculture based country is facing severe problem of water scarcity and, which is rising as a major threat to the economic built up of the country. The problem is further intensified due to the silt deposition in the reservoirs and along the bed of the irrigation channels which makes the designing of channels even more difficult.

In order to overcome the problem of siltation and water scarcity, investment in irrigation along with reforms in institutional arrangements for management of water is very much necessary to ensure adequate supply of food at all time. In this regard the concept of emphasis of the irrigation investment have shifted away from new facilities towards rehabilitation and upgrading existing ones. Operation and maintenance are the key aspects for effective cost recovery of irrigation projects and thus improved management and operation practices must be implemented to prevent further degradation of those irrigation projects.

In spite of large investments are being made in constructing new irrigation systems and improving existing irrigation systems by lining, tail reaches of most irrigation channels are either denied or faced with acute shortage during peak demand periods. It is due to the lack or absence of accurate discharge ratings of the flow control structures, which could be ensured that each off takes is drawing its due share of water. The costs of channel linings are generally high and can exceed the benefits. Consequently, development and evaluation of lower cost linings is needed.

A low-cost alternative strategy of selective lining of watercourses to reduce seepage and increase irrigated area is being increasingly adopted in Pakistan. This study

was conducted on seventeen selected watercourses supported by limited water measurement and agricultural data, through Socio Economic Assessment Performance through discussion with command area farmers. The study area is located in the Punjab province of Pakistan and covers four Tehsils namely Jaranwala, Chak Jhumra, Faisalabad and Samundri of District Faisalabad. Different types of outlets and their characteristics in the study area were worked out. Dimensions of the outlets were calculated by a given procedure. To estimate the effect of the unequal distribution of water and silt among the shareholders on the parent channel the bed, full supply level and existing dimensions of the outlet were measured. The discharges of the outlets were measured and in addition to this, farmers interviews were conducted to investigate the present situation regarding the availability of water and the outlet conditions. On the basis of research conducted, the trend of farmers income from head to tail ends of all watercourses, the benefit-cost analysis of conventional and low cost lining were carried out. Furthermore, the effect of watercourse improvement on gross cultivable land, cropping intensity, yield per acre, cost per acre and filling time were also analyzed.

It was concluded that most of the outlets were improperly designed while most of them varied from the designed dimensions, thus both resulting in the reduced discharges, especially at the tails. The watercourse improvement results in percentage increase of gross cultivable land while percentage decrease in filling time with significant variation in crop yield per acre, thus reflecting significant merit of watercourse improvement. The cropping intensity magnified increasing and decreasing trend with watercourse improvement depending on farmers seasonal planting.

On the basis of these evaluations and analysis certain recommendations in the end were given for future improvement of field channels. It was recommended that the outlets be calibrated once in five years in order to incorporate the seasonal variation in the amount of water supply. Detailed survey of all channels must be conducted throughout the year. The future planning of the improvement and rehabilitation of the existing low cost lined watercourses up to tail with proper designing parameters to improve water allocation and distribution schedules based on scientific information and technical studies should be carried out.