THESIS

PROSPECTS OF EVER INCREASING TUBEWELL IRRIGATION ON DROUGHT MITIGATION

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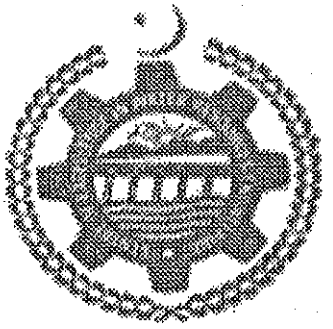

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ABSTRACT

Pakistan is an agricultural country with a blessing of natural resources of rich land and water. In the country 80% cultivation is dependent on irrigation. During the last few years, low rainfall has caused a dry hydrologic cycle in the country. Scarcity of rainfall, short and unreliability of canal water supply have compelled the farmers to install their own tubewells resulting in more use of groundwater to maintain sustainable crop yield.

To estimate increase in the number of tubewells, command area of Lagar distributary (Farooq Abad Sub-Division) was selected and field investigations were carried out in October 2002. To collect detailed information about tubewell irrigation, farmers and tubewell owners were interviewed. Water samples were also collected to assess water quality.

Analysis of data show that 100 tubewells were already in operation before 1990. Two hundred and ninety two (292) new tubewells were installed during the period of 1990-2002. The years of 1993, 1998 and 1999 were declared drought years (i.e. rainfall was 75% less than the normal). It was found that most of the tubewells were installed either during the drought period or in the subsequent years as consequent of the drought condition. Out of these, 61 tubewells were operated by tractors, 27 were operated by electricity and rest of them were equipped with peter engines. A total number of 76 tubewells at head, 87 at middle and 129 at tail reach were installed from 1990 to 2002.

Excessive extraction of groundwater has resulted in lowering of water table depth. Consequently tubewell discharge has decreased, resulting in increased pumping cost to the farmers. Due to excessive groundwater pumping water table is falling at the rate of 35-40 cm per year in the command area of Lagar distributary.

Analysis of groundwater samples revealed that 18% tubewells have fresh water quality (i.e. fit for irrigation), 18% have marginal water quality and 64% tubewells have hazardous quality. Furthermore Groundwater salinity (EC) was found to increase almost linearly from head of the distributary to its tail (0.87 to 2.54 dS/m).