

THESIS

**EFFECT OF FARMER MANAGED CONTROLLED
DRAINAGE ON WHEAT CROP IN MARDAN SCARP**

Submitted by

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ABSTRACT

A field study was conducted to investigate the impact of controlled drainage on wheat crop in Mardan SCARPs from November 1999 to May 2000. Surface inflow and out flow were measured by using current meter and weir in the watercourse and at the exit point of the collector in the study area. Crop water requirements were calculated by CROPWAT computer program. Topographic survey and cropping patterns were also determined. 'SURFER' software was used for comparing groundwater fluctuations in the study area.

Wheat was grown on 38% of the culturable command area (CCA). Computed crop water requirement was 607 mm/season in silty clay to silty clay loam soil having a hydraulic conductivity from 0.6 m/day to 1.2 m/day. Management allowable deficit (MAD) maintained by the farmers in controlled drainage area ranges from 44.7 to 57 percent. The amount of actual irrigation depth applied varied from 627mm to 1088mm for different frequencies of irrigations (four to five irrigations except one farmer near the canal who applied three irrigations) throughout the whole season of the wheat crop.

The result of the study showed that the deep open drain and canal operation had a very close relationship with groundwater table fluctuations. Moreover the canal operation and seasonal variations due to monsoon rainfall also affect groundwater levels in different parts of the selected irrigated area. During closure period of the canal for two months the water table drops to more than two meters (2.25-3 m) whereas the designed water level was 1.1 m. After reopening of the canal the groundwater level, in the controlled subsurface drainage area, restored back to the designed water level in one month. The controlled drainage area has highest yield of wheat to an amount of 6.5 tons/ha as compare to the yield of 3.5-5.4 tons/ha without controlled subsurface drainage. The water application

efficiency in controlled drainage area was 65 % and 48 % in uncontrolled drainage area. Thus controlled drainage resulted in 17 % water saving due to beneficial result of sub irrigation due to high water table. Hence it can be concluded that farmers' controlled subsurface drainage technique is successful at the tail of lateral/collector in terms of saving the irrigation and seasonal recharge for optimum yield of wheat crop in Mardan SCARP.