

THESIS

**A STUDY OF SEDIMENT PROBLEMS IN IRRIGATION NETWORK OF
VARAMIN PLAIN IN IRAN**

6163

Submitted by:

SEYED MOHSEN DEGHANI

99-PG-WRE-01

For the degree of

MASTER OF SCIENCE

IN

WATER RESOURCES ENGINEERING

**CENTER OF EXCELLENCE IN WATER RESOURCES ENGINEERING
UNIVERSITY OF ENGINEERING AND TECHNOLOGY
LAHORE**

2000

ABSTRACT

Sediment transport is an important aspect in the design and operation of an irrigation system. Settling of sediment reduces the conveyance capacity of the canals and annually, heavy investments are required for rehabilitation of irrigation system.

Varamin plain is located at $51^{\circ} 40'$ East and $35^{\circ} 30.05'$ North, in the south of the Albers mountainous, about 40 km Southeast of Tehran. River Jajrod that originates from southern heights of Albers, irrigates the Varamin plain. Total length of irrigation network of Varamin plain is 600 km, all canals are lined with concrete and irrigate about 130000 hectares of land.

The data including suspended sediment load and respective water discharge for 12 years were collected. The data was plotted on logarithmic paper, water discharge Q_w in (m^3/s) versus sediment load Q_s in (ton/day). Formula $Q_s = 3.0894 Q_w^{2.6476}$ was developed for average of 12 years. The process was also repeated for each year separately.

The actual sediment carried by distributary and minor canals in Varamin irrigation network was collected for full, 75%, 50%, and 25% of their flow depths. Ackers and White (1973) formula was used for calculation of sediment carrying capacity of the canals. The actual and computed sediment carrying capacities of different canals were plotted. It was found that when the depth was near 0.5 m the results match closely but for the greater depth, the equation under predicts the results. That is when the depth was more than 0.5 m the actual sediment carried is more than the calculated one.

Total sediment carrying capacity of the Varamin irrigation network at designed discharge was 6774.75 ton per day. It is recommended that when the concentration of sediment at entrance of main canal becomes more than 6774.75 ton per day, gate of the main canal should be closed.

For better management laboratory of Varamin barrage should be made more active. When the sediment concentration is more than 6770 tons/day some of the water may be diverted to the detention pool. And outlets should be set properly until they draw their share of silt from the main canal.