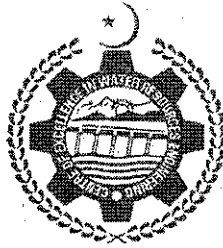


**M.Sc. WRM THESIS**

**IMPACT OF HYDROGEL ON INFILTRATION AND WATER  
SAVING IN IRRIGATED ENVIRONMENT**



Submitted By:

**MUHAMMAD WAQAS ANJUM**  
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## ABSTRACT

Ever increasing population requires production of more and more food with minimum utilization of water. Researchers and planners in agriculture are mainly focusing on increasing crop productivity using different techniques. Polymer application is one of the important and advance technique used in irrigated agriculture for effective water management. On water application, the Polymers swell and preserve water in the crop root zone. A part of applied water enters into the root zone and the rest flows over the surface, thus completing the irrigation phenomenon. Present study was undertaken to estimate variation in infiltration rates under different quantity of Hydrogel application in sandy soil and testing the most appropriate hydrogel application for water saving in irrigated environment.

Field tests were conducted at farmers' fields near Pasiyan Wala, district Toba Tek Singh. Ten plots were selected measuring 5ft x 200ft out of which three different hydrogel quantity of 1, 0.75 & 0.5 kg were applied.

The infiltration rate of water was measured in each plot using double ring infiltrometer before irrigations. Advance and recession rates were measured for control and hydrogel treatments. SIRMOD model was applied to study the hydraulics of water flow and to simulate the performance indicators.

Results of the study revealed that the infiltration rates reduced from 18 cm/hr to 3.4, 4.8 & 8.7 cm/hr in 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> treatment (1, 0.75 & 0.5 kg) respectively, showing that the infiltration rates decreased with more application of hydrogel amount. It is interesting to note that hydrogel can successfully act as seepage barrier as hydrogel swelling fills the pores or voids between the sand particles and effectively controls the seepage through soil. Water saving of 37.8, 29.45 and 19 % in 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> treatment was observed. Total seasonal saving of irrigation water was 19 %. As regarding the economic return, the best treatment was the third one i.e 0.5kg hydrogel that maximized the benefit.