

EFFECT OF ROD-KOHI IRRIGATION ON WHEAT AND CHICKPEA PRODUCTION IN A SEMI-ARID CLIMATE OF PAKISTAN

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ABSTRACT

The Rod-Kohi (flood irrigation/hill torrent) irrigation is practiced in Dera Ismail Khan Division of North West Frontier Province and Dera Ghazi Khan District of Punjab Province, Pakistan. It is an old traditional method of irrigation. Flood water is conserved in the specially prepared fields and is used for growing winter and summer crops. An on-farm research was conducted during the 1992-93 and 1993-94 rabi crop seasons to determine the impact of alternative tillage practices on crop water availability.

Four pre-flood tillage practices (1) cultivator, (2) moldboard plough, (3) disc plough and (4) chisel plough were evaluated. Improved varieties of wheat (*Triticum aestivum* L.) (Pirsabak-91) and chickpea (*Cicer arietinum* L.) (CM-72) were grown. Each tillage practice was replicated four times in a split plot design. Tillage impacts on soil water contents, plant growth and crop yield were measured.

Significantly less moisture was retained in the soil after the harvesting of two crops when the soil was ploughed deep with moldboard and chisel plough. However, the same observations were not recorded in the second year of study in wheat crop mainly due to more rains in latter year and especially the last rain which occurred a week before harvesting.

Among the four tillage practices, there was no pronounced effect on the characteristics of the two crops. The yield of wheat was significantly higher in the second year of study while it was reverse in the case of chickpea.

INTRODUCTION

The Rod-Kohi irrigation system practiced in D.I.Khan (N.W.F.P.) and D.G.Khan (Punjab) areas have great potential for increasing the agricultural produce of the country. The name Rod-Kohi is used for the irrigation done in the piedmont plains and

The climate of Rod-Kohi area is arid to semi-arid with precipitation occurring in the monsoon and spring season. Annual precipitation varies from 120 to 370 mm. June is the warmest month with a mean maximum temperature of 41°C. January is the coldest month with a mean minimum temperature of 4°C. Because of low humidity, continental location and dearth of vegetation, extremes in climate are commonly experienced.

The productivity of crops such as wheat, chickpeas, sorghum, millet and rapeseed/mustard in the Rod-Kohi irrigated areas is well below the national average (Ahmad, 1990). This is due to the practice of outmoded and poor methods of agriculture as well as lack of soil moisture conservation practices. The crop varieties used are local mixtures and low yielding. Fortunes of the Rod-Kohi farmers vary between subsistence and devastations. The latter could either be due to no hill torrent or too much of it.

Only in recent years some efforts have been made to evaluate the agricultural production potential of the Rod-Kohi irrigated lands (Amin, 1990; Wadud and Ahmad, 1990; Khan, 1990; Khan *et al.*; 1994). The introduction of improved crop varieties and the modification of tillage practices have been identified as potential on-farm practices that could increase the agricultural productivity.

This study is part of the research going on since 1992-93 in the Rod-Kohi area near village Shero Kohna and Akhmad about 25 km west of Dera Ismail Khan city.

MATERIALS AND METHODS

The experiments were conducted in the farmer's field in the years 1992-93 and 1993-94