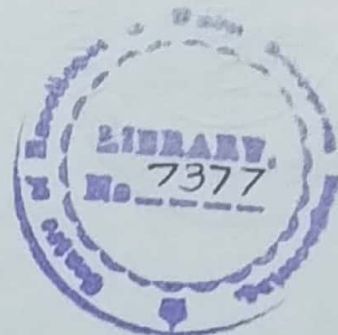


M.Sc. Thesis

ESTIMATION OF CLIMATE CHANGE AND ITS IMPACT ON RAINFALL  
PATTERN IN SOUTHERN PUNJAB



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## ABSTRACT

The issue of climate change is of growing concern since 20<sup>th</sup> century as it has a great influence on human life. High carbon emission due to fossil fuel burning to meet the energy requirement of highly industrialized society and high tech life style of mankind is threatening the stability of earth environment. Today, not only the hydrological system but life of many species on earth are highly vulnerable due to climate change. Such condition demands solid steps to be taken for sustainability of earth without compromising the development. To deal with this issue, management steps should be taken to mitigate this problem along with technological measures to introduce more clean and environmental friendly energy sources. This research mainly focuses on management i.e. how rainfall pattern is behaving under climate change, which can be used for future analysis of crop water requirement, ground water recharge etc.

In this study, past trends of rainfall and temperature during the last fifty years have been analyzed. Moreover, future projections of rainfall and temperature have been done for the 21<sup>st</sup> century using statistical downscaling. No trend was observed in maximum temperature but average increase in temperature in South Punjab has increased due to rising minimum temperature. In general, it can be said that the rising trend started around eighties of 20<sup>th</sup> century. Like minimum temperature, rainfall is also observed to have increasing trend which started around eighties of 20<sup>th</sup> century. South Punjab is receiving more than fifty years average rainfall in last three decades.

For analysis of future hydrological conditions, two climate models SDSM (statistical downscaling model) and LARS-WG (long Ashton research station weather generator) were used. Both models have shown that there might be overall increase in average rainfall in 21<sup>st</sup> century. The seasonal analysis of rainfall has shown that increase in rainfall might be due to increase in summer monsoon rainfall amounts. The comparison of SDSM and LARS-WG show that LARS-

WG is easy to run and less time consuming while SDSM is relatively complex but performs better in incorporating monthly and seasonal changes.

From this study it can be concluded that South Punjab is under the influence of climate change and hydrological conditions are being affected. Climate change has changed the hydrological cycle in past in the study area increasing rainfall amounts and in future it is expected that it may bring more changes in rainfall pattern.