PREFACE

In the present scenario climate change has become a global environmental concern. Its impacts are far and wide, which will be witnessed by all the entities present in the region. The United Nation Framework on Climate Change (UNFCCC) defines climate change as “statistically significant variation in either the mean state of the climate or in its variability, persisting for an extended period (typically decades or longer)”. These changes may be due to natural internal processes or external forces or due to persistent anthropogenic changes that ultimately impact the composition of the global atmosphere or land use patterns.

The World Meteorological Organization defines the classical period to study climatic variables is 30 years. The changes can be seen through the statistical description of the surface variables such as temperature, precipitation, and wind.

Inter – Governmental Panel on Climate change (IPCC) mentions that the warming of the climate systems is being witnessed in the present century. There have been observations that the global average air and ocean temperatures are increasing resulting in the rise of global average sea level and widespread melting of snow and ice. IPCC also observes that over the last 50 years some extreme weather events have changed in frequency and/or intensity as well.

To address the challenges being posed by climate change the Government of India too has adopted a National Action Plan on Climate Change (NAPCC) since 2008. To respond to climate change the NAPCC has sets eight priority missions to respond to climate change. These missions include the National Missions on - Solar Energy, Enhanced Energy Efficiency, Sustainable Habitats, Water, Sustaining the Himalayan Ecosystem, Greening India, Sustainable Agriculture and Strategic Knowledge for Climate Change.

It is seen that climate change adaptation and vulnerability identification can both be done more effectively at local level. Hence Rajasthan like each Indian state has prepared a detailed State Action Plan on Climate Change (SAPCC) to identify state-specific risks, impacts and opportunities posed by climate change.

This thesis title – ‘Vulnerability and Adaptation to Climate Change in the Context of Water Resources with reference to Rajasthan’ looks in to the environmental and water resource scenario of Rajasthan and the statistical changes reflected in the surface climatic variables of temperature and rainfall. The study observes these climatic variables during 1980 and 2009 i.e. for 30 years.

The chapter – I deals with the introduction of the term Climate Change and the theories related to it. The hypothesis, objectives and methodology have been discussed it the chapter. The Review of Literature is also a part of this chapter.
Chapter – II deals with the environmental background of the study area i.e. Rajasthan state. The Physiography, Geology, Rainfall, Temperature and other climatic parameters along with Soil, Vegetation and Land – use have been seen.

The Chapter – III discusses the groundwater and the surface water resource scenario of Rajasthan and traditional and modern water management techniques followed in the state. The present trend of water use, agro-climatic region wise in Rajasthan is discussed in the present context. The water use related data and surface water data has been collected from the Irrigation Department, Government of Rajasthan, Jaipur. The Ground Water Resource Data has been collected from the Central Ground Water Board, Western Region, Jaipur.

In Chapter – IV the various climatic divisions of Rajasthan according to Koppen, Thornthwaite, general rainfall distribution and agro-climatic division have been discussed. Rainfall and temperature are the climatic elements which would indicate inconsistencies or changes in the climate of a region if they all seen statistically seen over Rajasthan during different periods. For the same the topics analysis of rainfall variability and district wise analysis of rainfall deal with a detailed discussion of rainfall trend in the state district wise during the observed time span. The same chapter also discusses the general temperature trends agro-climatic region wise in Rajasthan and the seasonal temperature trend in the selected four districts of Rajasthan. The temperature related data have been compiled from the Statistical Abstract of Rajasthan of various years. The monthly temperature data for seasonal temperature analysis was collected from Indian Meteorological Department, Jaipur.

The data related to rainfall in Rajasthan has been collected from the official site of Water Resource Department of Rajasthan http://waterresources.rajasthan.gov.in/.

One of the predicted impacts of climate change is expected on the increase of climatic extreme events in the various regions of the world. In the context of Rajasthan the extreme events of flood and drought have been discussed in detail which includes discussion about their influence prone regions, history, impact and management strategy in the state. The impact analysis is based on the survey carried out in the Barmer region. This forms the subject matter of Chapter – V.

The climate change strategies adopted or planned by the Government of Rajasthan for making the state resilient to deal with the climatic changes have been discussed in the VI Chapter. It includes the enumerating the initiatives taken in the agriculture, water, forestry and biodiversity sector. The chapter also discusses the response strategies adopted by the locals of drought region of Barmer district of Rajasthan.

The conclusion and suggestions are in the last chapter of the thesis.