

IMPACT OF CLIMATE CHANGE ON CROP CULTIVATION PRACTICES IN MRBC COMMAND AREA, GUJARAT

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ABSTRACT

The vulnerability of natural systems to rapid changes in climate patterns is regarded as one of the most challenging issues in recent years. Water resources are a main component of natural systems that might be affected by climate change. The Third Assessment report of the Intergovernmental Panel on Climate Change indicates an intensification of the global hydrological cycle which would affect both ground and surface water supply. The overall impact of Climate Change will depend on the ability of water resources managers to respond to Climate Change and preparedness of the societies. The developing countries, like India, are going to be severely affected due to Climate Change.

Mahi Right Bank Canal Command Area (MRBC), located in central Gujarat, India, is selected as a study area. It lies between latitudes $N22^{\circ} 26'$ - $N22^{\circ} 55'$ and longitudes $E72^{\circ} 49'$ - $E73^{\circ} 23'$. The Wanakbori weir on the river Mahi supply water to MRBC commanding 2,12,694 ha of the land in Kheda and Anand districts. The project is operative since 1959.

This paper characterizes the important climate variable i.e. precipitation and evaluates its effects on cropping pattern, crop plantation schedules observed by the farmers for many years. Rainfall data for the part of MRBC (Borsad taluka of Anand district) is analyzed. Annual rainfall for the period 1876-2008 shows very wide variations in the rainfall. In the last two decades, alternate periods of

four-five years of very good rain (above average) and very less rain (less than average) are observed. The analysis of the precipitation records for 1963-2008 reveals that the numbers of heavy rainfall days in a year are increasing with remaining rainy days receiving very low rainfall. Out of average 38 rainy days in a year 29 days (76%) receive less than 24mm rain. There have been six occasions in the last four years when rainfall exceeded 120mm/day which appeared to be very rare in previous years. This situation results in frequent flooding of the fields during monsoon.

The farmers mostly cultivate paddy and tobacco in the command area. Tobacco is very vulnerable to heavy rain & flooding. Average maximum one day rainfall of 121.5 mm/day is calculated falling on 218th Julian day (i.e. first week of August). This is the transplanting period for tobacco which is not at all favorable condition for the crop. It is advisable for the farmers to delay the tobacco transplantation. Delayed crop activities would, on the other hand, result in reduced crop production. The cropping pattern actually developed in the command area and as per project planning has been observed quite different due to this reason. Tobacco plantation is observed in 6% MRBC area (as against 16% area planned) while paddy plantation has increased to 47% area (as against 26% area planned).

The project administrators are, also, required to plan the canal operation schedules as per the new cropping pattern and the crop planting periods. Pro active actions are very much required for profitable cultivation practices. The farmers and the project administrators shall be ready to adjust to changing climate.