The climatic impacts on Indian Agriculture

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In India, agriculture forms a critical component of the national economy, which is mainly dependent on the monsoon rainfall. Interannual variability of Indian summer monsoon rainfall in turn is known to be strongly linked to the slowly varying boundary forcings such as the variations in snow cover, snow ice over the land and the sea surface temperatures over the global oceans in general and the Pacific Ocean in particular. Occurrence of large-scale droughts and floods over India generally coincide with the warm and cold phases of El Nino-Southern Oscillation (ENSO) respectively. Examination of summer total food grain production in India during the last five decades or so, shows significant relation with the total monsoonal rainfall in the country. In addition, many crops show significant relation with the local/regional rainfall and temperature variability at different crop stages. While technological innovations have dramatically improved the agricultural production, climate-related anomalies still continue to cause severe hardship to a large population in South Asia. Advance information on the possible climatic impacts on food production is crucial to ensure proper food security in the region. Keeping in view the strong links between food-grain production and the monsoon rainfall and also the monsoon rainfall and someof the important global climatic phenomena, an attempt is made here to present a detailed analysis of the crop-climate relationships for the Indian region. This work also summarizes the agricultural situations in India in the recent past to form a background for the present study. A long record of macro-regional agricultural statistics, namely the area, area irrigated, production and yield statistics are collected from various published sources and compiled for 7 major crops in India as a whole and various states in the country. The data collected include the major crops namely rice, wheat, sorghum, groundnut and sugarcane as well as the total oilseeds and food grains production, for the period 1949-98. Various global and regional climatic variables have been used for the same period. These data sets are used to identify the global and regional climate signals in these agricultural indices and assess the vulnerability of agriculture to the climatic anomalies.

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