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Research Paper

Impact of global warming on rainfall and wheat production of Amravati district in Vidarbha, India

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ABSTRACT : India is an agricultural country and agriculture production very much depends on temperature and rainfall. Mostly agriculture in India is rainfed. Vidarbha is the eastern region of Maharashtra State. Nearly 89 per cent of cultivated area of Vidarbha is under rain fed farming.Now a days global warming has become a great challenge for the agrarian economy of India. This paper analyses the agriculture production of wheat, average maximum and minimum temperatures and total rainfall data for eighteen years obtained from IMD, Pune for Amravati district of Vidarbha. Regression and correlation analysis is obtained and their significance is tested. It is observed that minimum temperature is increasing significantly for Amravati district where as rainfall and wheat production revealed decreasing trend. Increased temperature and reduced rainfall affects wheat production in Amravati district.

KEY WORDS : Agriculture, Climate Variables, Correlation, Regression, t-test

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INTRODUCTION

Agriculture plays a key role in overall economic and social well being of India. Agriculture is an economic activity highly dependent on climatic conditions. Rain fed agriculture and farmers are trapped in a phase of continuous crisis. Temperature and rainfall are key factors for agriculture production that will affect yield of rainfed crops. India ranks first among the rainfed agricultural countries of the world in terms of both extent and value of produce. Rainfed agriculture is practiced in two-thirds of the total cropped area of 162 million hectares. In India 65 per cent of agriculture is heavily dependent on natural factors such as rainfall, temperature, weather condition etc. In crops, wheat has been chosen purposively since wheat has played important role in achieving food security of the country. Global warming becomes an alarming issue of concern in the developing world. Global warming is the increase in the average temperature of the earth's near surface air and oceans since the mid-twentieth century and its projected continuation. Global temperature will increase by 1.8^{0}C to 4^{0}C with an overall average increase of 2.8^{0}C in temperature (IPCC, 2007). The average global temperature has risen by about 0.8^{0}C from pre-industrial level. In India, monsoons are getting more variable, less predictable and very extreme. It is projected that by the end of the 21st century rainfall over India will increase by 15-40 per cent, and mean annual temperature will increase by 3-6^{0}C (NATCOM, 2004). Importantly, April of the year 2010 was reported to the warmest individual month ever. Eleven of the last twelve years during 1995 to 2006 rank among the 12 warmest years in the instrumental record of global surface temperature since 1850. Analyses done by the Indian Meteorological Department (IMD) and the Indian Institute of Tropical Meteorology (IITM), Pune, generally show the same trend for temperature, heat waves, glaciers, droughts and floods, and sea level rise as by the Intergovernmental Panel on Climate Change of United Nations (Raghava Reddy, 2010). Increase in global temperature will affect the agriculture production in India. This paper analyzes statistically the atmospheric temperature, rainfall and agriculture production data of wheat for Amravati district during the study period 1988 to 2005. According to IPCC reports, the surface temperature of the earth has risen by 0.6 ± 0.2^{0}C over the 20th century. The increased temperature resulting from global warming is likely to reduce the profit from wheat cultivation. More recent studies done at the Indian Agricultural