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# Rainfall variability (Annual and seasonal) in Anand of Middle Gujarat (India)

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**ABSTRACT :** India is predominantly an agricultural country. Success or failure of crops in any year is always crucial for the development of Indian economy, which in turn controls the economy of the country. In 1950s and 1960s, Indian budget was regarded as a gamble on the monsoon rains. The average rainfall in Gujarat varies from 33 to152 cms. The southern region of the state has an average rainfall ranging from 76 to 152 cms, Dangs district having the highest average of about 190 cms. The northern districts have a rainfall varying from 51 to 102 cms. But the Arabian sea and the Gulf of Cambay in the west and the forest covered hills in the east soften the rigors of climatic extremes. The rainfall at Anand (Middle Gujarat Agro-Climatic Zone-3) is ranged between 286.9 mm to 1693.4mm. The Rainfall variability (Annual and Seasonal) in Anand for the period 1970-2009 for 39 years were studied for their variability.

**KEY WORDS :** Rainfall data, Rainfall variability ( Annual and Seasonal)

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India's economy is dependent on the agricultural production, which in turn is dependent one of the monsoon rainfall and its distribution. The year to year fluctuation in rainfall as well as the fluctuation within the monsoon season governs the crop growth, development and yield. Earlier studies on rainfall probability in India have been carried by many workers (Singh *et al.*, 2009; IMD, 2010 and Halikatti *et al.*, 2010). South-west monsoon rainfall (received during June to September) determines the fate of dry land farmers as well as the status of national food security in India almost every year. The need for information about south-west monsoon rainfall is great in these areas. An accurate long-range forecast can help farmers increasing agricultural productivity in good rainfall years and negate the sudden downturns in agricultural production during anticipated drought years by giving farmers sufficient time to adopt drought resistant crop varieties and appropriate crop, soil and water management practices. The Indian meteorological Department (IMD) is now able to make all- India long- range forecasts of south-west monsoon rainfall accurately using power regression model based on 16 regional and global parameters from 1988 onwards.

The India Meteorological Department (IMD) has been issuing operational long- range forecasts for summer monsoon rainfall for more than one century. Since 1988, the operational forecasts have been issued using the 16 Parameter Power Regression and Parametric models for the summer monsoon rainfall over the country as a whole (IMD, 2010). For review of these operational forecasts and other related research efforts and problems. These forecasts have provided useful information on rainfall fluctuations and abnormalities which have been helpful to the planners. However, for a country with inherent spatial variability of monsoon rainfall there would always be some areas of deficient rains even in the best monsoon years or some areas of flood even in worst monsoons (Parthasarathy *et al.*, 1993). Walker (1924), Shukla (1987) and Gregory (1989) suggested that rainfall over several subdivisions of India should be grouped together to deduce area averages for large homogeneous regions. They further showed that the consideration of the local distribution characteristics of seasonal rainfall in dividing the country into homogeneous regions yielded better formulae for forecasting than when India was treated as one unit. Indian meteorological department (IMD) was giving long-range rainfall forecast every year on the basis of 16 parameters and now reduces 8 parameters since 2003. IMD's 8 parameters were 1. Arabian sea (SST), 2.Eurasian Snow Cover, 3. NW Europe temperature, 4. Nino 3 SST anomaly (Previous year), 5. South Indian Ocean (SST Index), 6. East Asia Pressure, 7. Northern hemisphere 50Hpa wind pattern, 8. Europe Pressure Gradient and July