

**Hydrological Aspects of Draught Up To 1987-88  
A Case Study in Madhya Pradesh**

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**ABSTRACT**

Drought is a dreadfully familiar word in India. In recent years the country faced three drought years in succession namely 1985, 1986 & 1987. It has been reported intensity wise the drought of year 1987 ranked second in the 20th century, the first one being in year 1918. Statistics on areal coverage indicate that out of the country's total geographic area of 328 m.ha., 107 m.ha. or about one third of the area and 29 percent of the population are affected by drought.

The recurring incidents of drought lead to reduction in streamflows, depletion of soil moisture storages, decline of reservoir and tank levels and fall in groundwater tank. This in turn lead to reduced agriculture and fodder production.

In this report the results of studies carried out for the year 1987-88, for the six selected drought prone districts namely: Jhabua, Khargone, Dhar, Sidhi, Betul & Shahdol of state Madhya Pradesh, have been described. The report includes analysis of rainfall and groundwater level data for finding deficit of rainfall and trend of groundwater table as a result of drought incidents.

The seasonal rainfall departure analysis shows deficiency in all the six selected districts with the extremes lying between 30 percent to 65 percent except Sidhi and Shahdol. Monthly rainfall departure analysis shows that all the six districts recorded deficient rainfall ranging from 10% to 60% except Sidhi.

The frequency analysis of rainfall showed that the probability values of occurrence of 75% normal rainfall in all the six selected districts namely Jhabua, Khargone & Dhar of state Madhya Pradesh are 78, 76 & 76 respectively i.e. below 80, indicating drought proneness of districts based on this analysis as per IMD criteria. However, in case of district Sidhi, Betul & Shahdol the probability values of occurrence of 75% normal rainfall are 84, 87 & 89 indicating that out of 100 years, 16, 13 & 11 years will experience 75% of the normal rainfall and so less drought prone. Herbst analysis of monthly rainfall data of the

districts has shown over two dry spells during 1984-87. The district of Sidhi showed maximum no. of drought spells and in general 4-5 spells were found in all districts since 1951. The maximum drought intensity was found in case of Khargone district while the longest spell of 94 days was observed in Betul district during 1978-86. The dry spell analysis, which has been done for one taluk in each of six districts, showed that at 75% probability level, the duration of dry spell ranges from 21-28 days, except the taluks of Dhar (Dhar) and Banas (Sidhi) were the duration of dry spell as expected at 75% probability ranges from 14-21 days.

The groundwater level analysis has been carried out in the districts of Jhabua, Khargone, Dhar, Shahdol & Betul. All the five districts experienced rainfall deficiency during 1987-88 ranging from 33-43%. As a result of declining trend of rainfall over the last three successive years, all the five districts except Shahdol have indicated a falling trend in pre and post monsoon water table levels and in most of the cases the rate of decline has been observed more than the previous year. This continuous decline can be attributed to continued deficient seasonal rainfall and over pumpage of ground water for various usages. The studies are continuing-for year 1988-89.

