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Abstract: Agricultural production worldwide is subject to various risks of which climatic risks tend to be dominant, especially under rainfed conditions. Rainfed agriculture occupies a prominent place in Indian economy and rural livelihoods. At present, about 60% of total net sown area is rainfed, contributing 40% of the total food production. It supports 40% of human and 60% of livestock population. Agriculture in rainfed areas continues to be a gamble and rainfed farmers face several uncertainties like aberrant weather, lack of timely inputs and credit leading to low and unstable productivity and profitability. The crop production in rainfed region has inherent risks because rain is undependable in time and amount. In order to minimize these risks, an attempt to study the agroclimate of two districts viz. Ranchi and Dumka, representing Central and Northeastern Plateau zone of Jharkhand state was undertaken. Of all the climatic factors, rainfall is of greatest concern to population in rainfed agriculture. The variation of monsoonal and annual rainfall in space and time are well known and this inter-annual variability of monsoonal rainfall has considerable impact on agricultural production, water management and energy generation. Analysis of annual, seasonal and monthly rainfall of a region is useful to design water harvesting structure. Similarly weekly rainfall analysis give more useful information in crop planning. The cropping patterns are basically dependent on Moisture Availability Index (MAI). The most dependable season for rainfed crop planning in this region is the kharif (SW monsoon) season with 24% and 35% CV for Ranchi and Dumka respectively. Ranchi is more prone to drought in comparison to Dumka. Agricultural droughts are more common in 23 – 26 SMW and 37 – 40 SMW at Ranchi but in Dumka it is less frequent and occurs generally between 37 – 40 SMW. The length of growing season at Ranchi has been observed as 154, 182, 203 and 203 days for Upland, Don III, Don II and Don I, whereas at Dumka it was 168, 196, 210 and 231 days, respectively. Crops of more than 200 days duration can be grow in lowlands of Dumka. The PET at Ranchi and Dumka is 1354 mm and 1269 mm, respectively, therefore crop water requirement for upland and lowland rice and maize is more at Ranchi in comparison to Dumka. Good prospects of water harvesting are also there in both the stations as 8 – 13 weeks 170 – 700 mm of surplus water in Ranchi and 8 – 14 weeks 90 – 570 mm of surplus at Dumka can be harvested during monsoon month. Maximum temperatures showed an increasing trend at both stations whereas, minimum temperature showed a decreasing trend, hence the days are getting hotter and nights getting cooler. The extreme weather events such as cold waves and severe heat waves are increasing in Ranchi and Dumka. High rainfall events are also becoming more frequent. Upland areas of Ranchi and Dumka, which has fairly low moisture retention capacity, less water requiring and tropical crops like pigeon pea and finger millet could be grown successfully. Agro forestry should be recommended for the upland areas of Ranchi and Dumka with sandy type soils. Agro forestry can arrest the erosion of top soil also. In sandy loam type soils rainfed upland rice varieties like Birsa dhan 108, Birsa Vikas Dhan 110, Vandana, Birsa Gora etc. should be adopted. Maize also grows well in slope lands of Ranchi and Dumka. Particularly Dumka with warmer climate suits best for maize cultivation. In the clay loam soil rice is the main crop that could be grown under bunded conditions, medium maturity duration varieties viz. Sahbhagi, Naveen, Lalat etc. are recommended in these soils. This is the potential area for rice cultivation and the potential need to be exploited. Lowland areas with clay soil and moist weather condition deep water transplanted rice varieties should be recommended. Waterlogging resistant long duration varieties like Rajshree, Swarna, BPT-5204 etc. can give higher yield. Ranchi and Dumka have greater chance for water surplus during their rainy season thus offer opportunity for water harvesting and supplemented irrigation to mitigate drought. It can prove beneficial for successive rabi crops also.

Description: AGROCLIMATIC CHARACTERIZATION AND DROUGHT ASSESSMENT FOR EFFICIENT CROP PLANNING IN SELECTED DISTRICTS OF SUB ZONE IV OF JHARKHAND

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