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Short Comminucation

Characterization of climate of Leh district of cold-arid Himalaya

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Leh is situated between 32 to 36^0 North latitude and 75 to 80^0 East longitudes and the district is scattered on an area of 82,665 Sq. kms including 37,555 sq. kms being occupied by China. The district is situated at an altitude ranging from 2900 to 5900 meters and is being the most elevated and habituated district of J&K (India) Anonymous (2008). Sparse population settled around the banks of major rivers / streams which make out their livelihood through crop and animal husbandry.

The district has inherent constraints like pro-longed winter, scanty rainfall, rugged terrain's and consequently limited availability of productive land and there exists possibility for expansion of economic activity through various scientific methods. The physiography of the district is divided into hilly and valley lands. About 85% of the area comes under hills and only 15% area is under valley SKAUST-Leh (2008).

The district is divided into three agro-ecological zones and comes under cold arid hill zone.

1. Upper Agricultural Zone (UAZ) 11801-14500 ft (amsl)
2. Central Agricultural Zone (CAZ) 10000-11800 ft (amsl)
3. Lower Agricultural Zone (LAZ) < 10000 ft (amsl)

The district possesses a wide range of flora and fauna. The forest vegetation mostly comprises of few tree species and few shrubs like popular, willow, sea-buck thorn etc. The district dominantly inhabited by Buddhists and the farmers mostly raise wheat, barley alfalfa and vegetables in terraced fields. The land use statistics of Leh district is presented in Table 1 (Anonymous, 2008).

Crop production is a complex phenomenon and depends both on abiotic factors (soil, weather, plant etc.) and biotic factors (insect pest, disease etc). These factors vary frequently with time during different crop growth stages and any abrupt change in these factors can bring drastic change in crop productivity (Sharma et al., 1997; Sharma et al., 2000). Weather is one of the most important factors playing major role in crop production and thus crop weather relationship is of an immense practical importance. Therefore, an attempt has been made to characterize the climate of Leh so that the information generated can be useful for better crop planning and management

Table 1: Land use statistics of Leh from 2001-02 to 2007-08 (*Area in hectares*)

S.No	Particulars	2001-02	2007-08
1.	Total geographical area	45167	45167
2.	Area under forests	0	0
3.	Not available for cultivation	1092	1058
4.	Other uncultivable land excluding fallow land	1148	2621
5.	Fallow land	10508	10496
6.	Total cropped area	10523	10599
7.	Area sown more than one crop	313	406
8.	Net sown area	10210	10193
9.	Net irrigated area	8476	10193
10.	Gross irrigated area	10493	10599

Source: LAHDC Statistical handbook 2009-10

Rainfall

The average rainfall of the district is 40-60 mm per annum which mostly occurs in winter in the form of snow. The district receives maximum precipitation in the months of Jan, Feb and March in the form of snow. During cropping season rainfall distribution is very low (Fig.1&2). Therefore, the farm activities are not directly dependent on rainfall and irrigation is a pre-requisite for raising crops.

Temperature

Temperature is a very necessary for all aspects of plant growth. All physiological processes are affected by external thermal environment. Leh region is characterized by tremendous temperature fluctuations & Variations within a season or between seasons. Temperature can affect productivity of crops through general survival, seed germination, seedling establishment, vegetative phase as

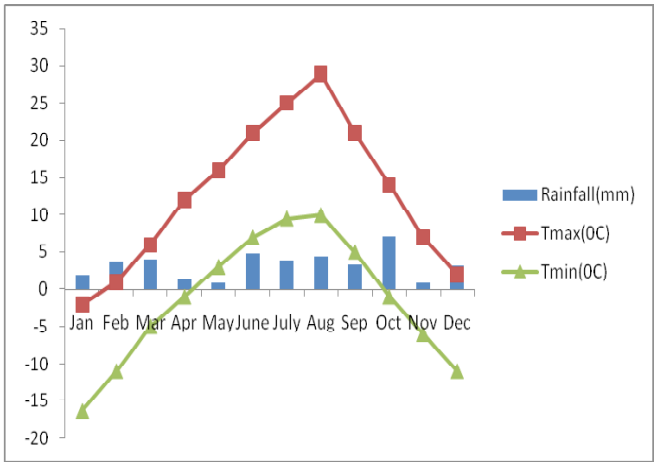

Fig. 1: Mean monthly rainfall (mm) and temperature (^{0}C) of 10 years (2000-2009).

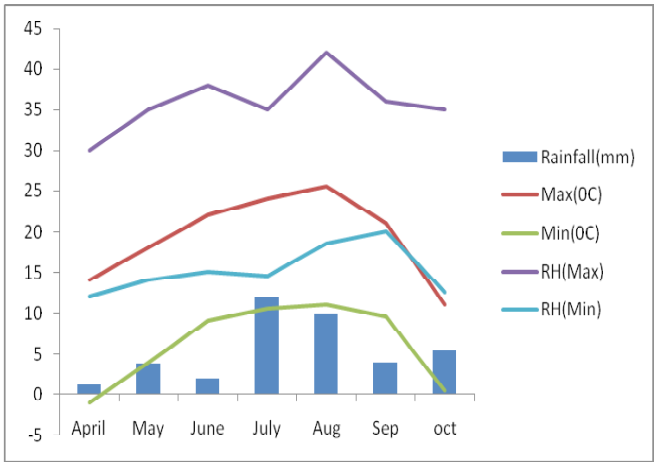

Fig. 2: Distribution of rainfall (mm), temperature (^{O}C) and relative humidity (%) during cropping season at Leh

well as reproductive phases of crop. Temperature is the only factor that limits crop cultivation during winter in Leh Region. The data presented in (Fig.1&2) shows that minimum temperature varied from -16.4 to -0.2^{0}C in the month of January to March and the maximum temperature varies from 20.63 to 28.9^{0}C in the month of June to August on monthly average form 2000-2009. The temperature of Leh district is unfavorable for growing a wide range of crops and the temperature pattern during cropping season is very unpredictable, besides this the temperature along with other climatic factors are challenging to sustainable crop production.

Relative humidity (R.H)

Relative humidity is affected by temperature, rainfall, vegetation and evaporating surface of various water bodies. The relative humidity has direct effect on stem elongation anthesis, crop establishment and provision of sustenance moisture in drought conditions. In Leh region relative humidity during cropping season is less than the normal. It may be as high as 70% on some rainy days but on average always remains below the normal requirement round the clock which is due to low rainfall and high solar radiation. The data presented in (Fig.2) shows monthly relative humidity during cropping season based on average of data of last 10 years. The data reveals that the mean average Relative humidity varied from 12 to 42 %. The relative humidity of Leh is less favourable for growing a wide range of crops during *Kharif* season. Besides this the RH along with other agro-climatic factors is less favorable for incidence of various insects, pests and diseases.

On the basis of above description of weather parameters that Leh District possesses very low and erratic type of rainfall, moderate temperature and low relative humidity. These conditions are not favorable to cultivate wide range of crops and are less favourable for insect/pests and diseases.

Therefore it is very essential for the farmers to plan their field operations on the basis of weather forecast. This can be achieved through effective & timely agro-meteorological advisory service provided to the farmers for increasing crop productivity and to minimize weather related avoidable losses.

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