

Agroclimatic Zones of Rajasthan

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ABSTRACT: On physiographic divisions of the state, its pattern, soil types, availability of irrigation existing cropping pattern, and administrative units, Rajasthan has been classified into five principal zones. Four thus of these are further subdivided into two sub-zones making geographical a total of nine agroclimatic zones. coverage of various agro-climatic zones.

Presently, environmental change is an encouraging subject, and planning the impacts of environmental change is an essential part. As per the assessment by Jointed Regional Improvement Program, the greater part of the region of Rajasthan uncovered environmental emergency as the dry season, outrageous climate occasions, flames, and others. In such a manner, this study is significant for directing exploration on both perception and representation of the limited change of climatic zones in the land area of Rajasthan. The Köppen environment grouping was applied as a kind of perspective. Specifically, such factors as temperature and precipitation were utilized for climatic zone characterization. The broad data set of the Google Earth Motor spatial investigation stage permits to use of environment reanalysis datasets for a long time. Albeit, World Meteorological Association prescribes considering a 30-year time frame to observe the environmental change, there is restricted information access for the locale of interest. In this way, just a 21-year time period was dissected, explicitly, a time range somewhere in the range of 2000 and 2021. Results are introduced as time-series guides of arranged environment zones and may

help different specialists with their activities connected with environmental change.

KEYWORDS: Agriculture, Irrigation, Fertilization, zone , agroclimatic zones , irrigated plain , transitional plain.

INTRODUCTION

Irrigated North Western Plain (Zones Ib) :

This zone covers a geographical area of about 20,63,000 hectares covering all the tehsils of Ganganagar district. 75 per cent of the geographical area is under cultivation and 17.7 per cent area is double cropped. Three canal systems, viz. Gang, Bhakra and Indira Gandhi Naharpariyojana, are operating in this zone, irrigating 44 per cent of the net sown area. Among crops gram occupies the maximum area, followed by wheat, cotton guar and mustard. Buffalo is pre-dominant animal species in irrigated areas, whereas sheep, goat and cattle are more common in unirrigated belt.

The climate of the zone is similar to semi-desert regions which is comprised of severe drought accompanied by high wind-velocity and low relative humidity. The range of average relative humidity is 60-70 per cent. The rainfall ranges from about 100 mm in the south-west to about 350 mm in the east. The mean daily temperature ranges from 20.5°C to 49.0°C. The mean monthly potential evapotranspiration at Ganganagar ranges from 40.4 mm to 247.9 mm.

The alluvium of the plain is greatly mixed with the aeolian sands from the desert but there are also extensive blocks of bare flood plains. At places the alluvium has

been deeply buried by the aeolian sand and is not visible now.

With the introduction of large canal irrigation extensive land levelling has been undertaken. The alluvial soils deposited by river Ghaggar in the flood plains of Ganganagar are yellowish brown in colour, loam to silty clay loam in texture with massive or blocky structure and are calcareous in nature. Stratification is common in these soils. The major soil types recognised in the region by soil survey department, Government of Rajasthan, are dune soils, Flood plain soils, Desert plain soils, and Gravely and Lateritic soils.

The normal duration of crop growing season with nil or slight water stress is estimated to be 30 days in the south-west to 60-90 days in the north-east.

Transitional plain of Inland Drainage (zone IIa) :

This zone covers a geographical area of 36,94,000 hectares. All tehsils of Nagaur, Sikar and Jhunjhunu districts and Taranagar, Churu and Rajgarh tehsils of Churu district are covered in this zone. This area is characterised by extensive sand dunes and low depressions. Several of these depressions have given rise to salt lakes of Degana, Kuchaman and Didwana. Smaller depressions accumulate water only temporarily after the rare heavy showers. There are no natural drainage outlets from this area. Seventy per cent of geographical area of this zone is under cultivation. Major crops of this zone are pearl millet, arid legumes, gaur and cowpea, which are grown under rainfed conditions and occupy more than 75 percent of the area under plough in the zone. A sizable area is put to gram cultivation under conserved moisture conditions in Churu district. Moving sand dunes, undulated Topography, and salinity of soil and groundwater are the major constraints in the zone for the production of crops.

The rainfall in the zone ranges from 374 mm in the west to 559 mm in the east.

There are three major seasons hot summer (March to mid-June), rainy season (mid-June to September), and winter (October to February). The zone is characterized by high temperatures and long periods of severe drought accompanied by high wind velocity and low humidity. The number of rainy days in the zone is less than 20 per year. The mean maximum temperature ranged between 12°C to 52°C. The wind velocity remains low (1 to 19 km/hr.) during winter but reaches to 20 to 60 kms/hr during summer. Under normal rainfall, kharif crops can be grown but failure of rainfall affects the crops. Ground water is generally saline and can be used to irrigate only salt tolerant rabi- cereals. About 97 per cent of the irrigated area is under wells.

The soils of this zone have been divided in three main types viz. desert calcic soils, the desert non-calcic brown soils and grey brown alluvial soils. The nitrogen and phosphorus status is poor in entire zone while that of potash is medium in other districts. Saline soils are found in the depressions. The nature and degree of salinity varies.

A layer of lime correction is present at 100-500 cm depth. Kharif crops are rainfed and rabi-crops are grown under well irrigation. The normal duration of crop-growing season with nil or slight water stress is estimated to be 60-90 days.

Transitional Plain of Luni Basin (Zone IIb) :

This zone covers a geographical area of about 30,10,000 hectares spread over Western Sirohi, entire district of Pali and Jalore and eastern part of Jodhpur district. It is situated in the south-west corner of Rajasthan and boundary touches with that of Gujarat. The plain of Luni Basin lies at an altitude of 300-600 metres along the western edge of Aravali Hills. The plain is drained by the river Luni and its tributaries towards the Rann of Kutch.

The climate of this zone except some part of Sirohi district is dry with large extremes

of temperature and low rainfall. The maximum temperature ranges from 35°C to 45°C while the minimum ranges from 1°C to 15°C. The average rainfall ranges from 300 mm to 500mm. Source of irrigation is mainly wells.

Red desert soils are found in Jodhpur, Jalore and Pali district. Saline soils are found in Rann of Jalore district, and in the foot hills of Aravalis and Sirohi districts, Lithosols are commonly occurred.

Flood Prone Eastern Plain (Zone IIIb) :

This zone covers a geographical area of about 23,68,000 hectares in which entire Alwar, Bharatpur, Dholpur and Sawaimadhopur district excluding Khandar and Sawaimadhopur tehsils of it, are included. Most of this plain is prone to flooding by rain water and is poorly drained. About 71 per cent and 9.5 per cent of total geographical area is under cultivation and forest respectively and 3.87 lakh hectare is double cropped.

The rainfall in the zone ranges from 500 mm in the north west to about 650 mm in the south east. About 37 per cent of the cropped area is irrigated and mainly through wells (51 per cent) and tube well (35 per cent) cannal irrigated area is only 9.3 per cent.

Sub Humid Southern Plain and Aravalli Hills (Zones IVa):

This zone spread over the Aravalli hills and covers a geographical area of about 33,59,000 hectare. All tehsils Rajsamand and Bhilwaradistricts, all tehsils of Udaipur district except, Dhariyawad, Salumber and Sarada tehsils and entire district of Chittorgarh except Chotti-Sadri, Pratapgarh, Arnod, and Badi Sadri tehsils are included in this zone. Aburoad and Pindwara tehsils of district Sirohihave also included in this zone The terrain is irregular. It is drained by the Banas River towards the east and Mahi River in the south.

The rainfall in the zone range from 500 mm in the west and north-west to about

700 mm in the southeast and about 900 mm in the southwest. The mean daily maximum temperature at Udaipur ranges from 24.2°C in January to 42 in May.. Likewise, the mean daily minimum temperature ranges from 7.8°C in January to 25.3°C in June. The mean monthly potential evapotranspiration at Udaipur ranged from 55.2 mm in December to 204.4 mm in May.

Humid South Eastern Plain (Zone V) :

This zone covers a geographical area of about 26,96,000 hectares. Entire districts of Baran, Bundi, Kota, and Jhalawar and two tehsils of Sawaimadhopur district vizKhandar and Sawaimadhopur are included in this zone. The area is drained by river Chambal and its tributaries. The altitude of the plain in the south, south-west, west, and north is 300-600 meters and drops to 150-300 meters in the central and eastern parts. Chambal is a perennial river in which four dams have been constructed.

Conclusion

The present findings of the study have been discussed in four sections. The first section dealt with the analysis of the pace and pattern of fertilizer use in Rajasthan which attempted to present a better understanding of disparity among different districts in the state. The second section encompassed the relationship between the growth rate of fertilizer use in various districts and structural variables. This analysis helped to capture the relationship between the potential and actual use of fertilizers in various districts of the state. The explanatory power of determinants of phenomena under investigation for the state and selected districts examined is presented in section third. In the fourth section, an assessment made on crop yield response to fertilizer use in wheat crops, under different agroclimatic regions of the state is presented.

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