

Agroclimatic Environment of Chickpea in Haryana

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Abstract: The chickpea data on area, production and productivity in different districts of Haryana were collected for 11 crop seasons and analysed. The state of Haryana has been divided into six zones. The zone comprising of Hisar and Sirsa districts has high spread and high productivity, whereas, the other zone with Ambala district has low spread and low productivity. Winter rainfall and soil types were superimposed on these zones.

Key words: Area, productivity, chickpea, productivity zones.

On a global basis, chickpea (*Cicer arietinum* L.) is the third most important pulse crop after dry beans (*Phaseolus vulgaris* L.) and dry peas (*Pisum sativum* L.). Because of its diversified uses and its ability to grow better with low inputs under harsh edaphic and arid environments, it has been an important component of the cropping systems of subsistence farmers in the Indian subcontinent. In India, chickpea is grown as a winter crop from as far south as Karnataka (14°N) to as far north as Palampur (32°N). The crop is usually sown with the onset of cooler temperatures in October and November. Soil moisture is gradually depleted downward in the profile as crop grows. Towards the end of the growing season, the evaporative demand of the atmosphere is on the increase. Limited moisture availability finally terminates growth and forces the plants to mature. The period in which chickpea can be grown is limited and is determined at a given location by climatic conditions. Thus, climate is an important determinant of yield. Therefore, a proper understanding and analysis of the

agroclimatic factors enable a better management of natural resources. The agroclimatological research also enables us to delineate the optimal areas for agricultural production, particularly crop production. Keeping in view the above facts, the present study plans to define different agroclimatological zones of chickpea in Haryana.

Materials and Methods

The data on area, production and productivity of chickpea in different districts of Haryana were collected for 11 crop seasons (1982-83 to 1992-93). The rainfall data of different district Headquarters were also compiled. The long term averages were calculated with respect to area, production and productivity of chickpea in different districts (Table 1). On the basis of the averages of area and productivity, the whole state of Haryana was divided in six zones. The criteria for zoning on the basis of a spread was: low spread (<50,000 ha), medium spread (50,000 - 1,00,000 ha) and high spread (>1,00,000 ha), and productivity: low productivity (<600 kg ha⁻¹) and

Table 1. Districtwise area, production and productivity of chickpea in Haryana (Average of 11 crop seasons, 1982-83 to 1992-93)

District	Area ('000 ha)	Production ('000 t)	Productivity (kg ha ⁻¹)
Hisar	131.2	101.9	707.3
Sirsa	127.3	82.0	638.6
Bhiwani	172.1	94.8	505.2
Gurgaon	21.0	16.5	679.7
Faridabad	3.2	2.8	861.0
Jind	57.1	34.1	645.7
Mohindergarh	63.7	41.2	548.3
Ambala	14.6	8.3	519.0
Karnal	4.9	3.7	678.9
Kurukshetra	7.3	4.9	616.7
Rohtak	56.8	40.3	681.7
Sonipat	4.7	3.4	675.9
Haryana	663.9 (Total)	393.9 (Total)	646.5 (Average)

high productivity (>600 kg ha⁻¹). The zones were then demarcated on the map of the state (Fig. 1). This information was later super-imposed with the isohytes of monsoon season rainfall and information on soil types in the state (Fig. 2).

Results and Discussion

On the basis of spread and productivity of chickpea, the state of Haryana has been divided in six productivity zones (Fig. 1). The zones are given below:

Zone-I (HH): having high spread and high productivity comprising of western districts of Hisar and Sirsa. Zone-II (HL): having high spread but low productivity comprising of Bhiwani district. Zone-III (NH): comprising of areas having medium spread but high productivity in the central districts of Rohtak and Jind. Zone-IV (ML): having medium spread but low productivity comprising of Mohindergarh district. Zone-V (LH): areas having low spread but high productivity occupying the districts of Gur-

gaon, Karnal, Kurukshetra, Sonipat and Faridabad. Zone-VI (LL): areas with low spread and low productivity comprising of Ambala district.

A close perusal of Fig. 2 shows that zones having higher spread (zone I and II) were restricted to low rainfall (30 to 50 mm) and light to medium soils in the eastern and south-western parts of the state. The maximum temperature in these zones declines from around 35°C to 20°C, and the minimum from around 20°C to less than 5°C, between sowing in October and flowering in January. The grain development and maturity phase in March and April are characterised by rapid rise in maximum/minimum temperatures and evaporative demand of atmosphere that hastens senescence and forces maturity. Seed yield in grain legumes has been found to depend upon both vegetative and reproductive components, which are markedly affected by these environmental factors (Summerfield *et al.*, 1980, 1987).

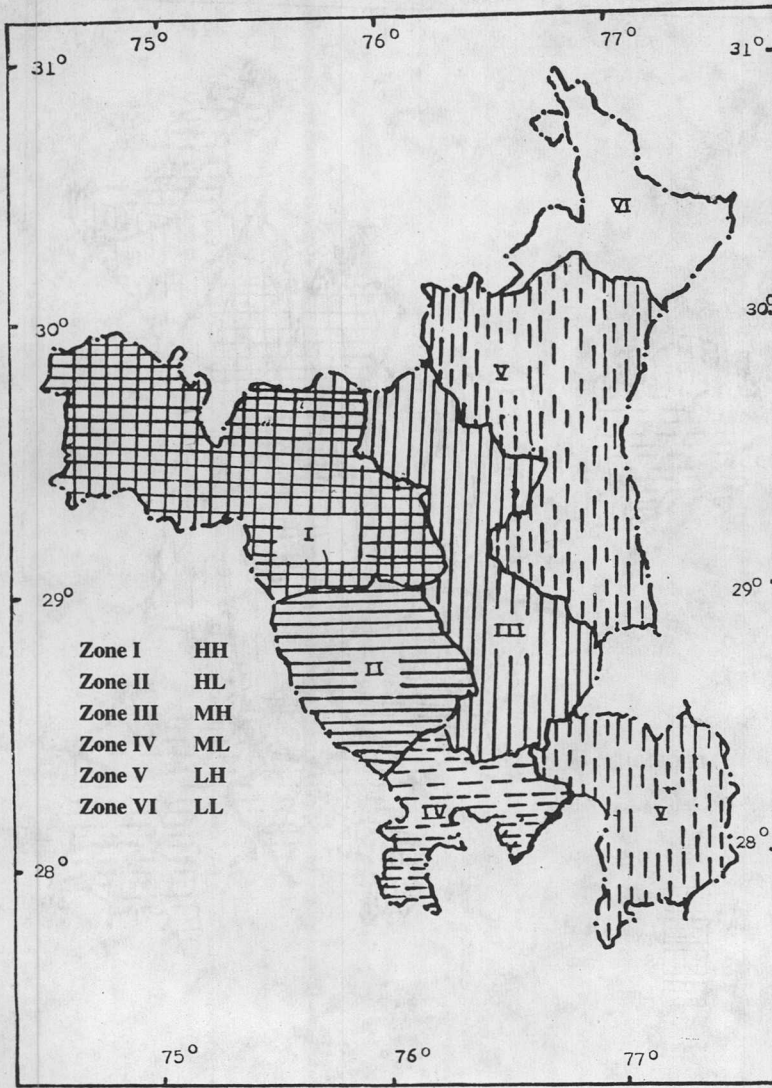


Fig. 1. Chickpea zones in Haryana.

The zones (III and V) with high productivity but low to medium spread extended over the central and south-eastern parts in the state. The winter season rainfall in these zones ranged between 50 to 70 mm in zone III and 70 to 125 mm in zone V, and the soils have sandy loam to loam

texture with better water holding capacity in comparison to soils in zone I and zone II. Due to the extension of irrigation facilities and breakthrough in crop production technology, the area under chickpea has given way to crops like wheat, sugarcane and mustard in these zones. The environmental

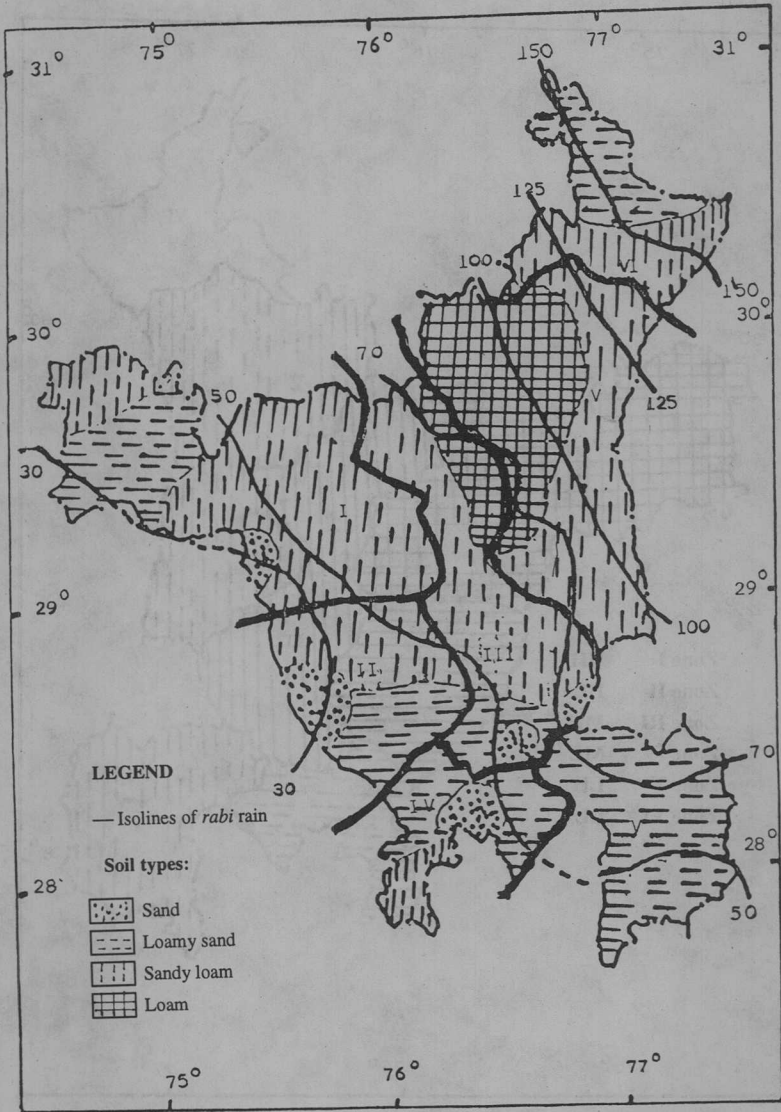


Fig. 2. Soil types and isolines of winter rain in different chickpea zones in Haryana.

factors other than soil moisture do not vary much from that of zone I and II.

The zone IV having medium spread but low productivity comprised of the southern district of Mohindergarh. The predomi-

nantly light soils (sandy to loamy sand) extended in the area and winter rains varied below 50 mm. The soil moisture is the major constraint in the area and has little irrigation facilities. The zone VI is traditionally a non chickpea growing area,

mainly having higher winter rains of around 150 mm and soils of heavy texture have potential for rainfed chickpea. Efforts may be made to encourage bringing more area under this crop under rainfed conditions. The area has plain to submontaneous topography. However, the irrigation facilities in the plains do not encourage farmers to sow chickpea and instead go for cash crop like sugarcane.

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