Some agro-demographic aspects in different agroclimatic regions of Rajasthan

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ABSTRACT

Some agro-demographic features in different agroclimatic regions of Rajasthan have emerged in course of compiling the population maps of the state. The rural population with percentage, density and decennial growth rate during the last census decade (1961–71) occupational pattern, agricultural population, per capita agricultural land, agricultural land per cultivator and pressure on land; production of cereals and pulses per cultivator; per capita production of staple food crops, per capita requirements in different macro agro-climatic regions are serially described through a series of 1:2 million maps.

On the basis of per capita food production a map showing the surplus and deficit areas has been prepared.

INTRODUCTION

The paper aims to correlate the rural population with the food crop production in different districts of agro-climatic zones in Rajasthan and to establish or map the surplus and deficit areas or carrying capacity zones in relation to food production.

In earlier communications Sen (1972a and 1972b) classified and mapped the macro and micro agroclimatic regions of the state showing their agroclim-
matic and cropping pattern characteristics. This paper deals only with the macro units. A little modification has, however, been made on parts of Udaipur and Sirohi districts with more than 750 mm of annual rainfall was earlier included in humid zone. But the area has under 15 per cent of the total area of the respective districts and is not of agricultural importance forming mostly hilly, rugged and barren terrains. In the present study these two districts are included in sub-humid zone. The five macro agroclimatic units dealt with in the present paper are:

Agroclimatic region

1. Arid
2. Transitional between arid and semi-arid
3. Semi-arid
4. Sub-humid
5. Humid

Districts included

Ganganagar, Churu, Bikaner, Jodhpur, Barmer and Jaisalmer.
Sikar, Jhunjhunu, Nagaur, Pali and Jalore.
Bharatpur, Alwar, Jaipur, Ajmer, Sawai Madhopur, Tonk and Bhilwara.
Sirohi, Udaipur, Chittorgarh and Bundi.
Banawara, Dungarpur, Jhalawar and Kota.

MATERIAL AND METHODS

The study is based on the analysis of 1971 census data (Chandra Sekhar 1971, 1972; Verma 1971a and b). The agriculture and land use data are collected from Statistical Abstracts published by the government of Rajasthan (1966, 1967 and 1968). The data so collected are of varied nature and compiled in the laboratory to make them mappable. The map of Agro-climatic regions published in Agricultural Atlas of Rajasthan (Sen 1972b) has been used as the base map. As the figures are available district wise, maps are designed on chropopleth technique with district as the mapping unit. Seven maps (1:2 million) have been prepared to depict the agric-demographic characteristics. These are finally depicted in four plates (Maps 1, 2, 3 and 4). The maps are self-explanatory.
AGRO-DEMOGRAPHIC ASPECTS OF RAJASTHAN

AGRO—DEMOGRAPHIC ASPECTS

Rural population

Arid Zone: Two distinct patterns are evident in the arid zone of the state. 50 to 70 per cent of the total population is rural in a belt comprising of the districts of Churu, Bikaner and Jodhpur. The decennial growth rate of rural population during the last decade shows an increase of 25 to 36 per cent of rural population (Map, 1). In another belt in the west comprising the districts of Jaisalmer and Barmer the rural population constitutes more than 85 per cent of the total population. The decennial growth rate of rural population, in the belt during the last decade is below +20 per cent. The other district, Ganganagar, of the arid Zone has the similar characteristics, the growth rate being +31.77 per cent during the last decade. The density of rural population in the arid zone districts is very low and varies from 37 persons per sq. km in Churu district to 12 persons in Bikaner and only 3 in Jaisalmer.

The transitional (between arid and semi-arid) districts have 80 to 95 per cent rural population, the average being 90 per cent. The decennial growth rate is, however, not uniform. In the northern districts (Jhunjhunu and Sikar) it is above +25 per cent and in the south (Pali and Jalore) about +20 per cent. The density of rural population in the north is 110 and in the south 65 persons per sq. km.

Semi-arid Zone: Like arid zone here too, two distinct patterns are noticed. In a belt comprising the districts of Ajmer and Jaipur, rural population falls below 70 per cent of the total population having growth rate below 22 per cent during the last decade. These two districts are, however, more urbanised. The density of rural population is about 100 persons per sq. km (Jaipur 126, Ajmer 114). All the other five semi-arid districts which form almost a semi circular belt have more than 80 per cent rural population. The decennial growth rate is not uniform. In the north (Alwar, Bharatpur and Sawai Madhopur) it is above +25 per cent with rural population density 100 to 150 persons per sq km. In the southern districts—Bhilwara and Tonk—the decennial growth rate during the last decade is about +18 per cent, whereas the density of rural population is below 100 persons per sq. km (Tonk 73, Bhilwara 90).
Sub humid Zone: The percentage of rural population varies from 82 in Sirohi to 90 in Chittorgarh—the average being 85. The decennial growth rate is not uniform. The density of rural population is 90 persons per sq. km in Udaipur. The average density of rural population in the zone is about 85 persons per sq. km.

Humid Zone: The percentage of rural population is very high, being more than 90 on the average. Kota has the lowest figure (78 per cent). The decennial growth rate is highest in Banswara (+38.04 per cent). In the other districts this varies from 25 to 30 per cent. The western districts (Dungarpur and Banswara) have rural population density of more than 120 persons per sq. km. In the eastern districts (Jhalawar and Kota), it is below 100 persons per sq. km.

Taking Rajasthan as a whole 82.39 per cent of the total population is rural. Except in Jodhpur, Churu and Bikaner districts of arid zone and Ajmer and Jaipur districts in semi-arid zone in all other districts the percentage is more than the state average. The density of rural population and decennial growth rate are not uniform and vary mostly according to rainfall and topographic conditions.

Agricultural population and its pressure on agricultural land

Map 2 shows the occupational pattern and per capita agricultural land in the different districts of Rajasthan. Cultivators and agricultural labourers constitute the agricultural population. This has been expressed in terms of percentage to total working population in the text. Per capita agricultural lands in different districts as indicated in the text are worked out by

\[
\text{Net sown area in ha} \div \text{Agricultural population}
\]

As per 1971 census, the working population of Rajasthan is 82.27 per cent of the total population. It is interesting to note that although the decennial growth rate during the last decade in +27.63 per cent, the percentage of workers in the state falls from 47.55 per cent in 1961 to 32.22 per cent in 1971. In the State the cultivators and agricultural labourers constitute 63.59 per cent and 9.10 per cent respectively.
Based upon Survey of India Map with the permission of the Surveyor General of India

Map. 2.  Government of India, Copyright, 1976
AGRO-DEMOGRAPHIC ASPECTS OF RAJASTHAN

It is thus seen that not only the bulk of the total population is rural but also the majority of them depends on agriculture. The analysis of the map shows the following characteristics:

Arid Zone: 30 (Ganganagar) to 35 (Barmer) per cent of the total population are workers. During the decade the percentage of workers falls by 17 per cent in Churu and Barmer districts, where about 80 per cent of the total working population are cultivators and agricultural labourers. Per capita agricultural land in these two districts is about 4.5 ha. In the other four districts the percentage of workers to total population fell by about 10 per cent during the last decade. In Ganganagar, agricultural population account for 78 per cent of the total working population out of which 59 per cent are cultivators and 18 per cent are agricultural labourers. Per capita agricultural land here is 3.65 ha Agricultural population accounts for 60 to 66 per cent in the other three districts; cultivators and agricultural labourers vary from 6.39 per cent in Bikaner to 7.95 per cent in Jaisalmer.

In the districts of transitional zone between arid to semi-arid working population decreased considerably during the decade. In Sikar and Jhunjhunu in the north, working population constitutes 27 per cent of the total population out of which about 50 per cent forms the agricultural population. 30 to 35 per cent of the total population of the other three districts are workers. Cultivators and agricultural labourers account for 70 and 9; 48 and 19 and 63 and 14 per cent to total working population in Nagaur, Pali and Jalore districts respectively. Per capita agricultural land varies from 2 to 3 ha.

Semi-arid Zone: 29 to 40 per cent of total population are workers. During the last decade percentage of working population has decreased considerably. In Jaipur and Aimer belt the total agricultural population accounts for about 59 per cent of the total working population, whereas in the other five districts this comprises 75 per cent. Agricultural labourers constitute about 8 per cent of the total working population on the average. Cultivators vary from 50 to 53 per cent in Jaipur-Aimer belt to about 70 per cent on the average in the semi-circular belt comprising five other districts. Per capita agricultural land varies from 1 to 2 ha.

Sub-humid Zone: Working population accounts for 30 to 40 per cent of the total population. In Sirohi only 43 per cent of the total working population are cultivators whereas the agricultural labourers account for 20 per cent. In the districts the figures are, however, not uniform. Cultivators
and agricultural labourers constitute 58 and 12, 73 and 8, and 68 and 6 per cent of the total working populations in Bundi, Chittorgarh and Udaipur districts respectively. Per capita agricultural land is less than 2.50 ha.

**Humid Zone:** 20 to 29 per cent of the total population in the western districts (Dungarpur and Banswara) are workers. 80 per cent of the workers form agricultural population, the cultivators and agricultural labourer being 73 and 4 and 82 and 7 in Dungarpur and Banswara respectively. Per capita agricultural land is 1 to 2 ha. About 30 per cent of the total population in the eastern districts (Kota 30.95 and Jhalawar 32.53) are workers, cultivators and agricultural labourers being 48 and 16 and 63 and 16 per cent to total workers respectively in Kota and Jhalawar districts. Per capita agricultural land is 2 to 2.50 ha.

Population and staple food crops

Map 3 represents the production of cereals and pulses (staple food crops) per cultivator in kilogram along with percentage of area under cereals and pulses in the different districts of the state in 1971. Cultivated lands per cultivator have also been indicated in the map. Associated with it is Map 4 which shows per capita production of cereals and pulses (kg) during 1971 in different districts. The two maps show the relationship between population and food production. The two maps bring out the following salient features in different agro-climate zones.

**Arid Zone:** The lowest production is in Jaisalmer district, being 117 kg per cultivator. Considering the total population, per capita production is only 23 kg in a year. The production is expected to be low because only 4.34 per cent of total land is cultivated for cereals and pulses (Map 3). Production per cultivator in Churu-Bikaner-Jodhpur belt is 700 to 900 kg, where per capita production is only 120 to 170 kg. In Barmer the production is a little more. Due to irrigation, the production is the highest in Ganganagar district (3326 kg per cultivator and 585 kg per capita).

The districts, transitional between arid and semi-arid, have higher production. But per capita production, except Jalore, is small varying between 200 to 235 kg. Per capita production in Jalore, in this belt, is however higher (330 kg). Production per cultivator, except in Nagaur (867 kg) exceeds 1000 kg in all the districts.
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Semi-arid zone—The production is the lowest in Ajmer (142 kg per capita and 806 kg per cultivator). Alwar and Bharatpur have higher production. Per capita production is about 325 kg. Production per cultivator varies between 1500 to 1600 kg. Tonk, in this zone, has the highest production (661 kg per capita and 2382 kg per cultivator).

Sub-humid zone—Production per cultivator in Udaipur and Sirohi exceeds 1000 kg, whereas in the other two districts the figure is 800 to 1000 kg per cultivator. But the per capita production is the highest in Chittorgarh district (280 kg). In other districts per capita production of cereals and pulses varies between 200 to 240 kg.

Humid zone: Like Ganganagar in the arid and Tonk in the semi-arid zone, Banswara district in the humid zone is characterised by high production (501 kg per capita and 2199 kg per cultivator). In all the other four districts production per cultivator exceeds 1300 kg. Per capita production here varies between 268 kg in Kota to 323 kg in Jhalawar.

Carrying capacity zones

Map 4 shows per capita annual production of cereals and pulses in different districts of Rajasthan. On the basis of this map an attempt has been made to classify the surplus and deficit districts in relation to local supply of staple food crops (cereals and pulses) and to map the carrying capacity zones of the state. Per capita daily consumption of cereals and pulses in Rajasthan seldom exceeds 0.5 kg. Considering different age groups and male-female composition of population it has been estimated that minimum per capita requirements of cereals and pulses in Rajasthan is 215 kg in a year. Accordingly, the districts having less than 215 kg as per capita production are grouped as deficit zone. In Rajasthan, particularly in the arid and the semi-arid zones, agriculture is mostly dependent on rainfall. Due to rainfall uncertainties, crop failure is very common, and once in every four years crop failure hits the state. The per capita crop production of the state is based on a year of fairly good rainfall. The production in many districts, falls even during average rainfall year. Accordingly, a transitional zone has been demarcated grouping the districts having per capita production between 215 kg to 265 kg. Districts having more than 265 kg fall under surplus zone. Accordingly, a carrying capacity map of the state in relation to the production of staple food crops has been tentatively prepared (Inset, Map 4). The map depicts that the districts of Churu, Bikaner, Jaisalmer and Jodhpur in the arid zone; Pali in the transitional zone; Jaipur and Ajmer in the semi-arid zone and Sirohi in the
sub-humid zone form a compact group in deficit zone. Ganganagar of the arid zone in the north stands out as the granary of Rajasthan and forms a pocket showing a surplus zone. Three groups of districts, one formed by Alwar and Bharatpur of the semi-arid zone in the north east; the second by Bundi and Chittorgarh of the sub-humid zone, all the four districts of the humid zone and Tonk of the semi-arid zone and the third by Jalore district of the transitional (arid-semi-arid) zone also belong to the surplus zone. Thus the surplus areas of the state form four isolated belts. The arid, and semi-arid zone districts including the transitional one (Jalore) have high production due to irrigation (Sen 1972a). The rest of the districts have per capita production between 215 kg to 265 kg and form the transitional zone between surplus and deficit zones. Except in the year of very good rainfall these districts practically come under deficit zone. Barmer is the only district of the arid zone, which belongs to this group.

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