

Demographic Changes in Different Agro-climatic Regions of Rajasthan

B.S. Gupta, Roop Chand and K.N. Gupta

Central Arid Zone Research Institute, Jodhpur 342 003, India

Abstract : This research paper establishes the relationship between spatial distribution of population with its demographic characteristics. Based on 1991 primary population census, significant variations exist in the density of population and population growth rate in different agro-climatic regions, viz., arid, transitional between arid and semi-arid, semi-arid, subhumid and humid regions. Proportion of main workers and marginal workers to total population in different agro-climatic regions has also been dealt with. Main findings of some demographic characteristics in the agro-climatic regions are depicted through two tables and three maps at 1:25,000,00 scale.

Key words : Human population, density, decennial growth rate, occupation structure, change, agro-climatic regions, Rajasthan.

Area wise Rajasthan is the second largest state in India. According to the 1991 primary census its total population is 4.4 crore (about 5.2% of the total population of the country). It is worthwhile to have a knowledge about the composition and characteristics of population of the state. It helps to know the level of efficiency, degree of homogeneity and social environment, thus giving an idea of the people's involvement in various economic activities of the region. Relationship between climate and some demographic aspects in relation to work participation in both macro and micro units was also studied.

Sen (1972a,b) classified and mapped the macro and micro agro-climatic regions showing their agro-climatic characteristics. Subsequently Sen and Gupta (1976) worked out agro-demographic characteristics in different agro-climatic regions in Rajasthan. Malhotra *et al.* (1983) worked out demographic changes (1971-1981) in different agro-climatic regions of Rajasthan. Therefore, an attempt is made here to study the changes in density and decennial growth rate for 1981-91 in the different agro-climatic regions.

Materials and Methods

The study is based on the analysis of 1991, 1981 and 1971 census data (Census of India,

1981, 1991). The map of agro-climatic regions published by Malhotra *et al.* (1983) has been used as the base map. The data so collected were compiled and three maps indicating density, decennial growth rate and occupation structure of population in different districts/agro-climatic regions were prepared.

Results and Discussion

Changes in density of population in arid region

The density of population in Rajasthan has increased from 100 persons km⁻² in 1981 to 129 persons km⁻² in 1991. Density varies considerably within the macro and micro units and from district to district. Variation of density of population in different agro-climatic regions is shown in Fig. 1.

Arid region : In the arid region as a whole (*kharif* monocropping), density of population during 1991 was 50 persons km⁻² which was found less than that of some of the districts in the region. Jodhpur (94 persons km⁻²) and Churu (92 persons km⁻²) were densely populated districts. These two districts have no comparison with districts like Jaisalmer (9 persons km⁻²) where agricultural conditions are not favourable. In Jaisalmer part of the area comes under hyper-arid zone where there is rare population. Concentration of population has been possible where water

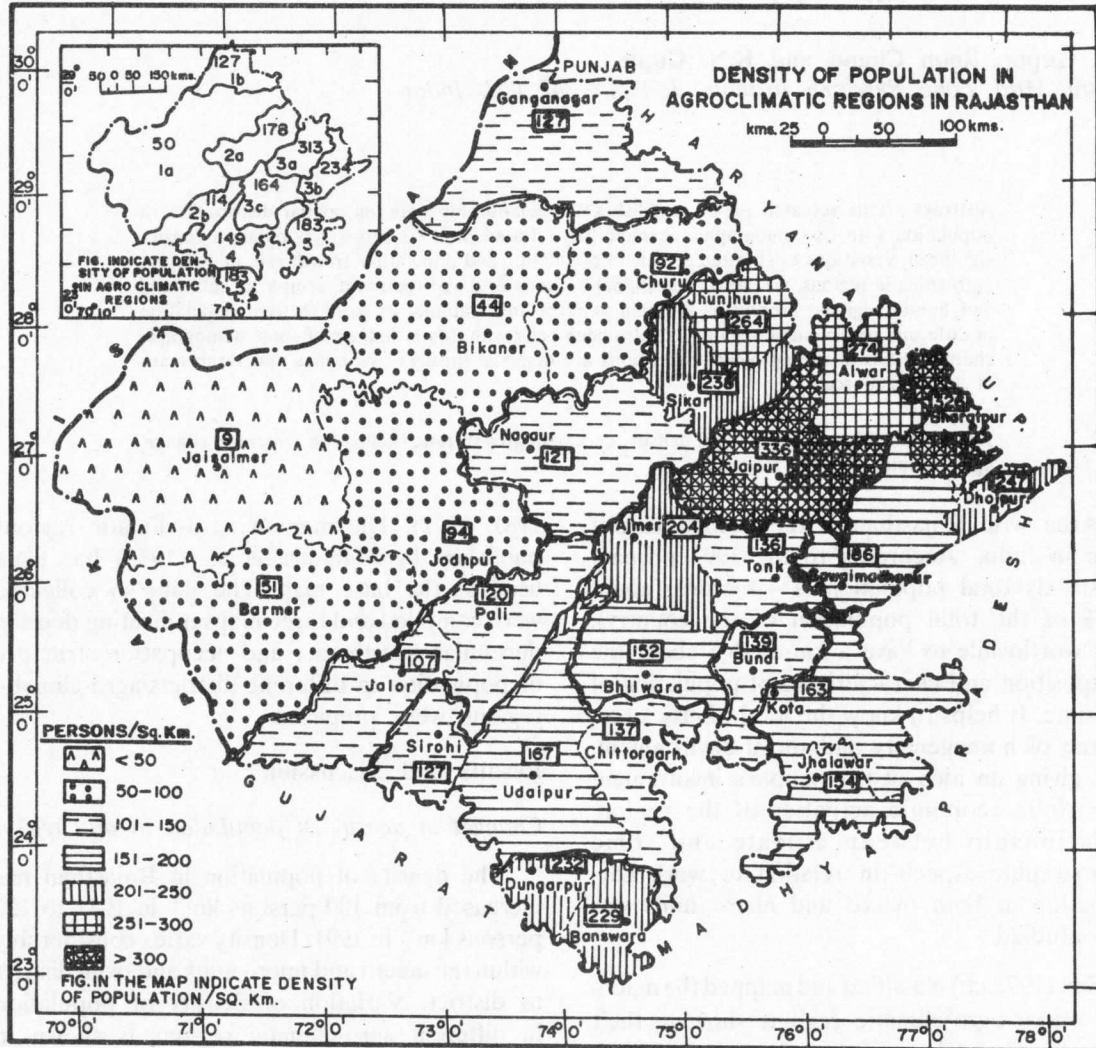


Fig. 1. Density of population in agro-climatic regions in Rajasthan

is available, agricultural conditions are better and economic opportunities are available (Malhotra *et al.*, 1983). There was an increase of 3 persons km^{-2} in Jaisalmer during 1981-91. Low increase in density was due to uncertain agriculture. In irrigated (*rabi* and *kharif* cropping) unit of arid zone (Ganganagar district) the density was 127 persons km^{-2} against 98 persons km^{-2} during 1981. It was mainly due to increased irrigation facilities.

Transitional between arid and semi-arid : In the districts transitional between arid and semi-arid *kharif* monocropping region (Nagaur, Sikar and Jhunjhunu) the density was 178 persons km^{-2} against 114 persons km^{-2} in irrigated *rabi* and *kharif* cropping (Jalor and Pali districts). The increased density in *kharif* monocropping area was, however, due to more industrialization, urbanization, mining activities and more irrigation

facilities. In the case of Jalor and Pali districts, agriculture is the main occupation, followed by industrialization (Malhotra *et al.*, 1983).

The density of population in arid region as a whole (which consists of arid region and the region transitional between arid and semi-arid) was 84 persons km⁻² which is less than that in the transitional region (151 persons km⁻²). This low density in arid zone was due to the constraints imposed by aridity.

Semi-arid region : This region has three micro units. The population density was 313, 234 and 164 persons km⁻² in *kharif* monocropping, *rabi* and *kharif* cropping and irrigated multiple cropping, respectively. The density in semi-arid zone as a whole was 233 persons km⁻² during 1991, which is about four times that in the arid region (84) as a whole and one and a half times of that in transitional region (151). Concentration of population was more in the plains where soil is fertile, rainfall is adequate and there is more irrigation facilities (Malhotra *et al.*, 1983). This region has more density than the subhumid (149 persons km⁻²) and humid (183 persons km⁻²) regions.

Subhumid region : The total area of the subhumid region is 38,821 sq. km which supports

a population of 57,97,768 (density 149 persons km⁻²). In some places there is no habitation. Due to hilly topography agriculture is not possible in some villages. The density in the districts of Sirohi, Udaipur, Chittorgarh and Bundi is 127, 167, 137 and 139, respectively, as compared to 105, 136, 113 and 106 during 1981.

Humid region : The region has Banswara, Jhalawar, Kota and Dungarpur districts having density of 229, 154, 163 and 232 persons km⁻², respectively. The overall density is 183 persons km⁻² which was found less than that of the semi-arid region (233 persons km⁻²).

Growth rate

Population in Rajasthan is growing steadily and the increase has been about 1.7 times over the past twenty years (Census of India, 1991). In 1991 the state recorded a growth rate of +28.44% against the growth rate of +32.88% during the decade 1971-81. Growth rate during 1981-91 declined in all the districts of the state except Bharatpur, Dholpur, Sikar and Nagaur districts, as compared to the rate in 1971-81 (Table 1). The pattern in different agro-climatic regions is evident from Fig. 2.

Table 1. Spatial distribution of population and growth rate in agro-climatic regions of Rajasthan

Mapping unit*	Population 1981 (,000)	Population 1991 (,000)	Decadal increase/ decrease	Decennial growth rate 1981-91 (%)
1a	5058.0	6687.6	1629.6	+32.22
1b	2030.0	2618.9	592.8	+29.01
2a	4217.5	5571.0	1352.6	+32.07
2b	2177.6	2629.0	451.4	+20.73
3a	5191.7	7019.1	1827.4	+35.20
3b	3420.0	4364.3	944.3	+27.61
3c	3534.4	4297.3	763.0	+21.59
4a	4718.4	5797.8	1079.3	+22.23
5	3914.2	5017.9	1103.7	+29.02
Rajasthan state	34261.9	44006.0	9744.1	+28.44

1. Census of India, 1991, Primary Census Abstract of Rajasthan.

2. Census of India, 1981, Primary Census Abstract Series-18, Rajasthan.

* 1a arid *kharif* monocropping; 1b arid irrigated *kharif* and *rabi* cropping; 2a *kharif* monocropping under transitional zone between arid and semi-arid; 2b irrigated *rabi* and *kharif* cropping under transitional zone between arid and semi-arid; 3a semi-arid *kharif* monocropping; 3b semi-arid *rabi* and *kharif* cropping; 3c semi-arid *rabi* and *kharif* multiple cropping; 4a subhumid *kharif* and *rabi* cropping; 5 humid *kharif* monocropping.

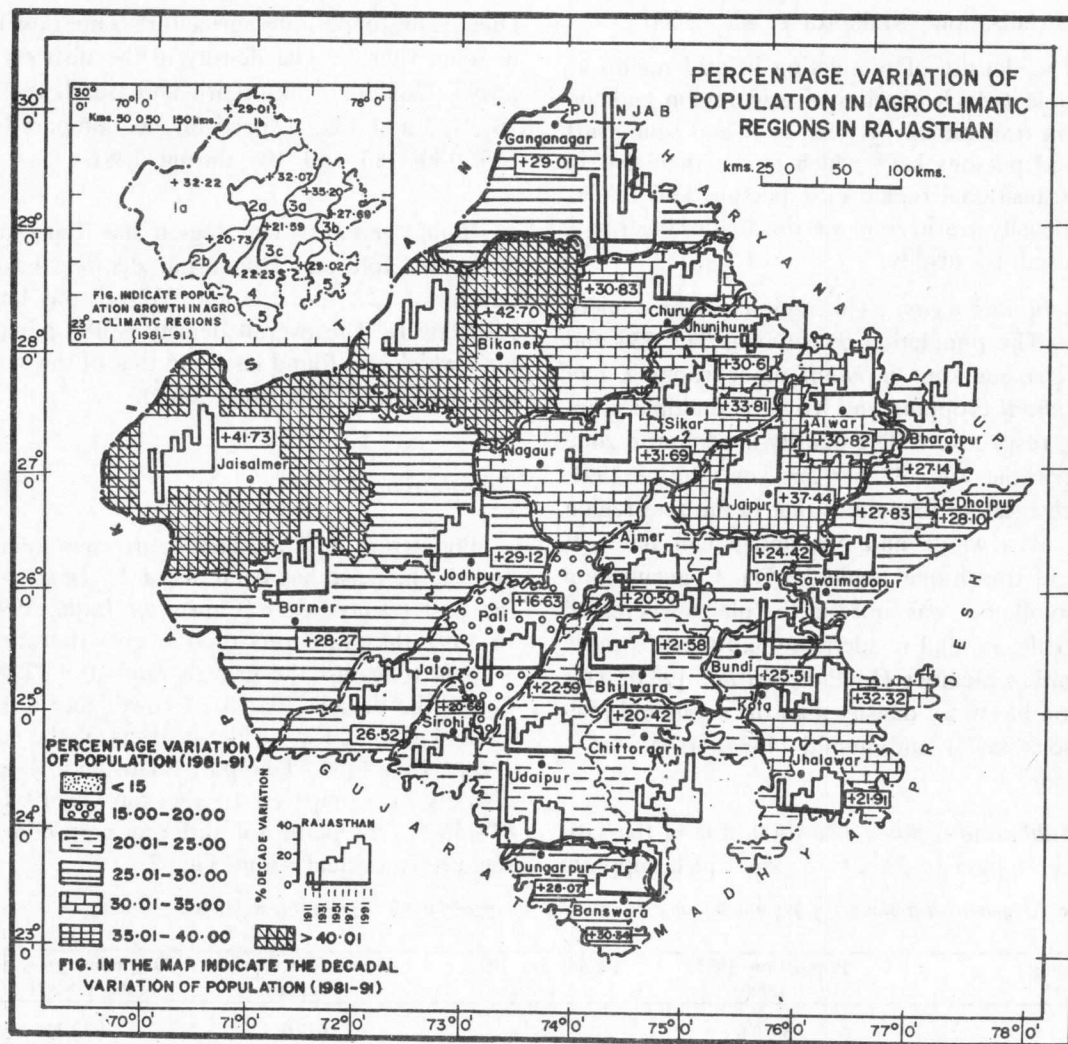


Fig. 2. Percentage variation of population in agro-climatic regions in Rajasthan

Arid zone : Arid zone as a whole recorded decennial growth rate of +29.84%. Arid monocropping area (*kharif*) experienced a growth rate of +32.22%, while arid irrigated (*rabi* and *kharif*) cropping area had +29.01%.

Transition between arid and semi-arid : In the region transitional between arid and semi-arid *kharif* monocropping experienced +32.07%

growth and irrigated (*rabi* and *kharif*) cropping experienced +20.73% decennial growth rate.

The highest decennial growth rate in the arid region was in Jaisalmer (+41.73%) and the lowest in Pali district (+16.63%). High birth rate and low death rate were the major factors for higher growth rate in Jaisalmer. The birth rate has been found higher than the all Rajasthan average

(Anon., 1991). In-migration due to allotment of land in the Indira Gandhi Canal Command area, import of labourers for construction works, etc., also played important role. The decline in decennial growth rate in Pali district may be due to out-migration to neighbouring districts on account of new irrigation facilities there.

Semi-arid : Semi-arid zone has three regions, i.e., semi-arid *kharif* monocropping, *rabi* and *kharif* cropping and *kharif* and *rabi* multiple cropping. Among the three regions, semi-arid *kharif* monocropping has the highest decennial growth rate (+35.20%), followed by semi-arid *rabi* and *kharif* cropping (+27.61%) and semi-arid *kharif* and *rabi* multiple cropping (+21.59%). Semi-arid *kharif* monocropping has two districts (Jaipur and Alwar). In these two districts the 1981-91 decennial growth rate was higher than the state average of +28.44% due to urbanization and industrial facilities made available in recent years. Jaipur and Alwar are coming up as developing business centres.

Subhumid and humid regions : The growth rate during the last decade was +22.23% in the subhumid region and +29.02% in the humid region. In the humid region the decennial growth rate was higher than the state average.

Considering the growth rate of bigger cities it is evident that urban areas like Jaipur, Jodhpur, Kota, Ajmer, Bikaner, Sikar, Nagaur, Banswara and Ganganagar have grown at a very rapid rate. The growth rate was more in the arid region, particularly in Bikaner and Jaisalmer. It is due to in-migration after the irrigation facilities were made available in recent years.

Occupational structure of population in different agroclimatic regions

The primary census abstract, 1991, recognises the following 9 categories of workers: (i) cultivators, (ii) agriculture labourers, (iii) people engaged in mining, quarrying, fishing and hunting, (iv) house-hold industries, (v) manufacturing/processing, (vi) construction, (vii) trade and commerce, (viii) transport and (ix) other services. Fig. 3 indicates the distribution of total working

population in the categories of cultivators, agriculture labours, household industries and other workers.

Agriculture is the chief occupation in Rajasthan. During 1991, 31.62% population was classified as workers, out of which 58.80% were cultivators and 10.01% were agricultural labourers as against 30.55% workers during 1981. During 1991, 2% workers were engaged in house-hold industries and 29.20% were working in other productive and economic activities (Table 2).

In the arid *kharif* monocropping area, 30.9% workers were total main workers, of which 63.11% were cultivators and 5.43% agriculture labours, 1.86% engaged in house-hold industries and 29.59% constituted the other groups of workers. In the irrigated *kharif* and *rabi* cropping region of arid zone (Ganganagar district), 30.19% were workers, of which 52.35% were cultivators, 18.27% were agriculture labours and 1.2% were engaged in agro-based industries. During 1981, there were 30.35% workers, of which 58.92% were cultivators, 14.82% were agriculture labours and 26.26% engaged in services based on agro-industries or related works.

Barmer (82.7%) in the arid region and Banswara (84.9%) in the humid region had higher percentage of population engaged in agriculture. The lower percentage of population engaged in agriculture was observed in Jaipur (51.5%) and Kota (57.1%). Here the urban population outnumbered the rural population. Most of the labours engaged in agriculture are now working in industries due to rapid industrialization.

Sex ratio

During 1981-91, sex ratio in Rajasthan went down from 919 to 910. It had never remain static or uniform in all the districts of Rajasthan except in Jalor district. In 1991, the sex ratio in 16 districts was higher than the state average (910), ranging from 918 (Ajmer and Jhalawar) to 1045 Dungarpur district. The remaining 11 districts had recorded the lower sex ratio than the state.

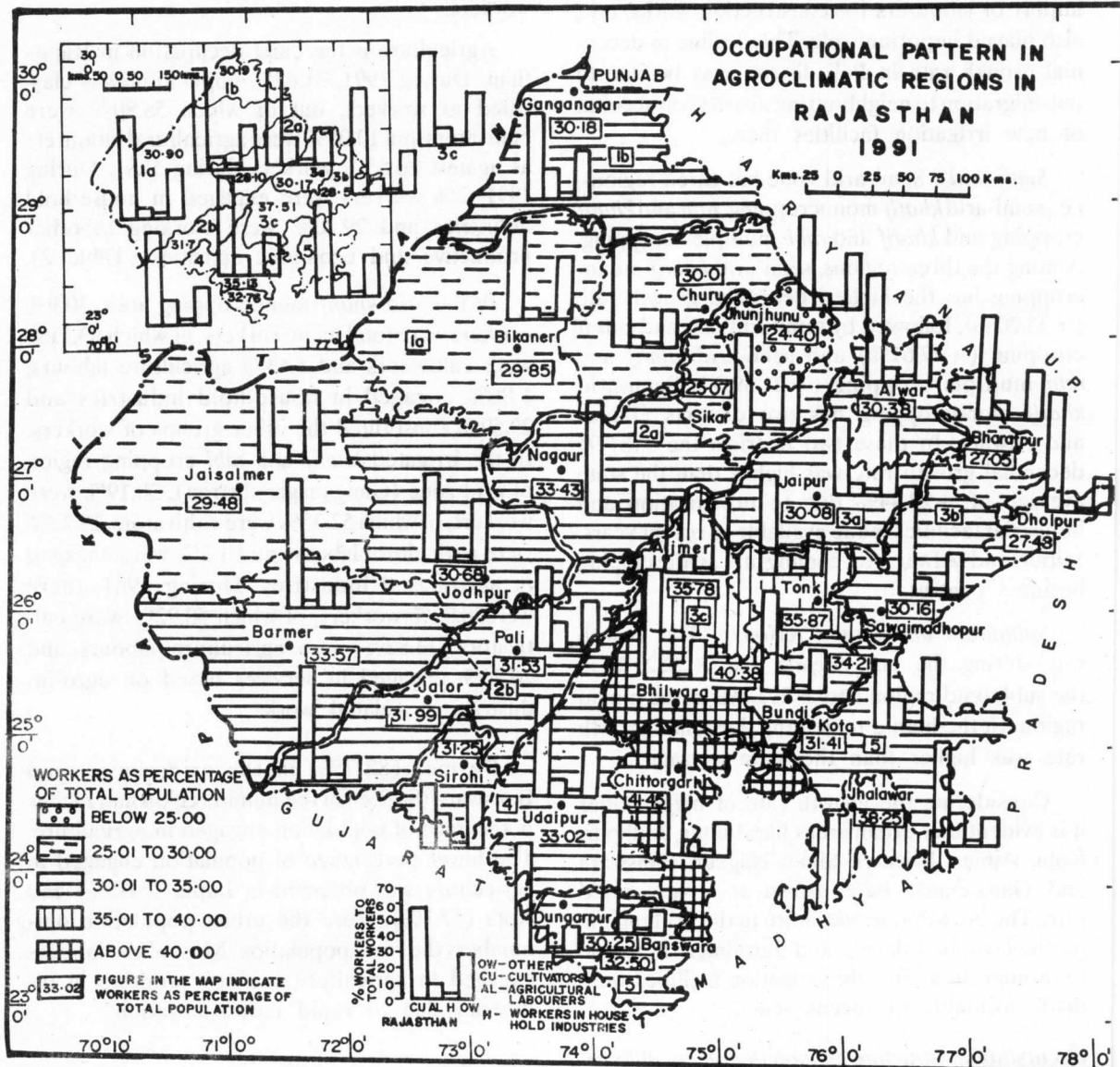


Fig. 3. Occupational pattern in agro-climatic regions in Rajasthan

During 1981-91 there was a marginal increase of females per thousand males in arid irrigated *kharif* and *rabi* cropping as well as in transitional region between arid and semi-arid irrigated *rabi* and *kharif* cropping. Sex ratio was found decreasing in the remaining climatic zones of Rajasthan.

Literacy

In 1991 census, the question of literacy was canvassed only for people aged seven years and above. This was unlike earlier census which took into account people of 4 year age and above.

Table 2. Distribution of working population in agro-climatic regions of Rajasthan

Mapping unit*	Total main workers (,000 No.)	Cultivators		Agril. Labourers		Household Industry		Other Workers	
		Actual (,000 No.)	% of total workers	Actual (,000 No.)	% of total workers	Actual (,000 No.)	% of total workers	Actual (,000 No.)	% of total workers
1a	2068.9	1305.9	63.12	112.4	5.43	38.4	1.86	612.2	29.59
1b	790.0	414.0	52.35	144.5	18.27	9.5	1.20	222.8	28.17
2a	1565.4	970.4	61.99	124.3	7.94	42.2	2.69	428.6	27.38
2b	834.2	482.7	57.86	131.7	15.79	24.5	2.94	195.2	23.41
3a	2118.1	1093.9	51.64	136.1	6.64	58.6	2.76	829.6	39.16
3b	1244.8	818.5	65.11	106.7	8.57	16.6	1.33	311.0	24.99
3c	1611.9	913.4	56.67	157.7	9.78	33.9	2.10	506.9	31.45
4a	2037.1	1238.7	60.81	232.9	11.43	33.0	1.62	532.4	26.14
5	1643.9	952.0	57.91	245.5	14.93	21.9	1.33	424.4	25.82
Rajasthan state	13915.1	8181.5	58.80	1391.7	10.01	278.7	2.00	4063.2	29.20

* Mapping unit shown in Table 1.

Source : State/District Primary Census Abstract 1991, Rajasthan.

Therefore, strict comparison with earlier decades may not be possible. Only 38.55% population in the age group 7 year and above was found to be literate in the state (1991 Census). The literacy rate was 24.38% during 1981. The figures during 1991 were much higher than the corresponding figures in 1981 in all the districts, as well as in all the agroclimatic regions of Rajasthan. The highest literacy rate was found in the semi-arid *kharif* monocropping region (Jaipur and Alwar), whereas it was the lowest in the subhumid monocropping region (Sirohi, Udaipur, Chittorgarh and Bundi).

Conclusions

The density of population was highest in the semi-arid region (233 persons km⁻²), followed by humid region (183), transitional region between arid and semi-arid (151), subhumid (149) and arid region (60).

The decennial growth rate during 1981-91 was the highest in arid region (+31.10%), followed by the semi-arid region (+29.10%), humid region (29.02%), transitional region between arid and semi-arid (+28.22%) and subhumid region (+22.23%). It was due to low death rate, high birth rate and in-migration due to opening up of Indira Gandhi Canal.

Percentage of workers to total population was the highest in the subhumid (35.14%), followed by humid region (32.75%), semi-arid region (31.73%), arid region (30.73%) and transitional region between arid and semi-arid region (29.26%).

About 77% of the total population of Rajasthan was rural, the highest being in subhumid (82.98%), followed by the transitional region between arid and semi-arid (82.16%), humid (79.20%), semi-arid (75.69%) and arid region (73.81%). The corresponding figure for the country as a whole is 74%. In twenty one districts, proportion of rural population is higher than the state average. Of these the most notable are Jalor (92.72), Dungarpur (92.70), Banswara (92.28), Barmer (89.96), Alwar (86.05) and Sawai Madhopur (85.16) districts.

It was found that 58.80% of the total working population in the state are engaged in cultivation and 10.01% as agriculture labour.

Of the total female population, 13.04% were main workers and only 10.70% were marginal workers. The highest concentration of main workers amongst the females was noticed in the semi-arid region, followed by transitional between arid and semi-arid regions, subhumid and humid regions. Marginal female workers were found highest in the semi-arid region and lowest in

the transitional region between arid and semi-arid region.

In 1991, sex ratio varied from 795 (Dholpur) to 1045 (Dungarpur). Sex ratio at district level was generally higher in the rural areas as compared to that in urban areas.

The literacy rate increased from 24.38% in 1981 to 38.55% in 1991. There is marked difference in the literacy rate between the two sexes. Female literacy rates are falling behind male literacy rate. The literacy level varied from 22.98% in Barmer district to 52.34% in Ajmer district. Twelve districts had a higher literacy rate than the state average of 38.55%. Ajmer district retained its position at the top with 35.30% literacy, while Barmer stood at the bottom with a literacy rate of 12.29%.

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