Rural section of Indian society is a very important component in the total sociological, economic and cultural fabric of India. The study of rural landscape, therefore, is a pre-requisite for any national or regional developmental plan. Rural landscapes include the elements of settlements, agriculture, dynamics of movement and growth, and space integration in terms of services and function.

A settlement as the point of origin of and primary residence of human society is the linking thread and life blood of all geographic studies. The consideration of settlement run like a thread through almost the whole fabric of geographic thought.\(^1\) Settlement, being a symbol of man’s occupance of land, serves as the link between the man and the environment. Since the greater part of the country is rural and agricultural in character, a study of rural settlements of the country is the paramount importance for determining various aspects and problems associated with the cultural geography.

Rural settlements as man’s living functional space, dots the country side since pre-historic time and forms an integral part of human life. More precisely, a rural settlement is man made habitat on the earth surface “representing an organized colony of human being including the building in which they live or work or store or use them otherwise and the tracks or street over which their movement take place.”\(^2\) Thus rural settlement is a relatively small and simple agglomeration of houses at favourable site, primarily associated with agricultural, which have influenced the formation of villages more than anything else. The study of spatio-temporal analysis of rural settlements is a primordial exercise in
understanding the complex interaction of **man and land environment**. Jind Plain has been taken as a case study, which is an old settled agrarian landscape. Geographical analysis of selected aspects of rural settlements such as their distribution, population potential, functional hierarchy, occupational structure, pattern, morphology forms the subject matter of the present study.

Jind Plain lies between 29° 3’ and 29° 50’ North latitude and 75° 57’ and 76° 47’ East longitude. On its east and northeast lie the district of Karnal and Kurukshetra. On the northwest it borders on the Patiala and Sangrur districts of present Punjab state. In the northwest, west and southwest it has a common boundary with District Hisar and its southeast lie the Rohtak and Sonepat districts.

Jind plain has been selected as case study based on Regional Divisions of Punjab, 1961. Before the creation of Haryana, Jind Plain was a part of Sangrur and Karnal districts of Punjab. According to data as provided in the Regional Divisions, Jind Plain had two parts: **Narwana Plain (145 villages) and Jind Plain (209 villages)**.

It is a level plain without any hill or stream. The plain has a sub-tropical continental monsoon climate. The region experiences over 70% of its total rainfall during monsoon months and winter is comparatively dry. Medium soil particularly loam (Bhangar and Nardak) are found in Jind Plain. The depth of water table generally ranges from 0.83 to 39.80 meters.

**Chapter-II** deals with population dynamics. Human habitat, as is rightly understood, comprises of two elements in complex integration that is man and land. The element of man has many facets but the most fundamental is its **number, distribution** and **movement** aspects. All these are the fabrics of demography. On the basis of population characteristics that is; distribution, density, growth of rural population, density and growth behavior, literacy, sex ratio, working force etc. the
region has been divided into two sub-zones that is; northern sector and southern sector.

As per 1991 census, Jind Plain has 354 villages including 4 uninhabited villages. It covers 3266.21 sq. kms. Rural area and total rural population of 966355 persons in 1991. The population distribution in the region concentrated in the southern sector. According to 1991 census the density of rural population is 298 persons/sq. kms. The very high and high density of rural population (>400 persons/sq. kms.) is confined in the southern sector around the urban centres while low and very low density (<300 persons/sq. kms.) is confined in northern sector and few patches in southern sector. Availability of rail and road network, other infrastructural facilities like educational, medical and marketing facilities are the major factors for high density of rural population in southern sector, while lack of infrastructural facilities are responsible factors for low density of rural population in northern sector of Jind Plain.

The growth of rural population of Jind Plain during 1961-91 is 92.3 per cent. The areas of high growth of rural population is situated around the city and towns of the region. The area, which is under low growth of rural population, is confined in extremely eastern part of northern sector and peripheral region of southern sector of study area. Only 3 villages lying close to Jind city and Narwana town recorded negative growth in their population during 1961-91.

The area of change in high density and moderate growth rate of rural population are mainly confined around the urban centers like Jind and Safidon in southern sector and towards west of the Narwana town in northern sector. The peripheral areas of the eastern part of the region covered by moderate density and low growth. There is a tendency of depopulation in the immediate surrounding urban centers. This tendency is probably due to the migration of rural population to urban centers.
For the size analysis of rural settlements, the data regarding total number of inhabited villages and their share of population have been compiled into seven population size groups. It can be noted that size speaks about the nature of soil, topography, social, economic background of the cultural group of a particular area. The very small size villages to moderate size villages show a negative growth in population and number of villages, while moderately large, large and very large size villages indicate remarkable growth in population and number of villages. These reflect a change in rural structure mainly to agricultural growth and development of transport and other infrastructural facilities after the formation of Haryana as a separate state.

Literacy is a major population characteristic, which plays an important role in socio-economic development. As per 1991 census, the total rural literacy in Jind Plain was 33.3% in which male literacy was 45.3% and female literacy was 18.9%. The area of very high and high literacy is mainly situated in southern sector, due to development of educational facilities and means of good transport network, communication etc. Low and very low literacy is found in scattered form mainly in the northern sector, due to lack of social awareness in education.

The average literacy rate increased 24.2% during 1961-91. The higher rate of increase of more than 30 per cent is recorded in the southern sector and around the city and towns. The areas of low increase in literacy is situated the middle and extreme northern part of study region. Negative change in literacy is observed in 6 villages, which are situated, in scattered form in the study area.

About 45.3% of males in proportion to total males are found literates in 1991. The very high and high literacy among the males are around the urban centers in the southern sector of the study region due to proximity of city and towns, availability of means of transport facilities, development agriculture etc. The low and very low literacy is found in scattered form in northern sector is due
to lack of social awareness towards education and large proportion of males are engaged in primary activities.

The average male literacy rate increased 30.1% during the 1961-91. The very high and high increased in male literacy are confined in southern sector of Jind Plain. The low increase in literacy is found in eastern part of southern sector and few patches in northern sector in scattered form.

About 18.9% of female in proportion to total female are recorded literate in 1991. The very high and high literacy among the females are found in southern sector of study region. Low and very low literacy is found mainly in central part of Jind Plain and some villages in scattered form in northern sector. The low female literacy in study region is due to lack of social awareness towards education and large proportion of females engaged in primary activities as agricultural labourer and marginal workers.

The average female literacy rate increased 17.0 per cent during 1961-91. The high increase in female literacy is mainly in southern sector except few villages at the periphery of the sector. The areas of low increase in rural female literacy at the periphery of the sector. The area of low increase in rural female literacy is situated in the scattered form in northern sector. Negative change is also observed in scattered form in Jind Plain and occupied only 8 villages.

The rural sex ratio in Jind Plain was 834 females/1000 males. Very high sex ratio (>950females/1000 males) is found in only 3 villages. The out migration particularly males is the main cause in these villages. About 60 per cent of workers are engaged in agriculture. High sex ratio is found in scattered form in the study area. Low sex ratio covered central part and southern sector except the area around the Jind city. Very low sex ratio is found in some villages of northern sector in scattered form and around the Jind city in southern sector of study area. Better medical facilities, transport network, educational facilities in these villages
and proximity if Jind city, which attract males workers are the responsible factors for very low sex ratio.

The high increase in rural sex ratio are found in 17 villages and mainly confined around the Jind city, Safidon and Julana towns in southern sector and southern periphery of Jind Plain. Low increase in sex ratio is found in whole of the study region. The low decline in sex ratio is found in 159 villages (45 %) of the total inhabited villages of the study area. The high decline in sex ratio is found in 37 villages and confined in southern sector.

The rural working force in Jind Plain was 29.72 % in 1991. The very large size and large size of working force found in scattered form and peripheryal areas of the study region. The are under small size of working force constitutes 203 (58.0 %) villages of the study area.

The average working force decreased 12.3 % during 1961-91. The high increase in working force is observed in southern sector of study region. The areas of low increase in working force is mainly confined around the Jind city and scattered form in northern sector. The areas of low decrease in working force covered 169 (48.29 %) villages of the total inhabited villages.

On the basis of the above selected parameters of population like distribution, density, growth of rural population, literacy, sex ratio and working force, Jind Plain has been divided into two sub-zones i.e. northern sector and southern sector. Further these two zones have been divided into seven micro zones with the help of superimposition of the generalized regions as demarcated in the different patterns of population dynamics.

It is observed that during 1961 to 1991 the northern sector, comprising four micro zones, has relatively high increase in rural population size (1467 persons/village), low increase in density (136 persons/sq. kms), low increase in population
growth (89.8 %), low increase in literacy (21.6 %), low decline in sex ratio (12 females/1000 males) and moderate decline in working force (12.8 %).

On the other hand southern sector, comprising three micro zones, has recorded relatively low increase in population size (1138 persons/sq. kms.), high increase in population growth (96.0 %), high increase in literacy (28.1%), very high decline in sex ratio (38 females/1000 males) and low decline in working force (11.4 %).

Further it is also observed that the north-northeastern zone around Kalayat town has recorded relatively very low increase in density (122 persons /sq.kms.), very low increase in growth of population (78.4 %), very low increase in literacy (18.8 %) and low decline in working force (9.7 %) and low decline in sex ratio (15 females/1000 males. While north- eastern zone around Alewa semi-town has observed low increase in density (134 persons/sq. kms.), moderate increase in population growth (95.8 %), moderate increase in literacy (24.7 %), moderate decline in sex ratio (26 females/1000 males) and moderate decline in working force (18.1%). The north -northwestern zone around Narwana town has observed moderate increase in density (144 persons/sq. kms.), high increase in population growth (100.2 %), low increase in literacy (21.6 %) and high decline in working force (13.6 %). The sex ratio has increased by two points that is 845 to 847 females/1000 males during 1961-1991. The northwestern zone around Uchana town has recorded relatively moderate increase in density (145 persons sq.kms.), low increase in growth of population (85.0 %), low increase in literacy (21.7 %) and moderate decline in sex ratio (16 females/1000 males) and moderate decline in working force (11.2 %).

The southeastern zone around Safidon town has recorded relatively very low increase in density (131 persons/sq. kms.), low increase in literacy (21.5 %) and very low decline in working force (7.6 %). The sex ratio increased by 4 points
that is 852 to 856 females/1000 males during 1961-91. On the other hand south central zone around Pillukhera semi-town and southwestern zone around Jind city have observed very high increase in density (153 persons/sq. kms.), very high increase in literacy (28.6 % and 29.3 %), moderate decline in working force (12.7 and 11.2 %) and very high decline in sex ratio that is 47 and 40 points respectively.

The low increase in population growth 87.0 % is observed in south- central zone while very high increase in growth of population is recorded in southwestern zone (104.4 %).

CHAPTER-III is devoted to study the population potential, service centers and functional classification.

In the present treatise for studying the behaviour of population potential in the Jind Plain. Two census decades are considered i.e. 1961 (before the creation of Haryana as a separate state) and 1991 was the scene after necessary development in the region and formation of Haryana state. Only those villages, which have a population of 5000 persons or more, are considered as nodes.

There are 13 nodes in 1961 and 47 nodes in 1991. The general picture of the population potential of Jind Plain in 1961 show maximum potential around Kalayat (100.0 %) followed by Batta forming a loop pattern in the northeastern part of the region. While minimum potential i.e. less than 40 % is recorded around Julana, which is situated in the south of Jind Plain.

The picture of population potential has completely changed due to emergence of 34 new nodes in 1991. The maximum potential is recorded around Jind, which is the administrative headquarter of the Jind district situated in the southern sector of the study region. Most of the locations situated on the peripheral area covered by lowest potential (less than 40 %). The population potential is affected by the pattern of population growth and linkage pattern.
In the present analysis only education, medical and postal amenities have been considered.

In education services; primary, middle, high and higher secondary schools are considered. In 1961, the facilities of primary schools were available in 234 settlements (67.6 %) out of 346 inhabited settlements. But in 1991, the number of primary schools has increased to 426, which covered the 342 (97.7 %) settlements. The facilities of middle schools were available in only 34 (9.8 %) settlements in 1961, but in 1991, 188 (53.7 %) settlements have the facility of middle school by increasing the total number from 34 to 220. Out of 346 settlements, only 16 (4.6 %) settlements had the facilities of high schools in 1961, but in 1991, about one/third i.e. 117 (33.4 %) villages have the facility of 130 high schools. It is interested to note that the facility of higher secondary school was not available in 1961 in Jind Plain. In 1991, only 9 (2.6 %) villages have this facility. It is also observed that the educational facilities were available in 278 (80.3 %) villages in 1961, which has increased to 343 (98.0 %) villages in 1991.

In medical service; registered medical practitioner (RMP), dispensaries (D), rural health centers (RHC), primary health sub-center (PHS), primary health center (PHC) have been considered. In 1961, the numbers of RMP were 99, which were available in 63 (18.2 %) villages. It increased to 261 in 1991, which covered 130 (37.0 %) villages. In 1961, the numbers of dispensaries were 43, which covered 24 (6.9 %) villages. But in 1991, the number of dispensaries decreased to 28, which are available in 28 villages (8.0 %) out of 350 settlements. There were only 10 rural health centers in 1961. This facility was not available in any settlement in 1991, due to abolished the term rural health center. In 1991, the total numbers of primary health sub-centers are 200, which are available in 191 villages i.e. about 55per cent of the total settlements. Primary health centers are available in
29 (8.3 %) villages. It is observed that in 1961, the medical facilities were available in only 73 (21.1%) villages, which increased to 264 (75.4 %) in 1991.

In **postal services**; telephone connections, post offices and post and telegraph offices have been considered. In 1991, the facilities of telephone connections are available in 66 (18.9 %) villages. In 1961, post offices were available in 80(23.1%) villages, which increased to 160 (45.7 %) villages in 1991. The facility of post and telegraph offices was available in only one village (0.3 %) during 1961, but it increased to 7 (2.0 %) villages in 1991. It is observed that the postal facilities were available in 81 (23.4 %) villages in 1961, which is increased to 171 (48.9 %) villages in 1991.

It is further observed that none of the above mentioned facilities (educational, medical and postal) were available in 62(17.9 %) villages during 1961, but only 4 villages dose not have any facility in 1991.

In the present study an attempt has been made on the basis of composite index value of the selected three amenities. In 1961, the southern sector of Jind Plain was comparative more developed in three stated amenities. The pattern of weighted score of selected amenities in 1991 exhibits that there is a definite shift in the spread of amenities and the less development region in north (particularly in north-northeastern, north-northwestern and north-western micro-zones) is received its due share of growth.

The lowest average score of educational services was found in northwestern zone in 1961, but in 1991 it is observed in north-northeastern zone. In medical services the average score is high in northeastern zone in both the decades but the low average score is found in north-northwestern zone in 1961 and south- eastern zone in 1991. In postal services the average score is high in southwestern zone and lowest score is observed in southeastern zone during 1961 but in 1991 the highest
average score is observed in northwestern zone and the lowest average score is recorded in north-northeastern zone.

Further, it is observed that north-western zone of the study region was handicapped in term of amenities of all categories in 1961 where as in 1991, the north-northeastern and southeastern zones are more deprived as compared to other zones.

The specialised and deficient functions have also been recognized on the basis of rural working force by using ‘Z’ score (data-mean/standard deviation) formula. The ‘Z’ score so obtained was classified into three categories. It was assumed that the value falling in between -1 to +1 from the mean represent the average working force of the region. The value higher and lower the average was considered as specialised and deficient function respectively.

In 1961, 27 villages (7.85 %) were specialized in the category of cultivators and mostly found in scattered form in the study region. But in 1991, number of villages increased to 43 (12.3 %) in the same category and mostly confined to the northern sector of the study area. This phenomena coupled with low literacy and absence of agricultural labourers suggest that villages have intensive agricultural occupation in a region productivity.

About 49 villages (14.2 %) were specialized in agricultural labourers in 1961. But in 1991 54 villages (15.4 %) have specialized in same category and most of villages concentrated in the southeastern micro-zone of the study region around Safidon town, which reflect mannal labour input in the occupation.

The villages specialized in household industries have almost doubled that is from 19 villages (5.5 %) to 34 villages (9.7 %) during 1961-91. This inference points out to the situation where agricultural possibility reduces and marginal service occupation increases.
Other workers were specialized in 48 villages (13.9%) in 1961 and mostly confined to the southern sector particularly around Safidon and Julana towns and Jind city. But in 1991, the number of villages decreased to 37 (10.6%) and majority of villages of this category are situated along the Rohtak-Sangrur State Highway no. 15, due to proximity of urban centers and availability of better transport facilities.

It is clear that the southern sector has a deficiency in cultivators and agriculture labourers while northern sector in the household industries and manufacturing and other workers. The southern sector is developed better economically as compared to northern sector. It is observed that in 1961, 139 villages (37.3%) were deficient in cultivators which increase to 149 villages (42.6%) in 1991 while villages having deficiency in agriculture labourers have decrease from 205 villages (59.3%) to 188 villages (53.7%).

It is further observed that 30 villages (8.6%) out of the total 350 inhabited villages have recording no changes either in specialized or deficient and most of the villages confined to southern sector of the study region.

In the composite picture of specialized, deficient and normal functions, north-northeastern and northeastern zones specialized only in agriculture labourers and mark deficient in all selected four categories. North-northwestern zone has specialized in cultivators while northwestern zone has specialized in cultivators and other workers. It is due to better transport network and infrastructural facilities. Northwestern zone has deficient in the categories of agricultural labourers, household industries and manufacturing and other workers.

Chapter -IV deals with morphology of rural settlements, in which pattern of settlements, house occupancy and structure of settlements have been studied. Morphological expression of rural settlements has been described by collecting
detailed informations. Religio-ritual model is also tested for micro level study of villages.

About 10 types of pattern have been identified on the basis of **built-up area** with the help of topographical sheets. Although the Jind Plain is dominated by square and rectangular patterns. But certain distinct shapes or patterns of the village emerge as a consequence of **physiography, transportational network, and density of rural population** etc. The southern sector of the study region generally show square and rectangular patterns of villages. In the northern sector although the pre-dominance of semi-circular and square shapes of village is visible. The linear patterns are observed along the S.H. No.15.

The square (39.43 %) and rectangular patterns (23.14 %) have maximum concentration in the southern sector of the study area. Semi-circular shape is covered the 17.17 % of the total villages. The linear patterns (6.57 %) mostly occurring in the southwestern zone of the study region. L and T patterns are observed in northern sector of Jind Plain.

Further, study the shape index (S) of a village concerned may be expressed as the ratio of the area of that village A, to the area of the circle with longest axis (L) as a parimeter,

\[ S = \frac{A}{\pi R^2} \quad \text{or} \quad S = 1.27 \frac{A}{L^2} \]

It is observed that the majority of the villages (41.43 %) are lying between shape index value of 0.6 to 0.7. This is mainly due to rectangular system of land division (Bigha system). The statement in further confirmed by the presence of 36 (10.29 %) and 66 (18.85 %) village recording near hexagonal and near circular to circular shapes respectively. About 60 (17.14 %) villages falls under the category of 0.4 to 0.5 shape index, while 19 (05.43 %) villages have elongated shapes (0.1 to 0.2) and 24 (06.86 %) villages falls in the category of 0.2 to 0.3 shape index.
The very high density of rural population/house (more than 8 persons) is occupied by 9 villages and confined in scattered form in Jind Plain, which covered 2.57% of total villages. This is due to proximity of urban centers about 70 per cent of population engaged in agricultural activities. High density having 8 persons/houses is found in 24 villages, which covered 6.86% of total villages. Moderate density of population/house (7 person/house) is confirmed in whole of the region occupied by 212 villages, which covered 60.57% of total villages. Low and very low density of population/house (less than 6 persons/house) is confined mainly in southern sector around the Jind city, Safidon and Julana towns.

Religio ritual model is also tested for micro-level study of villages in Jind Plain. Only two villages have been selected i.e. Gosian Khera and Rajana, which are dominated by Jat and backward class (Bairagi). It is found that still Brahmans occupied in the highest rank in the ritual hierarchy while the untouchables are on the lowest.

Further it has been observed that some changes have occurred due to the awareness of literacy or education, development of infrastructure in rural areas, improved technology and various schemes of the Government to improve the lot of the down trodden. Lowest castes have substantially improved and some families have constructed their own pucca houses in the core area or near the available facilities. So, we can say that the religio-ritual model is under going a change. The improved economic structure is also changing the standard of living of some scheduled castes people like Chamar and Dhanak. This change may become a trend, and it will be a good omen to the emergence of a mixed social culture in the future.

Chapter -V is devoted to identification of problems and suggestions for future for balanced rural development. It attempts to bring out regions of deficient and surplus area in terms of educational, medical and postal amenities,
hierarchy of service centers, network of rail and road and housing conditions. On the basis of the suggestions for further development of the region have been brought out. It is observed that north northeastern, northeastern and north-northwestern zones facilities of registered medical practitioner, dispensaries, primary health sub centers, telephone connection and post and telegraph offices are less than expected. North-northeastern and south-central zones, deficiency exists in higher secondary schools.

The average composite score in 1st order service centers of all amenities is high in south-western and in IIInd order service centres of all amenities is high in south-central while, north-eastern zone in IIIrd order service centers.

In 1st order, north-northeastern and north-eastern zones has the latest score while in the IIInd and IIIrd order, north-northeastern zone has the least score than the other micro zones.

Although, the road network is satisfactory in the region. The rail network, however, is provided in the whole of the region. Accordingly in the eastern part, a railway line joining Safidon to Kalayat via Alewa should be constructed to provide quicker and bulkier movement and traffic and goods in the eastern part.

Further, it observed that Jind Plain has moderate housing conditions. Southeastern and south central zone the condition of houses if good while north-northeastern and southwestern have moderate size. Northeastern and northwestern have rather crowded condition where as north- northwestern have still more crowded condition per house.

Chapter-VI is related to summary and conclusion.
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