ABSTRACT

Settlements occupy an important position among all the visual imprints made by man upon the physical landscape through the process of cultural occupancy since the dawn of human civilization. The evolution and growth of a settlement in an area is the result of the interplay of the prevailing ecological conditions, cultural and social values of the residents, technology, management system and the settling process through time span. In the initial stage, settlement bear simple forms and have closed relationship with environment. However, increased of knowledge and growth of civilization increases variability in the forms and sizes of settlements.

The study area, Bharatpur District, is one of the most early settled region of the country involves interesting pattern of human congregation for which it has been purposively selected for making a humble contribution to growing field of settlement geography. The district has an agrarian base and present diverse physio-cultural and socio-economic condition at micro-level in its different parts. It is one of the most ancient settled region and has long history of peopling and occupancy. Several archaeological findings, historical records and local legends pertaining to the pre-historic time, show that the study area was initially occupied by Matsya tribe before the Aryans. Inspite of the intermixing of various ethnic groups and cultural traits from within and outside the area has preserved its own traditions, culture, myths, norms and values, which has resulted in shaping the uniqueness in its identity.

The objective of the present study is:

1. To study the physical, cultural and demographic parameters that give rise to variation in the macro and meso region of the study area, as base for human settlements.

2. To trace the evolution of rural settlements from pre-historic to modern period with the help of cultural ecology and place names analysis.
3. To examine the spatial organization and transformation by successive 
   social groups or clans.
4. To deal with some salient characteristics of a few models of spatial 
   diffusion.
5. To study the spatio-temporal analysis and diffusion of clan 
   settlements.
6. To examine the caste structure which plays a significant role in the 
   formation of socio-economic hierarchy.
7. To interpret the distributional pattern and inter-relationship among 
   the rural settlement with the help of size (population and size), 
   spacing (observed, expected and index of randomness) and other 
   characteristic, through these findings an attempt has been made to 
   measure the degree of concentration and dispersion to classify the 
   rural settlements in different types.
8. To deal with the view of the shape analysis as well as the geometrical 
   form of shapes, and to study the factors responsible for the formation 
   of various pattern of rural settlement.
9. To study the morphology of dwellings on the basis of size and 
   building material and suggest a suitable house plan for the district.
10. To analyse the social morphology of the selected villages (built-up 
    areas) based on the relegio-rutual and secular dominance models and 
    also to examine the influence of castes and dominant landownership 
    on the spatial patterning of rural houses in the study area.
11. Finally, to summarize all the observations made during the course of 
    study and the net results thereof.

The methodology of the present study is:

In order to analyze the evolution and spatial organization of clan 
settlements in Bharatpur District, there are so many sources which are 
extremely helpful in providing significant clues to the understanding of the 
evolution of clan settlement in the district e.g. archaeological findings, 
historical sources, various written records, place names, culture, cults, 
folk-lore, maps, field survey and interviews.
To examine the spatial distribution and types of settlement in terms of spacing, degree of dispersion and concentration, quantitative techniques have been used in the following manner.

(i) \[ D = 1.0746 \sqrt{\frac{A}{N}} \]

(ii) \[ R_H = \frac{r_a}{r_b} \]

The changing patterns of the landscape / land occupied by different socio-cultural groups are carefully examined in sequential manner. The transformation and obliteration of the cultural landscape have been tested within the conceptual frame of histogenesis and morphogenesis.

The spatial diffusion of the clan settlements shows a typical character in which the third stage shows a asymptotic growth of settlement, thus it is similar to By Lund. The coastal like diffusion model is found because of its location.

The dimensional attributes have been applied to test the diffusion stage of the clan settlement and thus the ratio of the settlement velocity, viscosity of the landscape and the energy of the pioneering population have been considered. On the basis of these attributes, generalized models have been presented which may also be comparable to other areas.

For the analysis of the pattern or shape of settlement both qualitative (classical), and quantitative (modern) approaches have been applied. Shapes of settlements have been measured taking ninety villages as a sample on random basis, using the following formula:

\[ S = \frac{A}{\pi R^2} \]

The shape analysis of settlement has also been made by taken into account the number of contacts between a village and its neighbouring villages. Dirichlet / Thiessen Polygons and Hexagon have been used for proper planning of rural settlements.

The composition of building construction and material has been taken into consideration for the classification of rural houses. Social
morphology or spatial patterning of built-up area of selected village of discrete ecological settings at micro level has been analyzed on the basis of religio-ritual and secular dominance models.

Study on “Evolution on Spatial Organization of Clan Settlements in Bharatpur District, Rajasthan” has been organized into seven chapters excluding introduction and conclusions.

The introduction deals with the meaning, scopes, various approaches of the rural settlements, a review of relevant literature and references, importance of study, selection of the area, objective, methodology and the organization of the chapters.

The First Chapter gives the brief introduction of the area, its physical, cultural and demographic setting with emphasis on physiographic, geology, drainage, climate, soil and cultural attributes i.e., land use, cropping pattern, irrigation, transport and communication, manufacturing activities. It also provide demographic structure in the district.

The Second Chapter deals with historical perspective concerning the evolution of settlements of different period taking into account the evolution of settlements in sequent occupancy, the place names analysis, territorial evolution of clan settlement and diffusion of settlements.

The Third Chapter deals with spatio-temporal analysis of various clan settlements of the study area. The dimensional attributed have been applied to test the diffusion stages of clan settlements. Thus, notion of the settlements velocity, viscosity of the landscape and the energy of pioneering population have been considered. On the basis of these attributes, generalized models have been presented which may also be comparable to other areas.

In the Fourth Chapter an attempt has been made to study the spatial distribution of rural settlements. The distribution of rural settlements is affected by several factors in which relief, distribution of resources, population, land under cultivation, types of agriculture development of road network, localization of resources, political decision and cultural bonds are the important factors on the distribution of rural settlements in the
Bharatpur District. The spatial pattern of rural settlements has been studied quantitatively by using quantitative techniques.

The Chapter Fifth examines the various pattern of rural settlement found in the study area in response to the physical and cultural factors. These patterns have been identified on the basis of Survey of Indian Topographical Sheet and have been checked and modified with the help of village cadastral maps and through personal observation, wherever possible. Shape analysis of the villages has been based on quantitative technique taking into account ninety village sample on random basis. Further, relationship among contact index, population density and areal size of the villages have been studied. The present researcher has recommended that the Thiessan Polygon and Hexagon be adopted as model while planning the development of the villages in the study area.

The Sixth Chapter has been devoted to study the rural house types and building material. The Indian villages bounded by agricultural land with different types of building materials and house types in regional settings. Human dwellings are governed by tradition and cultural elements of the time and they form one of the most basic elements in cultural landscape and hold a significant place in the geographical analysis of settlement. House is a symbol regionalism representing social, cultural and economic organization of its people. It also assesses the impact of various physical and cultural factors on the pattern of house and the type of the building material used in the study area. Suitable rural house plan and a few remedial measures have been suggested for improving the village environment.

The Chapter Seventh seeks to analyse the social morphology of three selected villages (built-up areas), based on the religio-ritual and secular dominance models. The influence of caste and dominant landownership on spatial patterning of rural houses of these three selected villages of the district have been examined through field observation.

The conclusions have been drawn and recommendations have been made for the rational planning of rural habitat in the study area.
The different historical records, settlement reports, district gazetteer and field study make it clear that the settlement of this region has begun around 1500 B.C. and in the past the region was inhabited by Matsya tribe before arrivals of Aryans. By the end of the seventh century B.C. the Aryanization of the area has been completed. The region was first affected by the migration wave of Jats clan at the beginning of the twelfth century A.D. and migration of the various corporate groups or clans a much larger scale followed by Muslims invasions in 1195 A.D. a wave of migration continued upto 18th century, each of which has left its imprint upon the study area.

The most visible feature in the cultural landscape is the settlement, and it has been observed the distribution of rural settlement is influenced by various factors. Out of the several physical, social, economic and political factors, a few factors are more responsible for the distribution of rural settlements. However, the settlement distribution is not only determined by the natural condition but also influenced by socio-economic factors.

Four clans, namely, the Sinsiwar Jats, Sogarwal Jats, Chaudhary Jats, Meos, have been analyzed with the help of available literature, field survey and historical records. It has been observed that these clan settlements were diffused over the region by taking time nearly 300-500 years with the three stages of spatial diffusion processes. To measure the diffusion stages, seven dimensional attributes are considered: time (T), distance from parents settlement (L), population (P), number of settlements (n), length of time (S), population energy (p), and lastly viscosity of landscape (V). During the first stage of settlements diffusion process, the founding settlements are recorded in few places due to limited availability of the land and presence of vast jungle, except in the case of Sogarwal Jat clan settlements. In this case vast land was available and so they had established larger number of new settlements.
The second stage of spatial diffusion process mark with the establishment of a number of new settlements. It is due to population concentration and foundation of new hamlets.

The third stage was marked with stratification and competition (the tendency to produce great regularity in the settlement pattern). It has also been recorded that during third stage of spatial diffusion process the number of founding settlements is much less. Since 1800 A.D., nearly all available land was occupied by the clans and they did not establish additional settlements on their fertile land. It has also observed that Sinsiwar Jats have found additional settlements during the third stage of diffusion process due to natural growth of population. A reverse relationship between the distance and population of daughter from parent settlements is recorded: as the distance of daughter settlements from parent settlements increases the population of daughter settlements from the parent settlements decreases and vice-versa. It has been recorded in Sogarwal Jat clan settlements but in other cases such as the Chaudhary Jat clan and Meos clans different relationship has been found. A positive relationship is recorded in the population energy (p) and viscosity of landscape (V): as population energy (p) increases the viscosity of landscape (V) also increases. It is due to immigration and presence of market centers.

Caste ranking is determined in the light of population and economic power (landownership). Three village have been taken into consideration. It has been noted that the Jats stands first rank (landownership and population dominancy) followed by Brahmins, Gujurs and others.

The quantitative analysis of spacing of rural settlement at panchayat Samiti level has revealed that there is a direct relationship between spacing and the size of the settlements. It is obvious that where spacing is high, villages are larger sizes, with a small number of hamlets having higher densities of population, which results in compact structure of settlements. On the contrary in areas of low spacing, settlement are generally smaller in size with low pressure of population and scattered distributional patterns, viz., hamlet type of settlements. The nearest neighbour distance
approximation analysis of rural settlement has revealed that settlements are more regular than random.

An analysis of shapes of the villages show that the average shape index of the study area being 0.638. About 17 per cent of the villages conform roughly to rectangular or square shape. No village has a very elongated shape while nine villages approach near circular shape.

Contact index, population density and areal size do not show any significant co-relation with existing almost homogeneous environmental condition in the region.

Transformation of village shape into Dirichlet/Thiesson polygons and hexagons ought to be taken into consideration, while making plans for rural development. It has been found that village sites are mostly determined by physico-cultural factors where as markedly centres have developed at the intersection of roads or along the roads. As the number of markets centres increase the services area of individual market centres decreases. Increasing Christaller's K values may be taken as an index to represent better efficiency of purchasing power and development on the one hand and transport connectivity of a region on the other, which should be taken into account while makings plans.

The morphology of rural dwellings in the study area shows that the building materials and the architectural style are the expression of the physical factors of the region, whereas the ground plans are closely related to the socio-economic conditions of the residents. Mud or clay, is widely used in the district, because plenty of cheap clay is on hand to construct walls and roofs. The size of the dwelling reflects the economic conditions of the dwellers.

The social morphological study of three selected villages (built up areas) reveals that the economic power of the people and caste plays a decisive role in the selection of best available site for settlement. The analysis of the spatial patterning of rural dwelling of different caste shows that segregation is closely associated with caste inhabited in the villages.
To improve the living conditions of the rural peoples and their settlements, it is important to comprehend the socio-economic condition of the people and the potential resources of villages. The rural settlements are tradition bound and its nature of built up area is spontaneous. They are closely knit together through invisible thread of social fabric, and interdependent to one another to carry out their socio-economic business. Breaking of joint family system, pattern of existing dwellings, fragmentation of land holdings, social conflict are some of the cause for haphazard growth and mushrooming of settlements in countryside. In view of the above facts some of the important suggestions based on field experiences have been made to obtain the sustainable development of the countryside. These are as follows:

1. In order to improve housing conditions, house should be simple in design. Bricks that can be locally manufactured at the same time generating local employment can replace mud walls.

2. The congestion of houses may be relieved by providing extension site for them. This can also be achieved by filling up the stagnant ponds and pits lying near the settlement sites. These pits and ponds served useful purpose in medieval and ancient days but now they are turned into breeding grounds of mosquitoes.

3. All the villages and hamlets should be connected with brick line road with a view to maintain cooperation among the different sections of the society and improvement of their socio-economic conditions.

4. The sewage system needs improvement by providing soak pits for individual houses and pucca drainage for the streets, but both should be cleaned periodically.

5. Cattles pens and sheds should be keep little away from the dwelling sites attached to it with a view to good sanitation.

6. There should be provision to dry latrines near the inhabited sites to avoid the unhygienic practice of defecating in the open field.

7. Extension of safe drinking water through more tube-well installations.
8. Electric connections should be extended to every bit of the region.

9. Provision of better education, health facility for all and popularization of family planning measures, so that dependency burden on worker can be lessened.

10. Schemes for developing pisci-culture, dairying and poultry farming have been suggested.

11. The illegal gathering of forest produce should be regulated by introducing social-forestry, small scale industries or handicrafts generating rural employment and income.

12. Lastly, planning will be facilitated if further research in oriented to find out the process of human adjustment to environment.

National and International development policies are giving higher priority to distribute the benefits of development to the poor and other disadvantaged, through a combination of accelerating overall growth and disintegrating more of the benefits directly to those groups. For the development of human settlements the available resources should be used efficiently and to its optimum level to provide jobs, goods and services to the needy people of the rural areas; since poorest of the poor lives there.

National and International development efforts seek to increase agricultural output and rural employment and incomes, the spatial focus of settlements policy must expand to include rural settlements as well as urban settlements. One way or another, the inhabitants of rural settlements should be provided with at least minimal facilities for safe drinking water, primary health care, education, marketing and storage facilities for agricultural produce and inputs and opportunities to earn enough income whether in cash or kind, to provide adequate food, clothing and shelter. In addition, national settlements policies and plans should strive to provide the rural population with access to a wider variety of occupations and cultural facilities so that ambitions, educated rural people will be able to find challenges and rewards commensurate to their abilities.