INTRODUCTION
Settlement is visual imprint made by man upon the physical landscape. It is manifestation of physio-cultural and socio-economic condition of the region. As diverse physio-cultural, socio-economic conditions are found in different parts of the region, so it is obvious the diverse system and pattern is supposed to happen. The settlement is not grown in single point of time but it takes long interval of time. During its process of growth many more changes are found in their morphology, shape, structure, layout, plan etc. It is brought through different waves of social stock within the region. The region remained under the sway of many dynasties and each one tried to put their own imprint upon the physical landscape in accordance with their cultural norms of the society. These changes are apparently seen in the place-names of the area. Such kind of study is very helpful to know the exact ecological setting of the past and how they contributed in evolution, nature and spread of settlements.

The geographical study of rural settlement begins with Ritter's work in the early nineteenth century. Since then both the content and the methodology of the study have been developed principally within the German and French, while in England rural settlement geography is a relatively recent branch of human geography. Stone suggested that 'geography of rural settlements is defined as the description and analysis of the distribution of buildings by which people attach themselves to the land for
purpose of primary production'.¹ But he excluded some significant constituents like building materials, architectural styles, land use and fence types. A year later, his ideas were challenged by Jordan who defined settlement geography is the study of the form of the cultural landscape involving its orderly description and attempted explanation. Later on he emphasized three aspects of the cultural landscape: (i) the settlement patterns or distribution of farmsteads, (ii) the field pattern, or the form resulting from division of land for productive use, and (iii) house and farmstead type including the building materials and folk architecture.²

R.L. Singh is of the opinion that settlement geography deals with the facilities built in the process of human occupancy of land and their grouping. The nature and distribution of these facilities are related to the art and mode of living on the one hand and to such physical factors as water supply, slope, forest and swamps. These are designed and grouped to serve specific purpose, and carry functional meaning. Houses and highways, the two basic facilities of settlement, are the topographic expressions of their grouping. The external forms reflect architectural style of their time and they reflect changes in human occupancy of an area, after being the only relict of expressions of the past cultural landscapes.

Settlement is an organized colony of human being, including the

buildings in which they live or work or store or use them otherwise and the tracks or streets over which their movements take place. It is either rudimentary forms as expressed by the temporary camps of the hunter or the herder, including the one-wall houses of Semangs of Malaya or the giant building like sky scraper, reflect some human ingenuity and the influence of the environment. Thus the centre of interest in settlement geography is man and the reciprocal relationship between human occupance features and environment.¹

Settlement geography, a recent sprout from the venerable trunk of human geography was mainly concerned with urban settlements before the turn of twentieth century.² But, since about two-third of the world population and about 66 percent of the total settlements occupy rural area. Many historian, sociologist and geographers have studied rural settlements and the problems attached with environmental aspects in rural areas. Even urbanized world still possesses varied forms of rural settlements. Thus, a comprehensive study of settlement requires explanation of site and situation, building materials, forms including architectural style, function types and patterns, and characteristics. Of these, site and situations and material need full

interpretation of physical and cultural linkage while morphology requires in-depth study of sequent occupance involving historical background. As the past is the key to the present and we walk to a certain degree in every village among the ruins of antiquity,\(^1\) that involves archaeological analysis to understand the ground reality. The place-names study serves remarkably in reconstructing the sequent occupance.

The subject matter of settlement geography varies from herder's hut in a pioneer fringe to a skyscraper in New York. The totality of the human community in rural areas include the social, material organizational, spiritual and cultural elements are necessarily required for sustaining of human living. Under physical requirements as housing, work, energy supply, transport communication, water availability, education, health, protection and social welfare, system of territorial organization, local self-government, law and economic management and cultural facilities for the development of art, recreation and leisure come under this study. Further, with the growth of population, increasing migration rural to urban areas and vice-versa, the demand for house construction for rehabilitation of displaced persons form natural and human born calamities such as earthquake, flood and sense of insecurity caused by insurgency, communal violence etc are

\(^1\) August Meitzen (1985), Siedlung and Agrarweswh der Westgermanneu in his series entitled Anba and Agrarecht der Volker europas Noidich der Alpen, Berlin: W. Hertz, Vol. 1, p. 28.
developing wider scope of rural settlement studies which requires an integrated approach for rational planning and development.

**Approaches of Rural Settlement Studies**

Three basic approaches of studies are employed in rural settlement geography.

**Genetic Approach**

The genetic approach of settlement study was pioneered by Meitzen (1895). In the 20th International Geographical Congress Symposium (London, 1964), it was emphasized that the scientific study of settlement must be found on an appreciation of the nature and limitation of historical perspective, whether archaeological or documentary. As the core concern of settlement geography is the spatial arrangement and sequent occupance, the histogenetic approach is most appropriate for studying the degree continuity of territorial organization and problems of interaction between man and environment. Three basic attributes, i.e., retrogressive, retrospective and prospective are very common for historical perspective of rural settlement studies. Bloch advocated the first attributes in this context. According to him, retrogressive method is focused upon the past on the basis of the evidence gathered from the recent past.¹ The second approach, i.e., retrospective, advocated by Roger Dion focuses upon the present, the past

condition regarding settlements being considered for better understanding of the existing state. The third approach, i.e., prospective, concern itself with the future, the past and present settlement forms being regarded as relict feature adjustment with future probable needs.

Study of settlements on the basis of diffusion theory is also a significant approach followed by various geographers. Analysis of abandoned settlements, a new approach, provides conclusive evidence about the past settlements and human activities. This approach developed out of archaeology, it consist of three parts: (i) chemical analysis of soil phosphorous indicating human occupancy, (ii) micro-separation examining soil and settlement components primarily through mechanical means and (iii) polynology (pollen analysis). Eidt presented interesting finding in his studies.

Spatial Approach

Spatial organization approach is a form of system approach, which help in comprehending the settlements as a whole. It may be analyzed through different concept, among which very pertinent in rural settlement geography are (i) type, pattern and classification

1. Dion, Roger (1949), 'La geographica humanie retrospective' catriers Internationaux de sociologia', pp. 3-27.
(ii) functional integration and hierarchy, (iii) local identity (e.g., village structure) and (iv) planning and rationalization.\(^1\) Demangeon\(^2\) actually developed the concept of spatial organization in context to morphological structures. He presented the classification of French settlements into different types based on its shape. His works paved the way for the geographers to produce regional classification of rural settlements into different types. Schaefer\(^3\) initiated the modern orientation following the work of German Geographers. Modern geographers are following him in the study of settlements through the analysis of patterns and processes as they express the spatial organization in environmental space. Through this approach the interrelationship of man, nature and society is better expressed in any cultural landscape. A number of studies on morphology, size and shape of settlements speak some sort of organization of space ranging from a room, hamlet, town to the far of settled megalopolis.

**Ecological Approach**

The ecological-cultural approach finds its strength through the study of plant ecologist. Plant ecologist theories are being applied to explain the process of change in human behaviour and settlements over time. Radha Kamal Mukherjee regarding


adaptation of human society and ecology produced a fundamental work.\(^1\) The settling process as described by Hudson\(^2\) included three phased colonization, spread and competition similar to plant communities in space. He concluded that this process follows a cycle way temporarily. Since much of the human behaviour is of sub-optimal nature,\(^3\) people in various habitats are often with less than the ideal. Such habitats have been studied by many geographers including Kayastha\(^4\) and Singh.\(^5\)

The most significant theoretical framework of settlement formation has so far been developed by C.A. Doxiadis.\(^6\) He sets five principles, illustrated with hypothetical diagrams (Fig. i). The first principle is the maximization of man's potential contact with natural elements (e.g. water, trees etc.), with other people cultural elements (e.g buildings, roads, etc.). The second principles is the minimization of efforts required for the achievement of man's actual and potential contact, according to the general principle of least effort. The third principle is the optimization of man's protective space at every movement individually or in a group, in

\(^1\) Mukherjee, R.K., (1940), Man and His Habitation: A Study in Social Ecology, London.


\(^3\) Pred, A,(1976), Behavior and Location, Lund Studies in Geography, Series B.No. 27, p.28.


I. ST. MAXIMIZATION OF POTENTIAL CONTACTS
GIVEN CERTAIN CONDITIONS IN A CERTAIN AREA
MAN WILL SELECT THE LOCATION WHICH ALLOWS
A MAXIMUM OF POTENTIAL CONTACT

2ND AT A MINIMUM OF EFFORT IN TERMS
OF ENERGY TIME AND COST

3RD OPTIMIZATION OF MAN'S PROTECTIVE
SPACE IF HE IS ALONE
OR WITH OTHERS

4TH OPTIMIZATION OF THE QUALITY OF
MAN'S RELATIONSHIP WITH HIS ENVIRONMENT

THE FIVE ELEMENTS OF HUMAN SETTLEMENTS
ARE NOW OUT OF BALANCE

5TH OPTIMIZATION IN THE SYNTHESIS
OF ALL PRINCIPLES

Fig. 1
any situation or locality, whether it is temporary or permanent, whether he is alone or part of a group. The fourth principle is the optimization of quality of man relationship with his environment, consisting of nature, society, shell (building and houses of all sorts), and networks (lanes, street, road, communication, etc.). The fifth principle is that man organizes his settlements in an attempt to achieve an optimum synthesis of the previous four principles. This optimization works naturally through time and space, as well as the prevailing conditions and man's ability to create a synthesis.

Apart from space articulation or territoriality, there are also other pertinent factors, which are capable of general application. Doxiadis has developed a four fold frame which can be applied to composite individual settlements of all size and a territory as well as to its constituent (Fig. ii). Hypothetically, any settlement consists of four parts: (i) homogenous part (ii) central part (iii) circulatory part and (IV) special part. These parts are always subject to change but are always present in a living settlement.¹

**REVIEW OF WORK DONE SO FAR**

The study of settlements goes back to ancient period. Most of the Greek scholars observed the habitats of the people and associated with their culture. Herodotus² (440-25 B.C) made

PARTS OF HUMAN SETTLEMENTS

ANY SETTLEMENT CONSISTS OF:

- HOMOGENEOUS PART
- CENTRAL PART
- CIRCULATORY PART
- SPECIAL PART

A VILLAGE CONSISTS OF:

- HOMOGENEOUS PART (FIELDS)
- CENTRAL PART (BUILT UP)
- CIRCULATORY PART (ROADS AND PATHS)
- SPECIAL PART (TEMPLE)

THE BUILT UP AREA OF THE VILLAGE CONSISTS AGAIN OF:

- HOMOGENEOUS PART (HOUSES)
- CIRCULATORY PART (STREET)
- CENTRAL PART (SHOPS)
- SPECIAL PARTS (SCHOOL OR TEMPLE)
cursory observation of settled places, customs and tradition of their inhabitants of the known world.

A few references to the town and cities are found in the book of Starbo (63 B.C – 20 A.D). The geographical study of rural settlement in modern context began with Ritter's (1779-1859) work.

Moser (1780) makes an important methodological contribution to settlement analysis after carrying out field investigation of life in northern Germany he describes individual farm houses and the functions of farm structure and fields, as well as the influence of tradition on settlement pattern.

Arnold (1875) states that place names and history are important for establishing the order of settlement stratification, and it provides an indirect basis of assessing the factor in the location of the villages.

Finch and Trewartha (1942) mention a number of factors, which determines the pattern of settlements like topography, elevation and slopes, nature of soil, forest, existence of springs. Stanislowsky (1946), states that Latin Planning methods were later

3. Arnold, W., Ansiedlungen Und Wanderungen deutscher stamme Zumicist nech Hessischem Ortsnaman Marburg, (1 875).
extended to the new world by the Spanish and the Portuguese who had centuries of experience and operating vilas, pueblos and Ciudades from Roman Structures.¹

Blache (1952) has found that the concentration and dispersion are the results of physical influence on human environments.² He further states that human being select sides to contact between different geological formations and varieties of topography give new and favourable opportunity for their settlement. There is a marked tendency to converge or even to concentrate at the angles of slopes or at the intersection of different gradients.³ Again he says that the agglomeration of settlements itself becomes a locational force for the establishment of settlement.⁴

Ahmad (1952) made a commendable study of the rural settlement types in Uttar Pradesh. He grouped the rural settlements into compact, semi-compact, fragmented or hamleted and dispersed. He observed that religious belief and superstitions also exert pressure on the location of rural settlements in the Ganga Yamuna Doab. Villagers generally avoided a new site for a house as far as possible. Houses can be built on a new site only after the sanction made by the priest. Moreover the ancestral site

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3. Ibid., p. 238.
4. Ibid., p. 281.
of a house is usually regarded as sacred unless the family is in decay. Extension of a settlement on the south and west is forbidden, these two directions being considered inauspicious.¹

Brunhes² (1952) identifies settlement pattern by using the term 'nucleated' instead of 'compact' whereas Blache and Finch called it 'clustered' and 'Compact' respectively.

Anas³ (1954) has found that village and hamlet tend to avoid the low laying areas liable to inundation and seek dry points on some mound or elevated piece of land.

Mukerji⁴ (1954) has discovered that clan solidarity of Jats and Gujars have held them together on compact sites. The Jats have everywhere captured the best lands. Their farms have the best soils and are located in first assessment circles adjoining the villages.

Clark and Evans (1954) have devised a new quantitative technique to examine the pattern of rural settlements.⁵ This is called the nearest neighbour technique.

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Buschman (1954) investigated the inter relationship between the settlement patterns and the house types in different regions of India.

Singh (1955) has gone through temporal analysis of village pattern and says that when one speaks of the village plan one refers to the layout of a basti (inhabited site) resulting from the arrangement of houses and village streets or lanes.

Singh (1955) has also analysed the spatial pattern of the society and culture, particularly with emphasis on clan organization against the geographical background, which has been further elaborated in his later works. He has tried to trace the progress of some Rajput clans from their migratory stage to settlements.

Thomson (1956) has applied the nearest neighbour technique in his study of the distribution of population.

Bhattacharya (1956) made a study of settlement patterns in the Upper Ganga Plain of Uttar Pradesh and attributed agglomerated pattern to caste affinities.

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3. Ibid, pp. 70-14.
5. Bhattacharya, N.D., 'Rural settlements of Murshidabad West Bengal', The National Geographical Journal of India, Vol. XII, 1954, p.4,
Bradford (1957) focuses on settlement planning and says that Romans were much interested in it and had evolved a well-organized quadrate system.¹

Finch and Trewatha (1957) define the nucleated settlement as those which have all the dwellings of a mauza concentrated in one central site to form compact settlements, houses being clustered with each other. They called these settlements 'nucleated' or 'compact' while Blache calls them 'clustered.'² He also says that there is a close relationship between the relief features and the location of rural settlements and that dispersion increases in direct proportion to the raggedness of the surface of the land.³

Bertrand (1958) observes that the strong kinship relationships are major characteristics of the social structure in many rural areas of the USA. Individual section of a dwelling site is primarily influenced by the location of the residence of another number of the family.⁴

Blache (1959) calls concentrated dwellings of a mauza is one central site of a compact settlement.⁵

Singh (1961) defines settlement as an occupance unit representing an organized colony of human beings including the buildings in which they live or work or store and the tracks or

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2. Finch and Trewartha, op. cit., p. 548.
3. Trewartha, op. cit., p.545.
streets over which their movements take place. Even their rudimentary form as expressed by the temporary camp of the hunter or herder including the one wall house of the Semangs of Malaya reflect some human ingenuity with an imprint of the environment.¹

Yonekura (1961) made a comparative study of the rectangular village pattern in South India and Japan, and concluded that no single natural factor decides the village patterns. Regarding India’s Villages he observed that they are generally agglomerated in type like that of East Asia.²

Bose (1961) observes that as such a settlement does not have any particular shape, it is known as irregular or amorphous. He called such a pattern a shapeless cluster.³

Ahmad (1962) states that villages differ greatly from one another in shape and pattern by reason of contrast in the arrangement of streets and houses. As a matter of fact, the street system within a settlement is most essential element. When houses are built in groups, the street often plays the decisive role and the houses face is neither the east nor the west but towards the highway the street or the road. Besides the street system other

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cultural elements such as temples and mosques give a peculiar character to dwelling site.\(^1\)

Dacey (1962) focuses his attention on settlement he adopts the Nearest Neighbour Distance techniques.\(^2\)

Chisholm (1962) observes that the religious minded have staunch faith in the existence of God or Deity, which sometimes is the basis of all settlements.\(^3\)

Ahmad (1962) says that village ponds are great sources of water supply for drinking purposes for the cattle. Construction of house and minor irrigation facilities in the nearby cultivable land. There is hardly a village without a pond in the entire Doab region. Ponds are centres of rural activity where women come to fetch water and men to water their cattle. A few trees are grown near the ponds to provide shelter against the scorching heat of the sun. Thus these ponds become ideal, places round which settlements were situated.\(^4\)

Ullman and Dacey suggests that large centres have a far greater range of services and functions than smaller ones.

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Relationship between size and functional range is curvilinear. With each new addition in population new functions are added.¹

Kirk. H. Stone, (1965) defines settlement Geography is the description and analysis of the distribution of buildings by which people attach themselves to the land and calls for a focus of attention on where the buildings are they and why are they there.²

Jones (1965) states that the pattern of settlement is determined on the basis of the location of houses and the highways. This shows the shape of a settlement. Villages represent a sort of growth within the physical and cultural setting of a region. The pattern of settlement exhibits the relationship between one dwelling and the other. Sometimes is irrespective of site, often the pattern is unrelated to site. The site may also have no bearing on pattern.³

Dube, (1965) pointed out that from times immemorial the village has been the basic unit in the organization of Indian social polity. Yet the Indian village community cannot be regarded as static. Time and the interplay of historical and sociological factors have influenced the structure, organization and ethos of these communities in many significant ways.⁴

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Haggett Peter¹, (1965) found that time is an important factor in determining the locations of settlements. With the lapse of time development have been taking place according to a variety of reasons, social, political and economic which have a direct bearing on human settlements.

Jones, (1965) observes that the location of a village is the expression of a combination of physical and cultural factors operating in the area concerned.²

Jordan, (1966) modifies the definition of settlement morphology (synonymous with "form of the cultural landscape") and adds that "description of the form should come before explanation". He defines settlement morphology in terms of vertical and horizontal dimensions as well as materials composition.³

Perpillou, (1966) says that water supply is one of the most important and paramount factors in determining the location of rural settlements. Water being most necessary to men, animals and corps, man settles where it is available easily and in large quantities.⁴

Jan and John, (1967) found that settlement pattern denotes the shape or arrangement of settlement in relation to natural or

man made features or designs such as streams, ridges, canals and roads.\textsuperscript{1}

Doxiadis, (1969) has given a theoretical framework for the formation of settlements. In this regard he sets forth five principles. The first principle is the maximization of man's potential contacts with the natural elements (water, trees). The second principle is the maximization of the efforts required for the achievement of man's actual and potential contacts. The third principle is the optimization of man's potential space at even movement individually or in a group. The fourth principle is the optimization of the quality of man's relationship with his environment consisting of nature, society, shells & networks. The fifth principle is man's organization of his settlements in an attempt to achieve an optimum synthesis of the previous four principles.\textsuperscript{2}

Hudson (1969) makes a study of the arrangement of dwellings in north eastern Georgia and some rural areas of the United States. It is clear that ideas of individual members of a family and other attitude, towards ideal locations have a direct bearing on the arrangement of dwellings.\textsuperscript{3}

\textsuperscript{1} Jan, O. M. Brock and John, W. Webb, Geography of Mankind, New York, 1967, p. 242.
Mukherji (1970) has studied the cultural geography of Jats and has succeeded in tracing stages of Jats migration with emphasis on the origin, settlement pattern and nomenclature of their villages.¹

Singh (1971) has presented hypothesis regarding settlement pattern. According to him religions ritual norms of the Hindu Society lead to the maximization of Socio-Spatial distance among the different caste groups. While the secular norms of behaviour, which are based on functional expediency, lead to the minimization of these distances.²

Tiwari (1972) mixes rural settlement geography describing how the settlements are influenced by the rural landscape as well as by relationship as regard other aspects of rural life such as religion, rituals and social structures, economic functions as well as demographic characteristics.³

Nitz (1972) makes stimulating effort at evolving an outline and methodology for studying the evolution of rural settlement, using a comparative approach and making use of written records, archeological evidence, place names and field patterns. Nitz also pleads for the use of genealogical trees of rural families for

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reconstructing settlement processes and evolution of field patterns. He further suggests that settlement genesis can be worked out by dating the periods with the help of place names.¹

Sharma (1972) says that houses and house types reflect with great exactitude the inter-relationship between man and his environment and tell about man's struggle for shelter through time and space. The study of house types is necessary as well as fascinating. The house is man's first step towards his adjustment to his environment. The house is man's first step towards his adjustment to his environment. The site of a house has a direct bearing on man's occupation. Water is most necessary to man, animals and crops. Man takes shelter where it is available easily and in large quantities. Religion is another major factor underlying the form, spatial arrangements and orientation of house.²

Nitz (1972) asserts that a kind of historical spatial settlement stratigraphy has been developed by name change analysis and this technique should be applied routinely in much settlement investigations.³

Sharma (1972) has used intervening distance analysis for spacing in an Indian desert on the basis of the formula given below.⁴

⁴ Sharma, R.C., op. cit., p. 124.
2(Cos - 30°) \times \left( \frac{\text{Area}}{\text{No. of villages and towns}} \right)^\frac{1}{2}

= \frac{\log^2}{2} - \frac{\log^3}{3} + \frac{\log \text{areality}}{2}

= 0.0312347(\text{a constant}) + \frac{\log \text{areality}}{2}

Sharma in a further study says that roads play important role in the location of a new settlement and also in increasing the importance and size of a preexisting settlement. In many cases recently, with the introduction of regular bus transport, road have acted as a factor promoting the growth of twin village settlements.¹

Bhala (1973) studies the patterns of settlement and it led him to identify topography and social group as an important determinants.²

Brook and Webb (1973) have found that aggregation of population and the growth of village have been closely favoured by conducive factor like agriculture, water supply and mutual, social and economic needs. Density of a settlement results mainly from the degree or intensity of land use. Besides according to them, close social relationships and warm neighbourly feelings of the village community and cooperative agricultural practices have strengthened the traditional cohesive character of the settlements in the Ganga Yamuna Doab.³

¹. Ibid, p. 104
Singh (1973) has identified compact, semi-compact and hamlet types of rural settlements, and correlates the types on the basis of the well known physiographic and cultural factors.\(^1\)

Mukerji, (1974) says that rural settlement studies have for a long time shown a greater concern for types and patterns then for other attributes. He has given another attribute- spacing of rural settlements. With the help of a formula spacing may be easily calculated.

\[ S = 2 \times \left( \frac{A}{N^x} \right)^{\frac{1}{2}} \]

S, represents spacing, A represents the area of study and N is number of rural settlement. Finally he has drawn the conclusion that there is a positive correlation between low productivity, low density of rural population, small villages and wider spacing.\(^2\)

Mann (1974) describes the structure of rural settlement by applying the means of settling processes with reference to the role of socio-historical forces in their formation and function.\(^3\)

Mann (1974) also examines attributes other than morphology to known the spatial variation in the size of settlements. According to him, there are three parameters- population size, areal size and number of occupied houses

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independently of spacing. Need for defence, cultivated area and transportation network are also related to the population size of the settlement.¹

Mukerji (1974) stresses that the site, situation and location are important attributes of the rural settlements, playing their role in morphological evolution as well as in socio-spatial structure.²

Sen (1974) observes that site, situation and location are no doubt important attributes of the rural settlements. For example, people change their site in response to flood hazards. He also provided a fruitful guideline for studying the factors involved in the decision-making processes of a community for maximizing the futility of a site not merely in terms morphology but also of function.³

Singh, R.L and Singh, R.B. (1975) have studied the morphogenesis of Indian Village with reference to a Rajput clan in Middle Ganga Valley.⁴

Bhattacharya (1975) correlates the settlement patterns of Deltaic West Bengal with physiography and agricultural land use. He has also worked out a convincing correlation of settlement

pattern with micro-topographic variation. He asserts that deltaic settlements of the Middle Ganga Valley are not applicable to deltaic regions.¹

Singh, Rana (1975) suggests that varying degrees of regional and local dominance and sub dominance in any sphere, either caste, numerical, economical, educational, cultural or political, influence the settlement pattern.²

Edwards (1975) has studied Iberian settlement activities in America through questionnaires called Pelaciones Geographicas and in the ordenanzas de poblaciones of the codingo de Indias.³

Hassan (1975) focuses his attention on functional analysis and has found that settlements generally present a good example of human adjustment to the geographical environment. So that fauna, flora, terrain, water bodies and climate, all have their impact on human culture.⁴

Singh, R.L. and Singh, R.B (1978) have found that old settlements are associated with physical features like rivers, because the earliest settlers followed the main watercourses and their tributaries upstream. Such findings appear valid in many

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pioneer zones of the world and even for landscapes, which have been quite altered with the passage of time.¹

Hassan (1980) says that geopolitical and national ideology have guided both pre-1948 and the post-1967 Jewish frontier settlements in Israel. According to him, each settlement stage was characterized by penetration into remote areas on the periphery of older established communities. In order to comprehend the development of Jewish frontier settlements three factors must be taken into account the historical geographic situation, the method of settlement and the spatial network of the settlements themselves.²

Berensten (1982) says that settlement pattern in the Federal Republic of Germany has undergone changes along democratic lines since 1945 due to the new policy of the Government. Greater impetus has been given to the rural areas and this has led to the stability of small rural centres at the expenses of larger urban centers, which has brought about changes in both urban and rural areas, affecting the pattern of settlements.³

Johannes Auget (1982) asserts that the politico-economic factors must be taken into consideration regarding the condition

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of rural settlements.¹

Singh (1983) have studied the hierarchical systems and spatial patterns of central places in Baghpat tehsil on the basis of population size, central functioning and amenities available among rural settlements in the tehsil and the district.²

Nag (1984) have studied the evolution of Zambian settlements and planning in order to develop continuum of settlements, to check rural urban migration, discourage squatter settlements, organize the country through settlements and highlight the possible trend for future settlements.³

Grover (1985) discusses the evolution of the Kanet landscape by selecting a sample village Behlon in the Morni Hill of Siwalik range in the state of Haryana. It is believed that Kanets belong to the Rajput caste having a distinct identity to their own. The Kanet settlement may be located as a caste territory on a Kanet cultural area since they are dominant in terms of numerically and land ownership.⁴

Doxiadis's definition was given a new shape later in 1987 by Alexander B. Leman, who proposed a second definition, "human settlement are spatial / operational arrangements made by

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humans within certain scales, in order to support life and to pursue their aspiration, goals and targets.¹

Nag (1990) has discussed findings of Zambian settlements. He has studied spatial analysis and growth of population, rural development, urban settlements and urbanization, housing and squatter settlement, in detail supported by suitable quantitative settlement analysis.²

Gill, M.S. (1991) observed that the centuries old compact village in Punjab are gradually moving towards dispersion because of some factors like the enhanced feeling of security, rapid economic growth, acceleration in the rate of population growth, rapid rise in aspiration levels specially among the younger and educated people and lastly gradual spread of urbanism.³

Singh (1996) had identified the rural settlement of Saryupar plain as compact, semi-compact, helmeted and dispersed settlements on the basis of various physico-cultural and socio economic factors.⁴

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Ahmad, A., Hameed G. (2000) have applied the nearest neighbour technique in Meerut District in Uttar Pradesh to find out the spatial pattern of rural settlements and their variation.¹

The analysis of evolution and spatial organization of clan settlements in an ancient settled region like Bharatpur District is a difficult task, due to the complexity of successions, absorptions and interruption by later settler on the one hand, and lack of adequate data and records on the other hand. However, an attempt has been made in present work to trace the evolution and spatial organization of the clan settlements in Bharatpur District, with the help of the available sources and field studies.

Archaeological excavations at various sites of the region have shown that settlement of this region has begun around 1500 B.C. The earliest remains i.e., pottery belonging to the Late Harappan period have been found in Aghapur. Then successive cultural remains of different period have also been recovered from different places in the region. Though it is not possible to trace the successive evolution of settlement in early historical period, it is almost certain that the region was occupied by pre Aryan people during prehistoric time. The district close to Mathura in the east and to Bairath in further west, lends to the area an antiquity of epic age when Matsya inhabited this region. This tribe is

mentioned in the Rigveda along with other Aryan tribes.\textsuperscript{1} It is flourished as a Mahajanpada in the time of Buddhistic Anguttara Nikava.\textsuperscript{2} It may be summarized that their society was mainly rural, based on agriculture economy. They must have cleared the vegetation along the tributaries of the Parvati, Chambal and Ghambhir rivers to settle in this region. They must have made their colonies and named these after the name of the chief of their tribes or clans. The dwellings in their settlements were made of wood of bamboos and they do not differ much from those found in the study area even today. By the end of the seventh century BC the Aryanization of the area had been completed. The region was at first affected by the migration waves of Jats clans at the beginning of the twelfth century A.D. and migration of various corporate groups or clan on a much larger scale followed by Muslim invasion in 1195 A.D. Since a wave of migration continued upto 18\textsuperscript{th} century, each of which has left its imprint on the district area. A distinct socio-economic and cultural and those has emerged in it. It is rather difficult to trace the patterns of ancient and medieval settlements until extensive excavation have been conducted, which is impossible on account of the high density of population in the region. So the existing rural settlements have been taken into spatial analysis.

\textsuperscript{1} Bhargwa, M.L., 'A Geography of Rigvedic India', Lucknow (1964), p. 50.
\textsuperscript{2} Law, B.C., 'Historical Geography of Ancient India', Paris (1964), p. 42.
It is observed that, throughout the human history the settlements have evolved in relation to topography and resources of the area. The majority of the people of the region live in villages. This is a clear indicator of agriculture development and stability on the fertile land. Initially people lived in scattered hamlets, and later they clustered together in favourable spots either along the water courses or highways, which gave rise to the compact village type. Several historical and physio-culture factors such as better means of transportation and communication, efficient irrigation facilitates and improvement of socio-economic condition of the people together with the increase of the population have been the main factors of the clustering of human habitats in many parts of the region. In contrast to the compact type, there is the scattered type of rural settlements occurring in infertile tracts, usar infested areas, and areas with poor irrigation and transport facilities in the district.

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. It may also be added that no serious study on the evolution and spatial organization of clans settlements has been made so far in the district.

Objectives

The objective of the present study is an analysis of the various aspect of the evolution and spatial organization of the clan settlements in Bharatpur District. So as a first step, an understanding of certain issues becomes inevitable.

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.

**Methodology**

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.

Archaeological evidences consisting of earliest remains i.e. pieces of Ochre coloured pottery (OCP), black and red ware (BRW), painted grey ware (PGW), classical Northern Black Polished ware (NBPW) and Medieval glazed ware (MGW). A large number of terracotta male and female figurines, plaques, sculptural pieces, corroded coins, burnt bricks, fragmentary inscription on stones, statues, ruined brick stupas etc. have been found all over the study area. These evidences shed light on the sway of different dynasties from prehistoric period to ancient and to the medieval period. The antiquities recovered from the district are well preserved in various museums under the supervision of Survey of India.
Written records include Ain-i-Akbar by Abul Fazal, Miscellaneous papers of revenue settlement, Institute Gazette, District Gazetteer, Gazetteers of the North West Provinces of Agra, Memoirs North western provinces of India, Statistical Abstract Rajasthan, Descriptive and Historical Account Rajasthan, a large number of books on regional and local history. These are preserved in the state archives, revenue records rooms of the district headquarters and libraries.

Culture, cults, folklore, legends and oral history as narrated by the local people, interview and field surveys have been used to trace the place-names of villages and genealogy of the various clans.

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.

\[
\begin{align*}
(i) & \quad D = 1.0746 \sqrt[3]{\frac{A}{N}} \\
(ii) & \quad R_n = \frac{f_0}{r_E}
\end{align*}
\]

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.

The study is primarily based on field work and analysis of topographical sheets as well as orally recorded history. Field work has involved extensive traversing through the study area with the aim of observing the landscape features of the study area. Observation of the landscape includes a careful examination of the village landscape, its settlement morphology, social morphology, house types, building material used, ground plans, models of house construction, and general living conditions of the people. Such detailed work on the core elements of rural settlement has, however been limited to three selected villages.

The collected data, both primary and secondary has been presented in the tabular form and analyzed, using different quantitative techniques to derive specific conclusions regarding dispersion, spacing and settlement type. Simple choropleth mapping has been adopted throughout the work. Panchayat Samiti/Tehsils have been chosen areal units for the analysis of rural settlements.
Organization of Chapters

The entire study is divided into seven chapters excluding introduction and conclusion.

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.

Lastly the conclusions have been drawn and recommendation have been made for the rational planning of rural habitat in the study area.