Concentration Index For The Identification of Type of Rural Settlements in Kolhapur District

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Abstract

The difference between two settlements can be identify by studying different elements. Present paper aims to investigate distribution types of rural settlements and their affecting factors by the study of concentration index. Debouverie's (1943) method has been used to compute the degree of concentration. Compact, semi-compact, hamletted and dispread type of rural settlements are found throughout the study area. Fertile land and flood risk in eastern part and local attraction points in western part leads to compact settlement. However, roadside development of settlements leads to semi-compacted rural settlements in study area. The hamletted rural settlements are well linked in eastern part than the western hilly part.

Introduction

The intensity of dispersion can also studied in micro level and for this purpose types of settlements has to be explored. The type of rural settlements is mostly considered as a distributional type in which rural settlements are classified on the basis of agglomeration and dispersion of the houses. All human settlements are different from one another depending upon the surrounding environment. Hence, rural settlements show the reciprocal relationship of human occupance features and environment (Singh, 1961). Type is a visible elements of rural settlements. This element is distinguishable on comparison and they are varying according to the landscape- physical as well as cultural (Singh, 1994). They affects on the social structure and accessibility of the different facilities which are useful for rural peoples. Shelter, i.e. the superstructures of different shapes, sizes, types and materials erected by mankind for security, privacy and protection from the elements and for his singularity within a community (Sarkar, 2010).

Objective

Present paper aims to compute concentration index for the identification of types of rural settlements and their affecting factors.

Study Area

The Kolhapur district of Maharashtra comprises 7685 sq. km area and administratively divided into 12 tahsils supports 38,76,001 population (2011). The physiography of the district has Sahyadri hills in a north-south direction, plateau area situated to the east of the Sahyadri hills and eastern plain area. The average annual rainfall varies widely from about 600 mm in Shirol tahsil in the east to 6000 mm in Bavada tahsil in the west.

Database And Methodology

The complete concentrated and completely dispersed houses are the two extreme types of settlements. Hence, the calculation of concentration of the houses is one of the methods to study the types of rural settlements. The concentration index could be computed by using varies methods proposed by different scientists like Bernhard (1931), Pawlowski (1938), Debouverie (1943) etc. Among these methods, Debouverie's (1943) method has been used to compute the degree of concentration. Because according to Mandal (2001), "Debouverie tried to relate regional variations of the settlements with the standard concept of

concentration". The formula proposed by Debouverie (1943) which has been used for the present study is given below:

$$K = \frac{XxL}{H}$$

Where, K = The index of concentration of dwellings, X = Minimum number of dwellings per settlement, L = Number of Settlements in the region and H = Total number of dwellings in the region.

After calculating the degree of concentration of houses in each rural settlements, these rural settlements has been classified in to four type according to this degree of concentration (Table 1).

Table 1

Concentration Index for Different Settlement Types

Sr. No.	Settlement Type	Concentration Index
1.	Compact	Above 1.50
2.	Semi-compact	1.00 to 1.49
3.	Hamelated	0.50 to 0.99
4.	Dispersed	Below 0.50

Source: *Determined by Researchers.*

Singh (1969) considered hamlets and number of occupancy to identify the type of settlement. In the present investigation, researcher used new technique which consider the hamlets per settlement. This statistics is used to support the results obtained by the concentration index calculated by using Debouverie's (1943) method. The correlation analysis has been made to find factors influencing, on the concentration index.

Types of Rural Settlments By Concentration Index

Cultural, political and no doubt the economic systems also determined by the types of settlements. The type of human settlements reflects the concentration and dispersion of houses in the area. Conceptually, the two extreme types of rural settlements viz. dispersed dwellings and agglomerated dwellings. This degree of concentration has wide range, which allows classifying the human settlements not only two extreme types like compact and dispersed but another two intermediate types like semi-compact and hamletted.

1. The compact type of rural settlements

The compact settlements are also known as nucleated, clustered, agglomerated or concentrated settlements. Compact settlements are characterized with agglomeration of almost all the dwellings of the mouza or village in one place (Ahmad, 1952). In the study area the compact rural settlements have conjected pattern of houses with narrow roads generally having temple in centre. Compact rural settlements are distributed over the entire study area. About 19.90 per cent rural settlements of the study area are compact in nature (Fig. 1). The compact rural settlements are highly distributed in Karvir, Radhanagari, Hatkangale, Ajara, Chandgad, Bavda tahsils (Table 2 & Fig. 2). The hamlets per village are also low in these tahsils excluding Hatkangale tahsil (Fig. 3). Out of these tahsils the large settlements of Karvir and Hatkangale tahsils are compact settlement and small settlement of Radhanagari, Ajra, Chandgad and Bavda tahsils are compact settlements. Shahuwadi, Bhudargad, Panhala and Kagal tahsils have low proportion of compact rural settlements. The hamlets per village are also high in these tahsils.
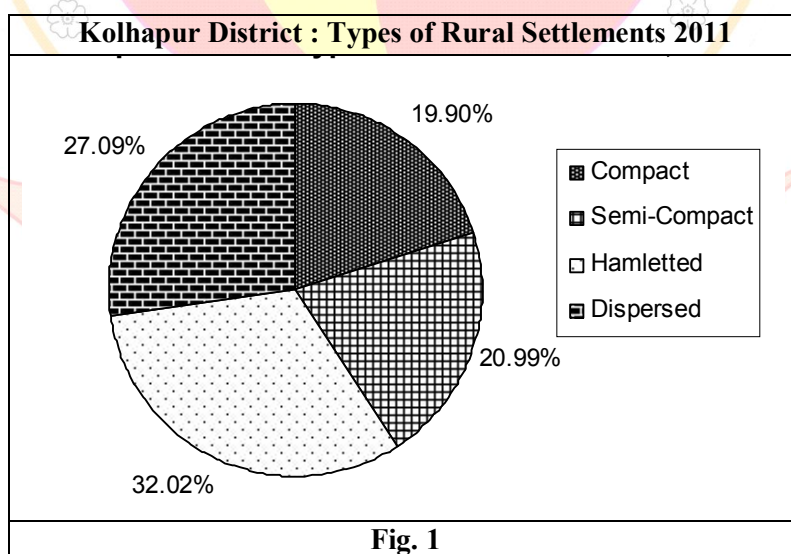
Though the compact rural settlements are distributed in both the eastern and western part of the study area, the reason behind the compactness is varied in these two parts. The fertile land and occasional flood

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leads to compactness of rural settlements of eastern part of the study area. Khidrapur village is become compact due to their flood risk location (Pore et.al. 2006). In western part of the study area the paddy cultivation is highly observed, which leads to compact rural settlements. Hall (1991) rightly stated that, compact settlements are well adapted to economic condition of paddy cultivation. Paddy cultivation periodically requires labour force and hence, both the farmers and the associated agricultural labourers tend to reside in same compact settlements. The western part of the study area is hilly and undulating, where houses are concentrated around the local attraction like well, spring, hill foot fertile land, roads, etc.

Table 2
Kolhapur District: Types of Rural Settlements

Sr. No	Tahsil	Compact %	Semi-Compact %	Hamletted %	Dispersed %
1.	Shahuwadi	13.53	28.57	25.56	32.33
2.	Panhala	16.15	11.54	36.92	35.38
3.	Hatkanangle	22.41	17.24	29.31	31.03
4.	Shirol	16.67	20.37	40.74	22.22
5.	Karvir	33.60	21.60	22.40	22.40
6.	Bavda	20.51	17.95	46.15	15.38
7.	Kagal	16.28	19.77	50.00	13.95
8.	Bhudargad	14.04	39.47	24.56	21.93
9.	Ajra	21.88	21.88	29.17	27.08
10.	Gadhinglaj	18.68	17.58	35.16	28.57
11.	Chandgad	20.51	19.23	32.69	27.56
12.	Radhanagari	23.68	12.28	29.82	34.21
Kolhapur District		**19.90**	**20.99**	**32.02**	**27.09**

Source: *Based on   1. Google Earth Images 2. District Census Handbook, Kolhapur District, 2001 and 2011.*
3. Socio-economic Review and District Stastical Abstract, Kolhapur District, 2017, P. 79.
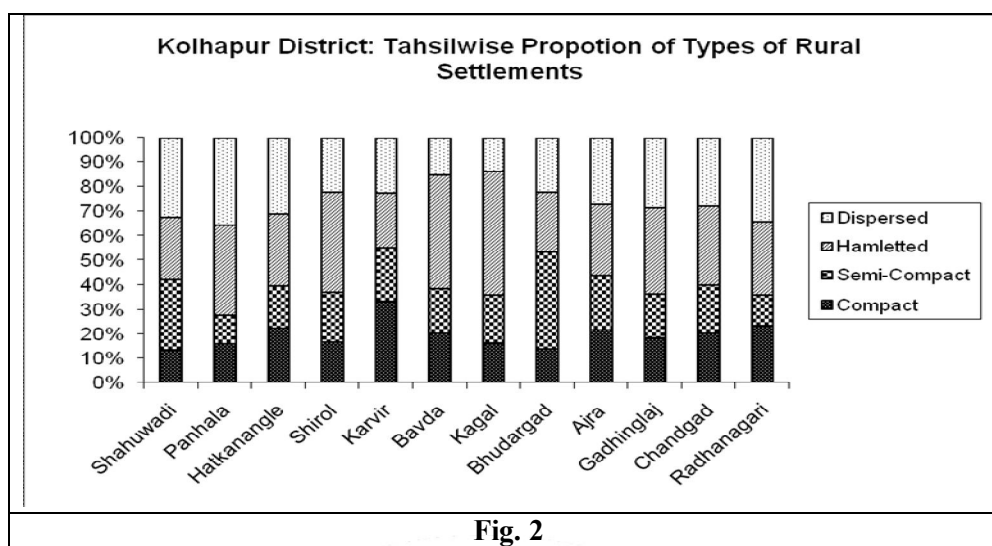

Kolhapur District : Types of Rural Settlements 2011

- Compact 19.90%
- Semi-Compact 20.99%
- Hamletted 32.02%
- Dispersed 27.09%

Fig. 1

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Fig. 2

2. The semi-compact type of rural settlements

Semi-compact settlements are also known as quasi-compact settlements. Semi-compact type is the intermediate type between compact and hamletted settlements. It is marked by the presence of one easily recognizable site and one or more small hamlets closely linked with the main site by foot paths or cart tracks (Blache, 1962). Out of total rural settlements of the study area 20.99 per cent rural settlements are semi-compacted (Fig. 1). The semi-compact rural settlements are highly found in Bhudargad (39.47 %) and Shahuwadi (28.57 %) tahsils. Karvir, Shirol, Kagal and Chandgad tahsils have the proportion of semi-compact rural settlements in between 19 to 21 per cent. Semi-compact rural settlements are less found in Panhala and Radhanagari tahsils (Table 2 & Fig. 2).

These Semi-compact rural settlements are converted from the compacted rural settlements. These rural settlements experiences out growth along the road which gives birth to small hamlets around the main settlement. In the western part of the study area, the hamlets of semi-compact rural settlements are attached with unmettle roads like foot pats or cart track. In the eastern part of the study area, the hamlets are linked to main settlement by mettle road. In an average the semi-compact rural settlements have tow hamlets. The dwellings in semi-compact rural settlements of the study area have been ranges from 750 to 1250 in some cases more than 1250.

3. The hamletted type of rural settlements

Hamletted settlements are also known as semi-sprinkled settlements. Hamletted settlements are characterized by the presence of serval smaller hamlets and separate individual habitations spreading over the entire mouza (Singh, 1958). These types of rural settlements have the small hamlets with unique identity in terms of social, cultural and economic characteristics. In these loosely connected settlements a street pattern is generally lacking and the struggling residences are separated by intervening cultivated fields (James, 1932).

About 32.02 per cent rural settlements of the study area are classified as hamletted rural settlements (Fig. 1). The tahsils viz. Kagal, Bavada, Shirol and Panhala have high proportion of hamletted rural settlements (Table 2 & Fig. 2). The hamletted rural settlements are located in hilly tract of Kagal, Bavda and Panhala tahsils. The creation of small *wadis* (farm houses) in the agricultural developed Shirol tahsil leads to develop hamletted type of rural settlements. The number of hamlets per village is also high in these tahsils (Fig. 3). These hamlets are poorly linked with each other in western part of the study area and contrary to this, the hamlets of the settlements of Shirol, Karvir and Hatkangale tahsils are well linked with each other. The

increase of road facility to link the hamlets of settlements would be come suitable strategy for the development of western part of the study area.

4. The dispersed type of rural settlements

Dispersed type of rural settlements is also known as deagglomarated or sprinkled or deconcentrated rural settlements. This type is completely opposite type to the compacted settlements (Table 1). In this type, the houses are located apart from each other. Not a single attraction is able to attract the all houses at one point and hence, the houses are spreaded in wide range in different places of the region.

About 27.09 per cent rural settlements of the study area have dispersed type. These dispersed rural settlements are mostly found in Panhala, Radhanagari, Shahuwadi and Hatkangle tahsils. In these dispersed types of rural settlements the houses are ranges from 20 to 100. The hilly and forested tract of Panhala, Radhanagari and Shahuwadi tahsils have dispersed type of rural settlements. The remoteness of these rural settlements is the major barrier for the development of this part. In Hatkangale tahsil, the houses are dispersed between two large settlements or around urban centres. In the eastern part of the study area, the high ground water table, agricultural prosperity and other conditions are more evenly distributed in all part of Hatkangale tahsil which allows to settle wherever the farmer wish and this leads to develop the farm houses sparsely. The hamlets per settlements are high in Hatkangale tahsil (6.32). These hamlets are nothing but the dispersed houses located around the large settlements.

Kolhapur District : Hamlets of Rural Settlements

INDEX
Average Ham
Above 2
1 - 2
Below 1

Fig. 2
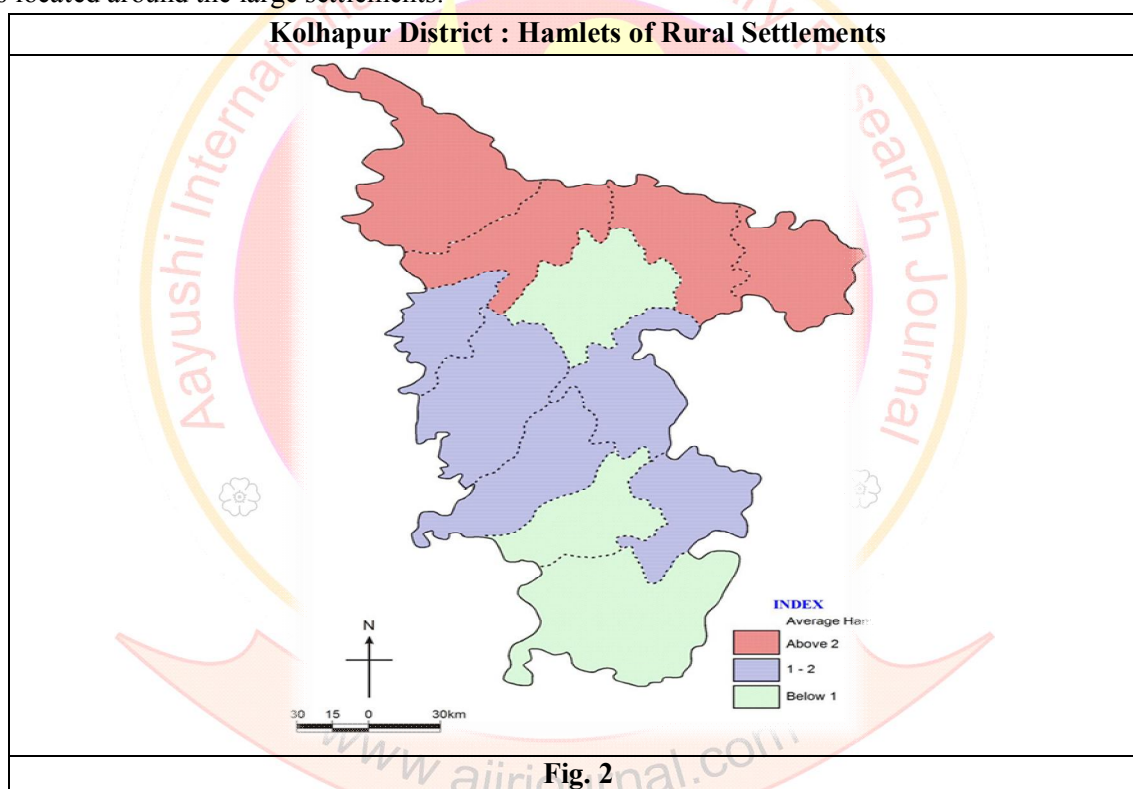
Factor Affecting On Concentration Index

The arrangement of rural settlements as geographical entities express the grouping of dwellings and their interrelationship makes the different types of rural settlements (Kumbhar, 1997). These types of rural settlements are product of both physical and cultural factors. The nucleated (compact) rural settlement of the study area are associated with river edge, hill foot, spring side, stream side location or concentrated on any other attraction. Theoretically, the hamletted and dispersed type of rural settlements is the result of hilly and forested nature. In the western part of the study area, forest and hilly slope sited rural settlements are mainly hamletted and dispersed.

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The **correlation analysis** between hamlets per village and other factors is useful to get the idea. The hamlets per village is positively correlated with road (r = 36), size of rural settlements (r = 70) and net sown area (r = 0.41) and negatively correlated with village density (r = -52), hilly area (r = 0.41) and forested area (r = -0.13). These correlation values revels that in the study area, not all compact rural settlements are associated with plain area and not all dispersed rural settlements are associated with hilly area. However, the complex process of compactness and dispersion of rural settlements of the study area has been taken on place. Combine effect of both centrifugal and centripetal forces result different types of rural settlements of the study area.

Conclusion

This degree of concentration has wide range, which allows classifying the human settlements not only two extreme types like compact and dispersed but another two intermediate types like semi-compact and hamletted. The fertile land and occasional flood leads to compactness of rural settlements of eastern part of the study area. The semi-compact rural settlements are highly found in Bhudargad and Shahuwadi tahsils. About 32.02 per cent rural settlements of the study area are classified as hamletted rural settlements. The hilly and forested tract of Panhala, Radhanagari and Shahuwadi tahsils have dispersed type of rural settlements. The remoteness of these rural settlements is the major barrier for the development of this part. In Hatkangale tahsil, the houses are dispersed between two large settlements or around urban centres. The hamlets per village is positively correlated with road (r = 36), size of rural settlements and net sown area and negatively correlated with village density hilly area and forested area.

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