

**CENTRAL PLACE SYSTEM AND SOCIO-ECONOMIC
DEVELOPMENT IN ALWAR DISTRICT OF RAJASTHAN
(2001-2014)**

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DOCTOR OF PHILOSOPHY

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DECLARATION

I, Bhawana Vaishnav, hereby declare that the thesis entitled "CENTRAL PLACE SYSTEM AND SOCIO-ECONOMIC DEVELOPMENT IN ALWAR DISTRICT OF RAJASTHAN (2001-2014)" submitted by me for the award of the degree of DOCTOR OF PHILOSOPHY is my bonafide work, and it has not been submitted so far in part or in full for any degree or diploma of this university or any other university.

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**DEDICATED TO MY TEACHER
FAMILY
AND
FRIENDS**

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Abbreviations and Name	Meaning
MCL	Municipal Council
M	Municipality
CT	Census Town
OG	Outgrowth
Service Center	A center which provide the services to surrounding region, is used interchangeably with central places in the Study

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Chapter 1

INTRODUCTION

1.1 Context and Introduction

Economic development does not take place uniformly in all regions, both due to inherent diversities and disparities created through the processes of economic development because of more emphasis on economic growth and market based approach. Regional disparities emerged historically and continue to persist¹ owing to the conceptual evolution in understanding the range of economic development and processes. There is no inherent mechanism to ensure that the benefits of economic development are distributed equally among all regions and among all sections of society. On the contrary, development is likely to accentuate disparities amongst regions and sections of population because spatial distribution seldom supports the growth of market. To reduce the regional imbalances, spatial approach of development is now universally accepted and it usually bypasses the need to focus on economic growth² therefore government intervention through spatial planning policies is necessary to reverse such a process of development and to achieve the regional balance in social, economic and ecological development.

Spatial approach to developmental planning was, motivated primarily due to the general concern that certain regions were suffering from slow rate of social and economic growth, owing to inherent physical constraints, social backwardness, uneven distribution of population density and economic underdevelopment³. Several scholars argued that regional approach of planning is essential to avoid widening of disparities, which ultimately could lead to insoluble social, economic,

¹Friedmann, J.R.P(1960).Regional Development Policies - A Case Study of Venezuela, Cambridge, M.I.T. Press,.

²Boudeville, J.R(1966). Problems of Regional Economic Planning, Edinburg,.

³ Planning Commission, Draft five-year Plan, 1971-83, Government of India, p. 170.

ecological and political problems (Friedmann, 1966)⁴, (Hirschman, 1958)⁵, (Myrdal, 1968)⁶, (Mishra 1974)⁷.

Bridging the regional imbalances is one of the means of achieving the goal of distributive justice. Balanced regional growth does not necessarily mean that every region should be developed equally. It refers to a situation where income and consumption levels, as well as quality of life should be uniform in all regions and among all sections. Spatial approach to development is now universally accepted to achieve the quality for targeted population without destroying its ecology and environment⁸. Moreover, the objective should not be to make every region a self-reliant. But it should be one, that can let a region achieve a self-generating growth potential and it must be accruing to the population in terms of providing equity of opportunities, eradication of poverty, maintenance of environmental sustainability and improving the overall quality of population (Smith 1979)⁹.

For developing of any backward areas, it is necessary to create conditions which can induce growth. The issue, therefore, is to locate a place which can optimally provide services and facilities in that place. The proper locations will not only afford services and facilities to a larger population but also, through integration, bring about a coherent development in a larger area. The integrated development includes two types of integration, functional and spatial, which are themselves interrelated. Functional integration refers to the integration of all economic and noneconomic activities, which influence the social, cultural and

⁴Friedmann, J.R.P., Op.cit. No. 1.

⁵Hirschman, A.(1958) *The Strategy of Economic Development*, New Haven, Yale University Press.

⁶Myrdal, G.(1968). *Asian Drama*, Vol.I, London,.

⁷Misra, R.P., Sundram, K.V., and PrakasaRao, V.L.S., (1974).*Regional Development Planning in India: A New Strategy*, Vikas Publishing House, New Delhi,.

⁸Prasad, K.N., (1967).*The Economies of a Backward Region in a Backward Economy*.*Scientific Book Agency*, Calcutta, (Vol. I) And 1968 (Vol. II).

⁹Smith, D.M.(1979).*Where the Grass is Greener*, Croom Helm, London.

economic activities of the people. As health, education, agricultural, industries and provision of services overlap. A change in one sector almost invariably brings about a change in another. It is therefore understood that any policy for development must try to utilize the effect of interrelationships. The interrelationships among various socio-economic activities depend on where they are located. If spatial relationships among existing activities are observed and found that there is a definite pattern in the dispersal or concentration of activities in space. The actual location of a specific function in relationship to other functions depends on many factors. Some of the important factors are the general level of development, demand for the functions and their supply, accessibility of these functions via roads and transportation infrastructure, time and distance of travel, income level of the people, and environmental cost of providing these functions, and so on. Much of our rural settlements are deprived of many basic amenities of life due to one or a combination of related factors. On the other hand, there are areas where there is a concentration of such functions attributed to presence of economic viability for the development of market based on such functions.

The present work is an attempt to study the "Settlement Structure and Spatial Organization of Service Centers in Alwar District of Rajasthan state in India.". It examines the structure of settlements in terms of population size, social and economic characteristics, available services, functions and infrastructure amenities. These parameters are utilized to identify the service centers and their regions in the district.

The study is related to spatial organization of service centers its role in deciding the socioeconomic condition of the region. It focuses on finding out the relation between the different centrality functions and the services based on the indicators like education, health, banking, recreation. Demographic indicators are also taken to find the causation of its effect on to the social and spatial distribution based on population size, population density, SC and ST population, size distribution and sex ratio. The order for centrality and its interaction with the social and economic

characteristic are observed in this study to establish the relation between spatial distribution and socioeconomic development in Alwar.

The central places are identified in Alwar region based on the data collected from Census of India, 2011. Field survey has been conducted to find the sphere of influence of identified central places and their spatial interaction with the settlements in providing services. Such study is of great importance during this era of economic development to eradicate the disparity in economic activities of different settlement.

Social and economic disparity in a region can be attributed to the gap between the spatial linkages of settlement with the well-functioning central place. Socio-economic development has always been the focal point of any planning process and for the attainment of economic development. The significance of linkage between spatial structure and economic development is phenomenal. A necessary condition for the development of a region is economic growth which is caused due to centrality of function, but the spatial linkages with the high economic growth can guarantee the socio-economic development, hence spatial linkages can help to bridge the gap created due to absence of such linkages. There are some other factors which also create disparities in socio economic development like geography, demography and culture.

The level of service and the functional organization decides the hierarchy of the central place which is important for the development of a region. The higher order settlement based on the complexity of the services decides the role of central place. And distribution of such central places over the region is extremely important for the spatial interaction between the different settlements to spread the influence of central place to ensure the socioeconomic development of the region. This necessitates the creation of chain of central places. Introduction of innovative function at the place where necessary institutional infrastructure is not available can cause the diffusion and spread of services even up to lower order settlements. Polarization of many services at a place will integrate the settlements

in the economic activities so that no any settlements left behind in terms of socio economic development.

Studies suggest that disparity is contributed because of many factors which may be economic, non-economic, and institutional. And the absence of centrality function acts as a barrier for the emergence of a small town in to a higher order settlement. Settlements that have no necessary services fail to operate as a higher order service centre and also fail in creating centripetal forces for spreading the development in the periphery.

A fully functional central place has pull effect and spread effect on the adjoining settlements that help in emergence of market for traditional activities like agriculture. Commercialization happens due to centrality functions the income level in lower order settlements improves and creates demand for other services. Any type of regional imbalance and topography is seen as hurdle in the diffusion of economic development evenly in the region. Unplanned settlement fails to show the agglomeration of important services so, central places resulting from such settlement pattern leads to sub optimal level of growth and development of the region.

In India the regional disparity is mainly due to under developed small and medium size settlements due to lack of some essential centrality functions like connectivity and institutional infrastructure. Thus these Central Places without essential centrality functions fails to generate commercialization of traditional activities and in turn there remain underdeveloped markets accentuating the failure of dual economy, the traditional as well as modern economy as explained by Lewis¹⁰. Such a settlement fails to generate development which causes a low level equilibrium trap and hence perpetual poverty resulting in to economically and socially backward region.

¹⁰ Lewis, A. (1984). The State of Development Theory. *The American Economic Review*, Vol. 74, No. 1., 1-10.

Prevalent poverty in a large number of small and medium size settlements in developing countries necessitated the need of regional planning based on centrality after analyzing the hierarchy and identifying the missing services. The development can be ensured by

- (A) Introducing innovative institutional services.
- (B) Introducing the missing functions of small and medium settlements.
- (C) Making small town function as shock-absorber for sparsely located urban central places.

1.1.1 Theoretical framework

The available theories and methods for identifying growth centres of various orders and their interaction with hinterlands could be utilized for the planning for regional development. Among those theories that may suit our purposes very well is the central place theory. The concept of central place is mainly a contribution of a German geographer, Christaller¹¹ and has been refined and improved upon by many other with significant contribution by Losch¹² and others. The theory is deductive but was tested by Christaller in Southern Germany and by others in different parts of the world. The main idea of Christaller's theory, stripped of details and elaborations, is as follows:

1. A central place can be a city or a town depending on the specific area or region under study which provides functions and services to its tributary area, and located at the centre of the minimum traveling distance incurring the minimum cost to the customers and the maximum profit to the sellers.

¹¹W. Christaller (1933), *The Central Places in Southern Germany* (Translated by C. W. Baskin). New Jersey, 1966.

¹²Losch, A. (1954). *The Economics of Location* (Translated by W. H. Waglom and W. F. Stolper). New Haven,.

2. There is a hierarchy of such central places. The higher order places provide functions that the lower-order places cannot because of absence of such services there. But the reverse is not true. The higher-order places provide functions in addition to what the lower-order places have.
3. Functions, which are unique to the higher-order places, have a wider range than those that are common to both the higher and the lower-order places.
4. It follows that the higher-order places, because of their wide-ranging functions, command a larger area than the lower order places. In other words, their degree of centrality is higher than that of the lower-order places.
5. The higher-order places are fewer in number and more dispersedly spaced than the lower-order places.
6. The higher-order places have not only their unique functions but also a larger number of establishments providing lower order functions than the lower-order places. The reason for this is that higher-order places command a larger trade area and customers minimize their travel cost by shopping both higher and lower-order goods in the same place.
7. There is a hierarchy of central places ranging from the highest-order place to the lowest-order place with each order of place nesting the next lower-order places. Ideally, the command area of a central place is shaped in the form of a hexagon to provide the maximum efficiency. The nesting pattern or lattice of lower-order places within such a command area is determined by three principles: (a) marketing, (b) traffic, and (c) administrative.

According to Christaller, the centrality of a place is a measure of its importance. He recognizes population size as an associative factor but the major emphasis is

placed on the functional importance of a place in terms of the nature and the range of services offered.

The implication of central place is still significant as the hierarchies of urban center describe the spatial pattern of urbanization. This help planners to understand and explains the location of trade, different services and functions to find the level of development with the existing spatial arrangement and to innovate some new model to get the desired level of regional development. Spatial arrangement and spatial cluster also affected by various factors population, demographic characteristics, socioeconomic structure, shopping behavior and purchasing power.

1.2 Objectives

1. To examine regional imbalance in social and economic development of Alwar district in Rajasthan based on the existing distribution of central place system.
2. To identify central place system and service centers based on marketing, education, health, transportation, banking/credit services, agricultural market centers and socio-economic activities.
3. To identify characteristics and functional composition of service centers and central places.
4. To examine the hierarchy of service center in terms of functional organization.
5. To identify hinterland region of Service Centers and Central Places on the basis of interaction in terms of economic, social, cultural and marketing for Agricultural and other purchases.
6. Suggest appropriate spatial organization of Service Centers and Central Places with functional distribution of services for balance regional development.

1.3 Research questions

- 1) What is the degree of social and economic inequalities in the Alwar District?
- 2) Whether distribution of service center in Alwar, is in conformity with central place model or not?
- 3) Whether the identified central places have the required social economic and marketing function to serve the region?
- 4) Whether hinterlands of the service centers show the sign of trickledown effect from service center?
- 5) Whether people located in the service center have the threshold purchasing power, and connectivity to seek services and benefits from the service centers?

1.4 Data base

- 1) Data is obtained from village and town directory of Alwar and district census hand book of Alwar, and Census of India, 2011, primary census abstract of Rajasthan.
- 2) District and village wise map of study area has been collected from district census hand book census of India, 2011, and administrative atlas of Rajasthan, census of India, 2011.
- 3) Other source of data and information has been obtained by the help of computer software ARC GIS, Google earth. Location of rural and urban settlement, railway stations and central places are located through Google earth software and thus personal geo database has been created with the help of Arc GIS software.
- 4) Field survey has been conducted in randomly selected settlement through questionnaire.

1.5 Methodology

- 1) To obtain the distribution pattern of rural and urban settlement tehsil wise and village wise map of Alwar district and location of all rural and urban settlements has been identified using administrative atlas of Rajasthan(census, 2011)¹³, Google Earth, arc GIS map and geo-referencing, geodatabase is also created.
- 2) Centrality functions are calculated by considering basic amenities like education, medical facilities, banking facilities, transport and communication facilities and other socio economic activities in all the villages and urban settlement by assigning appropriate weights. Weights are assigned to the functions based on population threshold for the functions. To calculate composite index, population threshold has been multiplied by the total number of functions in each central place.
- 3) All the functions are divided by their average to obtain composite index. After that centrality score has been calculated for each of the settlement.
- 4) The definition of threshold has been given as, total population divided by total number of functions.
- 5) Population distribution in different hierarchies has been explained by the help of Rank Size rule¹⁴ method.
- 6) The hierarchy of settlements has been mapped and cross classified with population size, number of functions, centrality score and accessibility.

¹³Government of India (2011). Administrative Atlas of Rajasthan, Census of India, 2011.

¹⁴Zipf, G.K. (1949) “*Rank size rule in national unity and disunity*”, Bloomington, ind: Principia Press.

- 7) To study the transport network of the Alwar, alpha, beta, gama, index and cyclometric number and koning number has been used for network analysis. Accessibility of roads and railway station has been created by the use of Arc GIS map. Finally centrality function map and accessibility maps has been superimposed to study the relationship between centrality and transport accessibility.
- 8) Primary data has been collected by conducting field survey. To conduct primary survey settlement has been chosen by random stratified sampling method. Four sample settlements are chosen from each tehsil. Out of 16 tehsils in Alwar district, 64 settlements have been chosen for field survey.
- 9) Spatial interaction for education, health, economic activity, recreation activity, marketing activities, administrative activities and transport activities has been focused on while conducting survey to access the pattern of interaction between the lower and higher order center, and presented with the help of flow diagram maps. After that the interaction pattern, range of distance are classified.
- 10) Spatial interaction was asked from respondent of the questionnaire regarding different institution and services especially educational, medical, transport, banking, recreation, administration, economic, marketing and other service
- 11) Primary data based on the field survey has been processed by using statistical software SPSS.
- 12) On the basis of overall study deficit in the functions and infrastructure has been highlighted so that a plan for developing the backward region can be formulated.
- 13) Cartographic technique has been used to create new set of geodatabase. Based on these geodatabase, location map of settlement

distribution, map of central place distribution, map of railways and road accessibility, physiographic map, flow chart map of spatial interaction has been drawn. These maps are used to make distribution map of Alwar to represent demographic, social and economic characteristics. Paint brush is used to show spatial interaction map for different services in Alwar district.

1.6 Research design

The research work has been distributed along five chapters.

1) Chapter- 1

a) Section I

Section I, introduces research problems and implication for socioeconomic development and related issue at large for Alwar. It also includes a briefing about research questions, objectives, and methodology and research design.

b) Section II

This part of the chapter contains Literature survey in support of problem suggested in the study and the prospective plans for the socioeconomic development of the region under study.

2) Chapter- 2

This chapter covers population size and distribution of all the rural and urban settlement and cover social, economic, and demographic characteristics of settlement.

3) Chapter- 3

This chapter covers detailed study of different services, function of central places, and their distribution in Alwar district.

4) Chapter- 4

This chapter find out the cross classification of population size, accessibility and relationship with transport network has been included, and after the study the spatial distribution and functional characteristics of central places has been accessed in term of its coverage and capacity to provide services.

5) Chapter- 5

This chapter has identified hinterland for each order of central places on the basis of field survey and study the impact of central places identified in Alwar on the socio-economic development of adjoining hinterlands. Based on this result a spatial plan has been suggested to introduction of new central place and innovative function of centrality to carter the need of socioeconomic development of Alwar region.

6) Chapter-6

This chapter has the summary part and conclusion part of whole study done on the centrality based socioeconomic character of Alwar.

(Section – II)

Literature Review

Central place has been one of the important concept since primitive society as people at that time were dwelling in a group, they organized in to small settlement after the transition from hunter gatherer society in to agriculturist society such traces of an organized spatial pattern of settlements and its interaction with distanced settlements through connectivity via rivers system like Tigris, Euphrates and Indus river system, or trade relations can be evident from the earliest civilization like Mesopotamian to Harappa civilization.¹⁵¹⁶¹⁷¹⁸

The foundation of systematic study of spatial organization of central places reflect out from several theories and hypothesis propounded by many social scientist especially in economics (linear city model¹⁹) and sociology but the first such explicit study as a concept emerged in the study related to explaining the effect of distance between farms, on farm economy by Vonthunen²⁰.

German and French geographers were the main contributors in the field of settlement geography. The study of man and spatial relation is important for explaining various processes and its effect on the nature of social, institutional and economic organization. Such man and land relation study is also traced back

¹⁵Smith, E. M., Roberts, M., Irwin, G. J. & Allen, J. S., (1998). Patterns of Prehistoric Human Mobility in Polynesia. *Proceedings of the National Academy of Sciences of the United States of America*, Vol. 95, No. 25, pp. 15145-15150.

¹⁶ Noor, A. Mohd. (1992). Traditional Malay villages in peninsular Malaysia: A diminishing signature of a cultural landscape. *Development vs. Tradition: The Cultural Ecology of Dwelling and Settlements: 3rd International Conference* (p. 21.) . Paris: Traditional Dwellings and Settlements Review.

¹⁷ Terrell, J. Edward. (2006). Human Biogeography: Evidence of Our Place in Nature. *Journal of Biogeography*, Vol. 33, No. 12, Special Issue: Conservation Biogeography, p. 2088-2098.

¹⁸ Pearson, Charles E. (1980). Rank-Size Distributions and the Analysis of Prehistoric Settlement Systems. *Journal of Anthropological Research*, Vol. 36, No. 4, pp. 453-462.

¹⁹Hotelling, Harold (1929). Stability in Competition. *The Economic Journal* Vol. No. 153, p. 41-57.

²⁰Vonhünen ,J. Heinrich (1826). Theory of agricultural location, Der isolierte Staat (The Isolated State) (translated by Carla M. Watenberg). London:Pergamon.

from early sources furnished by Carl Ritter²¹. Modern orientation and the ideas concerning spatial study as a science expressing as the pattern and process was initiated by Schaefer²².

Christaller²³ was a German geographer who gave a systematic theory explaining the concept of central place. Study was about the determination of centrality of a place because of its importance with respect to other place in providing essential services. He recognized the size of population as an important factor with major emphasis on the functional importance in providing different types of services.

The central place theory²⁴ was based on the centrality of function and had its importance to study the relativity of one central place from other in urban geography. The importance of urban centers has the impact on the development of the settlement in its sphere of influence was seen as the guide line for regional development by locating different services at economically viable points. And only Central place theory was able to provide a viable statement on the location of market and service places with many functions and the allocation of economic activities among these cities, towns. A large empirical literature has been generated by this theory, regarding its importance in regional planning and central place²⁵.

The pattern of the central place and its approximation to theory is interpreted as a circular one and then improved to accommodate the drawback of circular pattern with honeycomb network, which is an idealized one and any deviations from the idealized pattern occur because of various physical, economic, and administrative

²¹Baker, A.R.H. (1969) *The Geography of Rural Settlements in Cooke and Jonson(ED) on Trends in Geography*, Oxford, :Pergamon, p. 123.

²²Schaefer, F. A. (1953). Exceptionalism in Geography, *Annals of Association of American Geographers*, Vol.43, P. 225 - 46.

²³W. Christaller (1933). *The Central Places in Southern Germany* (Translated by C. W. Baskin). New Jersey, 1966.

²⁴ Ibid.

²⁵ Berry, B. J. L. and Pred, A. (1965). *Central Place Studies: A Bibliography of Theory and Applications*. Philadelphia: Regional Science Research Institute.

conditions. Thus a condition required by the theory was not satisfied in the real world²⁶. In real world there is no such pattern as it was suggested based on the limiting assumption of W. Christaller²⁷. Thus any spatial study is bound to make deviation from the pattern suggested by the theory itself.

Even with the limitation on the theoretical validity of the model because of the limiting assumptions, the vitality of the theory for the study of the regional structure, spatial distribution, and describing the interaction of different services at a place for analyzing about the level of regional disparity and planning for the development of regional economy for targeted outcome cannot be denied.

Many of the tests revealed that there was rather more regularity in settlement patterns that one might have expected a priori and that certain aspects of urban functional hierarchies could be identified²⁸ to understand the rationale for the size, number and spatial distribution of places offering a range of services to dispersed population, under certain assumptions, which were questioned again and again by different geographers (Berry, 1976)²⁹.

Population threshold is one of the important requirements of any urban center and population is a subject matter of demography. And a wider definition of population geography includes settlement geography and thus central place theory became inclusive in nature. But history of the development and use of Christaller's theory provides an interesting case study of the rise and fall of a very particular form of theoretical framework under normative and deductive theory³⁰. Any study related to development *ab*

²⁶Dacey, Michael F. (1966). A Probability Model for Central Place Locations. *Annals of the Association of American Geographers*, Vol. 56, No. 3, pp.550-568.

²⁷Losch, A. (1954). *The Economics of Location* (Translated by W. H. Woglom and W. F. Stolper). New Haven: Yale University Press.

²⁸Pacione, Michael (1986). *Population Geography: Progress & Prospect*. London: Routledge.

²⁹Berry, B.J.L. (1976). *Geography of Market Centres and Retail Distribution*, New Jersey: Prentice Hall, Englewood Cliff.

³⁰Op. cit., No.11.

initio start with the spatial arrangement, if it is ignored the likelihood of any plan failing soon in future seems obvious, so the model given by French and German geographer preserve its vitality till date in the field of settlement geography, planning , and development economics.

Christaller and Losch³¹'s versions of the theory put forward in the 1950s and 1960s among geographers who sought to move beyond the description and classification of settlement types, to a verifiable model for testing the potential of a central place as a leading factor in study of spatial interaction and regional development³², for that the inclination was to test the theory derived from central place theory hypotheses which could be linked with empirically verifiable predictions. The prediction of centrality based on the theoretical assumption sometime failed to give a link between market and disparity because of the small threshold size of population the market remains underdeveloped and once a force for development became a factor for creating regional disparity. And the literature suggest that the transition towards a market economy involved a complex process of institutional, structural and behavioral changes³³.

In order to accommodate the development of market as a force for creating centrality at the administrative level change sought in administrative structure, regulation and decentralization of administrative power and minimizing the government intervention, at the economic level the transition from plan to market economy involved the liberalization of rules regarding manufacturing, decontrolling prices, trade activities, connectivity related infrastructure and financial and banking system, discussion as regards the strategies of transition

³¹Dacey, Michael F. (1965). The Geometry of Central Place Theory. *Geografiska Annaler. Series B, Human Geography* Vol. 47, No. 2. pp. 111-124.

³²Op. cit., No.11.

³³ Berry, Brian J. L. & Garrison, William L.(1958) Alternate Explanations of Urban Rank–Size Relationships *Annals of the Association of American Geographers* Vol. 48, No. 1 ., pp. 83-91.

to market economy^{34,35}. For the development of market system for creating urban centers any planner are supposed to take in to account many factors as per the need of the time and space but focusing on the spatial arrangement set some variable as primary one like infrastructure, housing, connectivity, health facilities, education services.

There is hardly any discussion regarding the interaction of economic transition based on the centrality function and regional disparities. Spatial arrangement and regional planning focusing only on the macro economic variables always led to worsening of regional inequalities. This is because some regions might have a traditional structure with an orientation towards the domestic market or any region may be ignored because of lack of threshold population³⁶. More often in developing nation planning are done on the logic of economic viability or intended the public purpose thus fails to bring regional development.

The creation of new central place in a the settlement means providing the availability of goods and services to its surrounding settlements which will in turn depends on the distance and cost at which facilities could be offered (Berry 1976)³⁷. Berry and Garrison have recently stated that whatever the distribution of purchasing power (and whether in open countryside or within a large metropolis) a hierarchical spatial structure of central places supplying central goods will emerge. The same was explained by many economics geographers under the locational advantages of cost, and hence the centrality is recognized, the same is in consonance with the Hotelling's location theory in

³⁴Giannias,D., Liargovas,P. and Chepurko, Y.(2005). Regional Disparities as Barriers to Transition to a Market Economy: The Russian Experience. *The Journal of Developing Areas, Vol. 38, No. 2 (spring,)*, pp. 55-70.

³⁵Berry, B. J. L., Barnum, H. G., and Tennant, R. G. (1962). Retail location and consumer behavior. *Regional Sci. Assoc. Papers and Proc. 9*, p. 65-10.

³⁶Op. cit. No. 11.

³⁷Op. cit., No. 13.

economics which tried to explain the location of markets place on linear and circular arrangements to minimize cost of transportation and capture the market by producers³⁸. The assumption is that the consumer would buy the goods from the nearest market, and the concentration of market at the central place would depend upon the population size of that place. Homogeneous distribution of income and settlement proved to be superfluous assumption of this theory (Hagget.P)³⁹.

Central-place theory submits that differences in access to consumer markets affect the location of goods and services, there is a maximum range that a consumer is willing to travel for a specific good and a minimum market size (threshold) necessary to support suppliers⁴⁰. The interplay between range and threshold determines where the good or service is offered or not.

Preston's study supports the validity of the principal behavioral assumption of Christaller in the central place theory. There are existence of interdependence between centers to provide the goods and services, and also hierarchical class-systems of central places. There are relative importance to settlements (central place system) as regional centers because they provides goods and services demanded by the center's own inhabitants and from nearby settlements. Haggett, argued that nodal region is a general system in human geography in which some of objects like towns, villages, farms, etc. are related under circular flow of money, migrants, freight, etc. and other energy inputs come in the system by the biological and social demand of the people.

³⁸Op. cit., No. 19.

³⁹Hagget, P., Cliff, A. & Frey, A. (1977). Location analysis in human geography. New York: Wiley.

⁴⁰Beavon, K O.S. & Hay, A.M. (1978). Long Run Average Cost, Price and Christaller's Concepts of Range: An Explanatory Note. *Geography* Vol. 63, No. 2 .

Preston (1971)⁴¹ said that hierarchical pattern are because of greater social, physical, and economic heterogeneity of larger areas, and other differences are found in individual subsystems. When all these subsystems are aggregated central place hierarchy is developed. With the changing technology and life style, Christaller's contributions is important in the investigation of settlements and structure, and operation of particular space economies.

After analyzing Christaller's and Losch's concept, Bell⁴² indicated the most critical locational and centrality factors are markets, transportation routes, and raw material⁴³. Losch argued that alignment of centers along transport axis, are more important rather than maximizing the coincidence of activities in center like locational decisions of entrepreneurs and complementary activities, agglomerating economies of alternate sites and having immigrated population affect central place system.

Different study is also conducted in India to highlight the gap between the regional disparities due to ignorance of centrality various study focus on to judge the level of development based on the spatial arrangement of central services at the central places which by the logic considered as the growth pole fueling the socio economic development of the region. Especially in India the towns vary widely in terms of level of growth when compared at different point in time based on size population. Size population as the threshold for creating centrality of services is not always act as the factor of growth pole. The disparity in the growth rate is also low for towns which has further gone down in the seventies suggesting strengthening, of

⁴¹ Preston, Richard E. (1971), "The Structure of Central Place Systems", *Economic Geography*, Vol. 47, No. 2, Apr., pp. 136-155.

⁴² Bell, Thomas L., & Stanley R. Lieber & Gerard Rushton (1974) "Clustering of Services in Central Places", *Annals of the Association of American Geographers*, Vol. 64, No. 2 pp. 214-225.

⁴³ Op. cit. No. 11.

the economic base of small towns⁴⁴. By the study in India a larger number of small town, suggested high variation in their growth rates, a smaller percentage of the towns registering a higher growth rate than others as these regional economy do not show the explained factor contributing the difference in the pattern of regional growth causing disparity⁴⁵

In the country like India and others less developed countries where population are dispersed (low population density) and surrounded by agricultural land, Christaller's central place theory provides a techniques to chart out the functional relations, between division of space and settlement accordingly, to understand and formulate the policy design for regional development⁴⁶. The central place theory (1933,Walter Christaller) was successful to explain the size, number, and distribution of central places (towns and cities providing goods and services to surrounding areas) in southern Germany, gives an insight to look and recognized the settlement pattern in any region and proved that there is always a definite pattern of the distribution of human settlements. The theory also visualizes landscape in which there are small centers but increasingly fewer large central places.

This version was further improved by August Losch and used, based on the concept of hierarchies and combined it with the framework of economic art in which he has shown the flexibility between the number of central place and their functions. The attempt was to use this central place model as a tool for spatial development, to achieve economies of scale, by avoiding the issue of economic growth he treated the agglomeration of human activities as spatial

⁴⁴Kundu, Amitabh (1983). Theories of City Size Distribution and Indian Urban Structure: A Reappraisal. *Economic and Political Weekly*, Vol. 18, No. 31 (Jul. 30.), pp. 1361-1368

⁴⁵ Berry, B JL, (1961): "City Size Distribution and Economic Development", *Economic Development and Cultural Change*

⁴⁶Zutshi B. (1986), "*Settlement structure and spatial organization: A case study of Jammu & Kashmir*", unpublished thesis submitted to Center for study of Regional Development, JNU.

reflection of socioeconomic change which witnessed the emergence of extensive literature on central place theory and its impact on spatial distribution, socioeconomic change and in to the regional development⁴⁷. In case of India development of a region needed to be observed beyond the issue of economic growth.

Only centrality can maximize access to services of all kinds to the population as it is important for the development of the market. And markets offer a full range of goods and support a large constituent population and diverse economy. Cities with suboptimal access offer only goods with lower market thresholds and narrower ranges, such cities have correspondingly smaller populations and underdeveloped economy. The result of differential access to consumer markets is functionally differentiated among places and a flow of consumers from lower order central places to higher order central places for the provision of higher order goods and services creates a network of consumer flow that is nothing but the structure of spatial interaction among different settlements with different orders of their hierarchy. In such network of consumer flows, centrality is reflected by the number and volume of exchanges from other cities⁴⁸. The higher order central place draws more consumers from all other lower order central places. Thus the concept of centrality is always implicit in any economics theorization and making of policies related to economic growth and development.

Geographical differences exist in India at different level but there are two ways to observe the problems of regional imbalance through centrality concept as it is implicit in all studies related to human settlements, these ways are through central place distribution and decentralization and concentration of activities of particular nodal center and their diffusion from that center (Harris

⁴⁷Bell, Thomas L., Lieber, Stanley R. & Rushton, Gerard (1974). Clustering of Services in Central Places. *Annals of the Association of American Geographers* Vol. 64, No. 2, p.214-225.

⁴⁸ Hoover, Edgar M. (1955) The Concept of a System of Cities: A Comment on Rutledge Vining's Paper. *Economic Development and Cultural Change* Vol. 3, No. 2, p.196-198.

and Ullman; 1954)⁴⁹. Functional effect on the settlement pattern in the adjoining areas of the central places keeps on expanding and is analyzed through the extent of diffusion.

The two main process of diffusion through which the wide variety of social changes takes place are contagion diffusion and hierarchical diffusion. First happens from direct local contacts between people, and the examples for these are spread of diseases , agricultural innovations, all these happens due to spatial homogeneity and progression of social segregation within a city as simulated for the Negro ghetto of Seattle. (Morrill,1953)⁵⁰. In India there is the vastness of geographic extent prevent the contagious diffusion. The hierarchical diffusion is more scattered in urban centers, where potential adopters are preferentially located this explains the spatial evolution and cultural innovations.

But the diffusion process can be controlled through targeted government policies of redistribution and controlled production process and interregional trade, government policies intend to foster the development in the rural areas by providing the accessibility of required resource base in urban areas to increase the agriculture productivity and linking with the market for agricultural output in the nearby towns. This increases the level of social and economic gains in rural areas result in development of that region. (Wanmali⁵¹, Sen^{52,53})

⁴⁹Ullman, E.L.(1941).A Theory of Location for Cities.*American Journal of Sociology*, 46, p. 853-64.

⁵⁰ Morrill R.(1993).Development, Diversity, and Regional Demographic Variability in the U.S.*Annals of the Association of American Geographers*, Vol. 83, No. 3, p.406-433.

⁵¹Wanmali, S. (1970). Regional Planning and Social Facilities: An Examination of Central Place Concepts and Their Application, A Case Study of Eastern Maharastra. Hyderabad:N.I.C.D.

⁵²Sen, L.K.(1972) , Readings on Micro-Level Planning and Rural Growth Centres, Hyderabad:NICD

⁵³Sen,L.K, and others , Planning Rural Growth Centres for Integrated Area Development – A Study in MiryalgudaTaluka, Hyderabad: NICD.

Regional economic development planning and spatial development planning are done by assimilating the concept of centrality theory and social diffusion processes, but this do not work exactly because of real constraints like irregularity of settlements, distribution of services, physiographic features, and differences in socioeconomic conditions.^{54,55}

This study about Alwar (Rajasthan) based on the centrality theory to find the distribution of settlement pattern and the functions influencing the socioeconomic development, the study also tries to find that how the physiographic features, transport networks, population distributions and government efforts in redistribution of resources determine the development outlook of the region under study. The study will also try to validate the centrality theory and diffusion process. It also checks the functional and hierarchal structure with the agglomerations of service center, and its distribution in the area under study.

⁵⁴Chattopadhyaya, B and Raza, Moonis (1975). Regional Development Analytical Framework and Indicators", Indian Journal of Regional Science, Volume 7, No 1.

⁵⁵ Mayfield, Robert C. (1963) The Range of a Central Good in the Indian Punjab. *Annals of the Association of American Geographers* Vol. 53, No. 1 , pp. 38-49.

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Chapter 2

ALWAR REGIONAL STRUCTURE – SALIENT FEATURES AND SPATIAL ARRANGEMENT

2.1 Introduction

Regional structure is defined as spatial arrangement of any geographical territory and it is a dynamic concept as it keeps on changing in accordance with demography, administrative, economic and political characteristics. These changing characteristics if not taken into account while planning then it will negatively affect the socioeconomic development of the region as the pressure on the available services increase. To achieve a desired level of regional development, regional planning is required and regional planning without spatial arrangement is supposed to give sub optimal outcome with skewed distribution of service.

In order to find the problem related to the socioeconomic condition of a region the distribution of services and physiographic characteristic, economic activities and industrial and administrative requirement need to be analyzed.

To have a proper understanding of the spatial relation and settlement distribution based on size of population, the human and cultural landscape of the region based on social, demographic and economic characteristics of the Alwar region are analyzed.

(1) Demographic characteristics take population density, population growth rate and sex ratio.

(2) Socio economic characteristic take distribution of urban population, urban center growth rate, schedule caste and schedule tribe population distribution, literacy rate, work force participation rate.

Alwar is administrative district of Rajasthan state in India, located in north eastern part of the state and is taken as study area because its important location between state capital Jaipur and national capital New Delhi. It also falls under the definition of NCR (national capital Region). So it is important to examine that, whether the development is spreading in the region and if spreading, which services are supporting and of which are pulling back on equal spread of benefit

in all the settlements. Is the benefit of being NCR is accruing to all the settlements in terms of centrality of services which are vital for socioeconomic development? All such questions make the study of Alwar important for planners.

2.2 Study area

Alwar has total geographical area of 8380 sq. k.m. that account for 2.5 percent of Rajasthan state. Agriculture is main economic activities of Alwar District. Main crops under Kharif and Rabi with 44 percentage (area wise) crops under kharif like Bajra, Maize, Jower, Kharif pulses, Arhar, Sesamum, Cotton, Guar crop. Wheat, Barley, Gram, Mustard, Taramira, Rabi pulses, are major crops of Rabi season which are grown in 56 percent of geographical area and thus Rabi crops dominate the region¹. The main sources of irrigation are wells and tube wells. Very less area is irrigated by canal system in Alwar (Rajasthan, 2016)².

Average rainfall received is 657.3 mm, distributed evenly causing flood and drought condition. This has direct impact on agricultural produce and cropping pattern in Kharif and Rabi season. Area fall under the monsoonal effect has also put positive impact on agricultural activities in the normal year³. Agriculture being a dominant economic activity in the region, industrial activities is also present and come under secondary activities. Industrial areas are not evenly distributed in the region and such industrial setups are in Alwar, Rajgarh, Khairthal, Thanagazi, Behror, Sotanala, Bhiwadi, Pathrei, Khushkera, Chopanki, Tapukra, Shajhanpur, Keharani, Ghilot, Salarpur, karoli, Rampur-Mundana, and Sare-khurd. There exist different level of industrialization and types of industries, large scale industries, medium size and small size industries. These industries are mainly export oriented and manufacture a range of exportable product like

¹ Rajasthan, G. o. (2016). *Annual Socio Economic Survey*. Alwar: Dept. of economy and statistics, Alwar.

² Ibid.

³ Ibid.

shaving blade, hand tools, aluminum extruded product, surgical blade, synthetic blended fabrics, empty hard gelatin capsules, leather shoes, subscriber carrier system, tyre-tube, picture tube, Chemicals, sanitary items, crockery, suiting, slate tile, different chemicals like calcium cyanide, alkalies salt, moped, PVC cable and readymade garment. Some industries have huge growth potential like Granite, chemical plant and marble art ware. There is still further scope for new industries like repair & maintenance as per need of industries and for making finished goods (India, 2016)⁴.

A tertiary economic activity has also some contribution in the economy of Alwar with untapped potential. These service industries are hotel and tourism, automobile workshops and manufacturing units. Other potential service industries are packaged food industry, printing press, bakery unit, beauty and herbal therapy and fashion designing institute.

Industrialization in Alwar region has led to changes in spatial relation with the changing pattern of economic activities causing economic transformation. Workforce engagement in secondary and tertiary activities has increased rapidly. Industrialization has also brought infrastructure development and cause upcoming of new towns in the region. For example Bhiwadi is growing rapidly in terms of urbanization because of industrialization. This urbanization has brought infrastructure development and upcoming of services like education, health, credit recreation, banking, marketing and transport. Connectivity in the region has also improved.

This economic transformation has also lead to regional disparity in Alwar. Because of industrialization and agglomeration of services⁵ only a few pockets are developing. The social and economic development has accrued especially to

⁴ Ministry of MSME, G. o. (2016). *District Industrial Potential Report of Alwar - Rajasthan*. Jaipur: MSME- Development Institute.

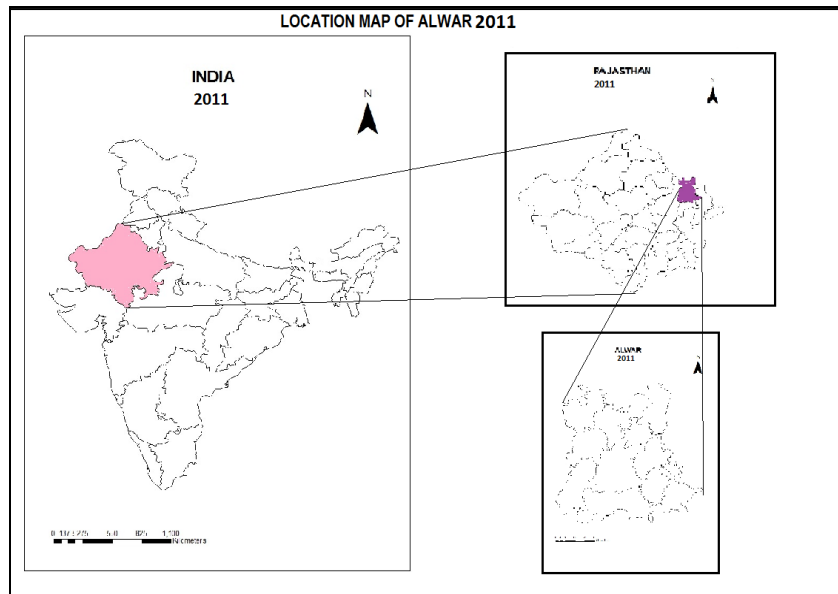
⁵ Berry, B. J. L. and Garrison, W. L. in "The Functional Bases of the Central Place Hierarchy," *Economic Geography*, April 1958, pp. 145- 154

industrial town or in settlements near to the national highway (NH-8). But still some regions are lacking in infrastructure and hence social and economic development. There are a few nodal centers which provide services to underserved areas. Physiography and spatial relation has also put impact on the distribution of development.

(a) Space Relations

Alwar region comes under Udaipur Gwalior region, surrounded by Rajasthan plain, Punjab plain, upper Ganga plain, Bundelkhand region, Malwa region and Gujrat region. Alwar is near to Punjab plain rather than upper Ganga plain and Rajasthan Plain (Singh, 1971)⁶.

Map no.2.1
Location map of Alwar

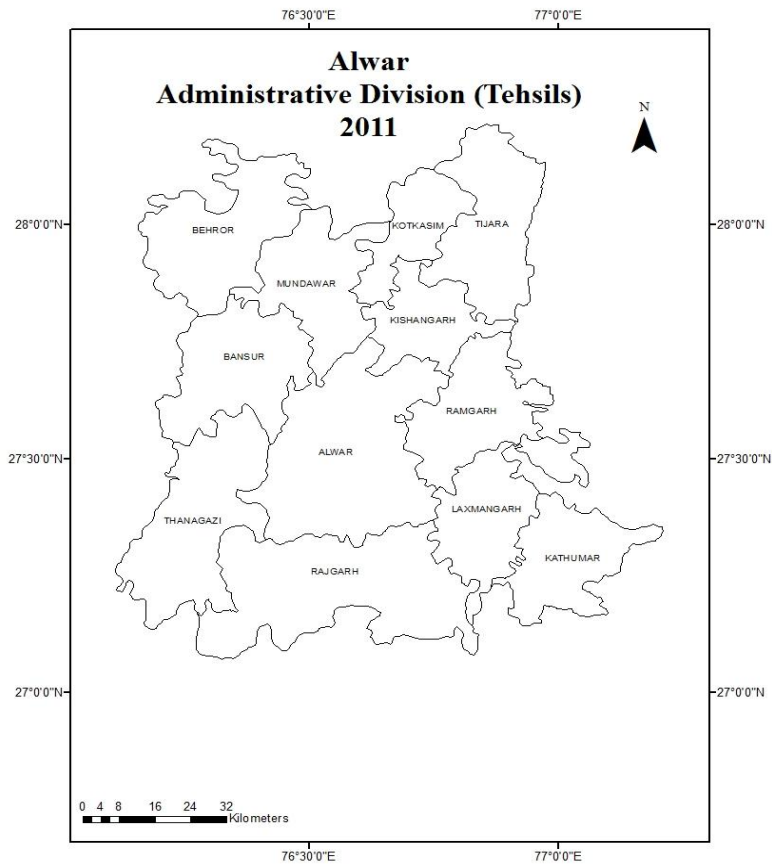


Source: census of India 2011

⁶ Singh, R. L.(1971): India: A regional geography, National Geographical Society of India, Varanasi.

The district is located in the north-east of Rajasthan and extends from 27°4' to 28°4' north Latitudes and 76°7' to 77°13' east Longitude. Distance from south to north boundary is 137 Kilometers and from east to west is about 110 Kilometer⁷. It shares its boundary in the north, north-west and north-east, with Haryana State, in east with Bharatpur district and, in the south-west with Jaipur and in the south with Dausa districts. Its area is 8380 sq. k.m. with population density 438 person per sq.k.m. (Census, 2011)⁸.

Map no.2.2
Tehsil map of Alwar district , 2011



Source: census of India 2011

⁷ Government of India, MWR (2013). *Ground Water Information, Alwar District Rajasthan*. Jaipur: Central Ground Water Board.

⁸ Government of India(2011). *District Census Handbook of Alwar District, Census of India, 2011*.

According to census 2011⁹ the administrative division parts it into 12 tehsils is visible in district of Rajasthan (Map no. 2.2). Recently After census year 2011 four tehsils are divided to add four new tehsils. These new tehsils are Neemrana, Reni, Govindgarh and Malakhera. Neemrana tehsil is carved out of Behror. Reni is carved out of Rajgarh. Malakhera is carved out of Alwar. Govindgarh is carved out from Laxmangarh. So at present the numbers of tehsils are 16 in Alwar district. The region is divided in to 12 sub-division and 16 tehsils and 14 panchayat samiti for administrative convenience. (1) Laxmangarh (2) Behror (3) Mundawar (4) Kotkasim (5) Tijara (6) Bansur (7) Kishangarh Bas (8) Ramgarh (9) Thanagazi (10) Kathumar (11) Rajgarh (12) Alwar (13) Reni (14) Malakhera (15) Govindgarh (16) Neemrana¹⁰.

(b) Environmental Framework and physical setting

Environmental framework consists of physical landscape, relief feature, climatic conditions and drainage pattern. Physical and environmental setups impact on the economic activities and fixed the distribution settlement pattern and define the level of socioeconomic development of a region. Therefore the study of this factor becomes important.

Alwar district is in quadrilateral shape and located between Satluj Yamuna divide (India 2016)¹¹. Gradual denudation of Aravali has cause the formation of ranges and rocky hills. Aravali as a range passes diagonally through north eastern part in Tijara tehsil to south western part of the district in Thanagazi adjacent to Jaipur district. Map no. 2.3 is depicts that another hill range passes through Mandawar, Jindoli and Alwar to south west of district near to Jaipur. Low hills are spread in Thanagazi, Rajgarh, Alwar Bansur, Kishangarh and Tijara tehsil.

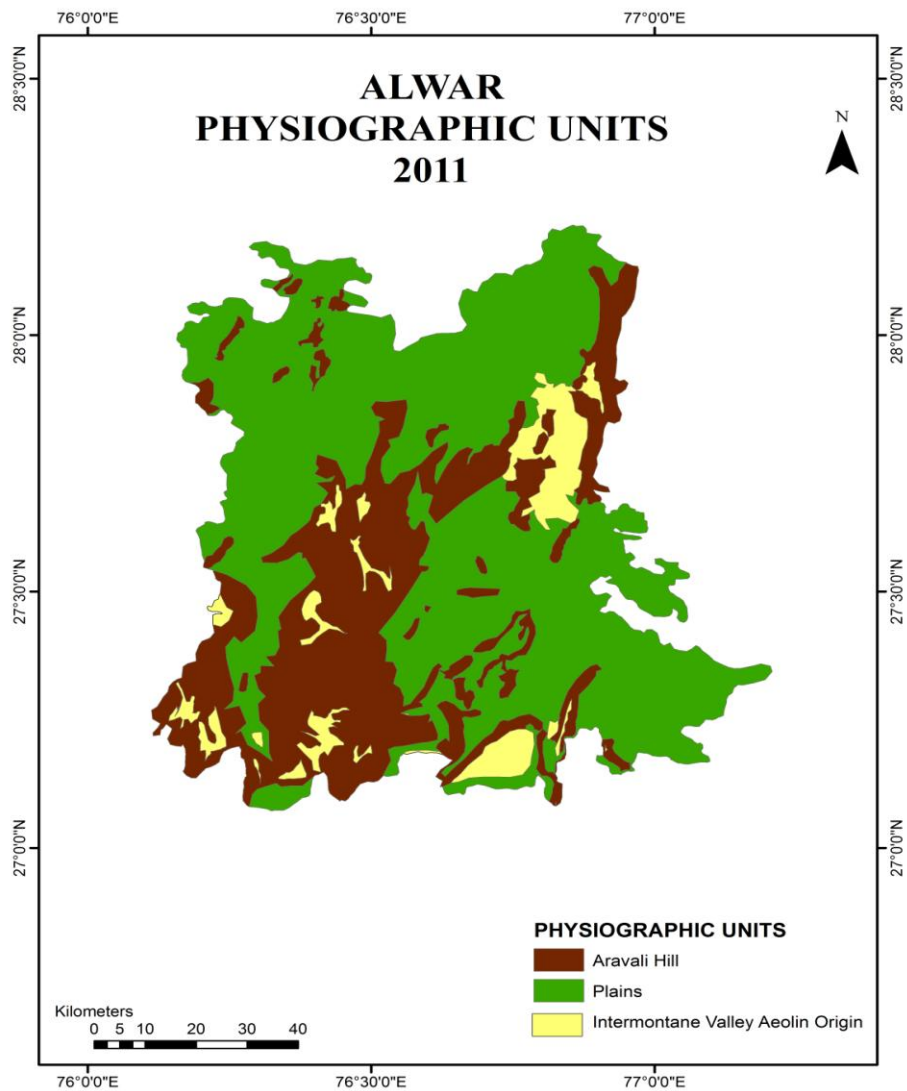
⁹ Ibid.

¹⁰ Govt. of Rajasthan (2017, July 17). *alwar.gov.in*. Retrieved July 17, 2017, from official site of Alwar: <http://alwar.rajasthan.gov.in/content/raj/alwar/en/home.html>

¹¹ Ministry of MSME, GOI (2016). *District Industrial Potential Report of Alwar - Rajasthan*. Jaipur: MSME- Development Institute.

Eastern part of Alwar, Mandawar, and western part of Bansur, Behror and Rajgarh, eastern part of Lacchmangarh are plain with scattered hills. Kathumar and kotkasim tehsil has prominent features of plain. Intermountain valley is found between the hills, it is spread in Ramgarh, Rajgarh, Thanagazi, Bansur tehsils.

Map no.2.3
Physiographic units of Alwar district in 2011



The intermountain valley as well as plain region (Government of India, 2013)¹² affect the distribution of economic activities, settlement pattern, population density, population growth rate, accessibility of the different type of services and connectivity. In plain region accessibility of the services and connectivity is high, which leads to high population density, population growth rate with nucleated and compact settlement pattern.

There is no perennial river in Alwar district. But some seasonal rivers exist which flow from the hills and bring runoff water. These streams do not reach to the sea and disappear into sand which makes them part of inland water drainage system. These streams are named as Sabi, Ruparel, Chuhar Sidh and Landoha. Natural drainage pattern is in south west to north east direction¹³ which depicts the slope of Alwar. Drainage pattern affects the settlement pattern as water resources determine the distribution of settlements. There is no significant drainage pattern in Alwar region. Drainage pattern in Alwar only helps in few areas of Plain region for irrigation and making the ground water table high in certain regions of the basin determine the soil system of Alwar region.

The climate of Alwar is semi-arid and it experiences very hot summers with maximum temperature crossing the mercury above 47°C, and very cold winters. The region receives rainfall from the south west monsoon during summer and from western disturbances in winter. Significant amount of rainfall is received from the south west monsoon with an annual average of 63.1 cm¹⁴.

The soil system of Alwar region has mainly three types¹⁵.

¹² Government of India, MWR (2013). *Ground Water Information, Alwar District Rajasthan*. Jaipur: Central Ground Water Board.

¹³ Ibid.

¹⁴ Ibid.

¹⁵ Ibid.

(a) Lithosol and Regosol of hills (Red and Grey valley Soil): This soil is distributed along the Aravalli hills in south western part of the Alwar. It is shallow with gravels very near to surface and is of light textured and fairly drained. The colour of soil varies from red brown to grey brown. This soil is found at foot hills and not fertile, affect the ground water recharging. This affects the life of inhabitant of foot hills of Aravali hills and economic activities like agriculture.

(b) Old Alluvial Soils: This soil is created from alluvium deposits and distributed along the western parts of Alwar district. This soil is non-calcareous, semi-consolidated to unconsolidated in nature usually varies from brown soils to loamy sandy texture and is well drained and distributed in gently sloping parcels of land. Population density is less in the region compared to plain region. (Refer Map 2.3, 2.4, 2.5 & Table no.2.1,)

(c) Recent alluvium (Red Sandy Soils): This soil is also created because of alluvium deposits during runoff and is distributed in eastern part with good depth and well drained and non- calcareous in nature with sandy loam to loam in texture¹⁶. This soil is more fertile and found in the eastern plain region, which support the economic activities like agriculture. It leads to higher population density and population growth in eastern plain region. (Refer Map 2.3, 2.4, 2.5 & Table no.2.1,)

2.3 Distribution of Settlements

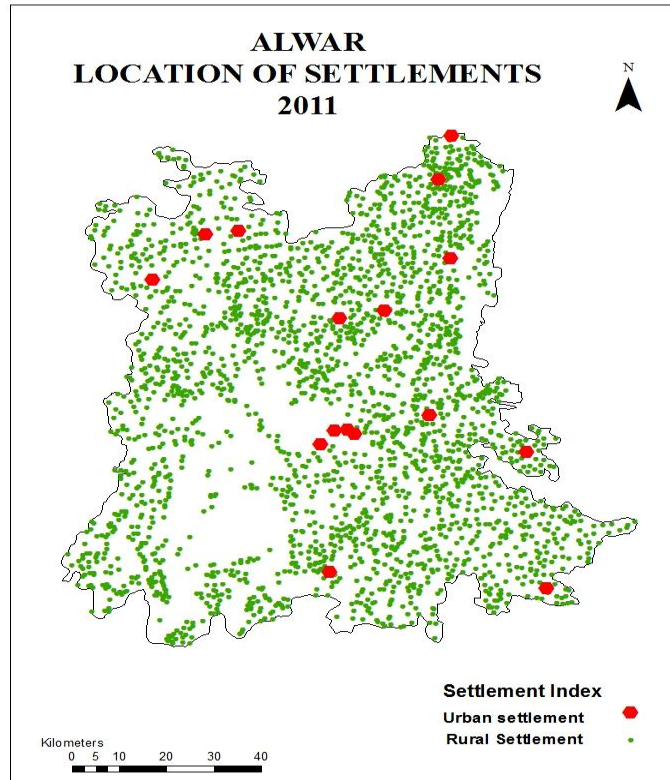
Settlement pattern anywhere is determined by various factors like physiography, drainage pattern, soil system, connectivity. All these factors are important in developing of growth points¹⁷ and centrality functions leading to urbanization and specialization of services in a region.

¹⁶ Ibid.

¹⁷ Hirschmann, Albert O., (1961) The Strategy of Economic Development, New Haven, Connecticut: Yale University Press, pp. 183-187.

Map no. 2.4 is depicting the distribution pattern of settlements In Alwar District. This map is created with the help of Google earth images and administrative atlas of Rajasthan, Census of India, 2011. Eastern region and north eastern region of Alwar district have close and compact settlement pattern. Plain region settlements are spread along the eastern region of Alwar District. Western, southern and south western part of Alwar district have scattered distribution of settlement pattern because of Aravali range passes from north east to south and south west region.

Map no.2.4
Settlement pattern in Alwar District, 2011



The central parts of Alwar district have very less or no settlements because of spread of Aravali range in central part of Alwar district. Small hills are spread in dissected form and create scattered pattern of hills in south western, southern and western part of Alwar district causing less population size settlements. There

are patches of settlement near the central part, eastern border and south western border of district. Settlement is found dispersed in western and north western part of Alwar, but it is more compact and nucleated in plain region in eastern part of Alwar district. Most of urban settlement is distributed in eastern and central part of Alwar district. Western and south western part of Alwar has a few urban centers. The western and south western parts are covered by Aravali hills, whereas eastern part has plain region. Physiography plays important role in deciding the distribution of urban settlements. In north western part, urban settlements are comparatively developed along NH-8. (Refer Map No. 2.3 and 2.4)

(a) Urban Settlements

Urban place is decided by different factors like demographic, economic, social, morphological and functional criteria. These factors support in causing formation of growth point with many economic activities and agglomeration of services hence in developing a place as an urban settlement. All such supporting factors at a place are unlikely to be present and so settlement distribution reflect unplanned pattern causing regional disparity. The settlement and its distribution tehsil wise in Alwar district. Most of the urban settlement is located in Alwar, Tijara Behror and Kishangarh tehsil. Some of the settlements are located in Kathumar, Lachmangarh, Rajgarh and Ramgarh. Bansur, Kotkasim, Thanagazi and Mandawar tehsil do not have any urban settlement. Industrialization provides supporting conditions in Tijara and Behror tehsil for development of the urban settlement. Bhiwadi, Tijara and Tappokra are developed because of industrialization. Shahjahanpur, Neemrana and Behror settlements are developed because of connectivity from Delhi through national highways. Alwar, Diwakari, Desoola and Bhoogar are developed as urban settlement because of centrality and nearness to District head quarter. Some urban settlement develop because of tehsil headquarter and connectivity like Rajgarh, Ramgarh and kishangarh. (Refer Table No. 2.1 & 2.3)

All the urban settlements usually have good percentage of population density defined as the number of persons per square kilometer of any geographic area (Premi, 2003)¹⁸.

Density = Total population of a particular territory divided by total area of that territory.

Distribution of Population density is decided by geographical, economic, social, cultural, historical and political factors. Some geographical factors which decide the distribution and density of population are terrain, climate, soil, water bodies, mineral resources, industries, transport and urbanization (Khullar,2014)¹⁹. Alwar region show no deviations from above logical conclusion. Based on the findings of census the table No- 2.1 Table No.2.2, and graph no. 2.1 and map no. 2.5 explains population density which is a significant characteristic of settlement.

The distribution of population density tehsil wise show that Alwar tehsil has highest population density followed by Tijara tehsil and lowest population density is in Thanagazi tehsil followed by Rajgarh. Population density is low among the tehsil of south and south western part as Aravali range covered most of the area in Thanagazi and Rajgarh these areas also have chain of low height hills. Physiography influences the population density significantly in Alwar. In the tehsils of eastern part of Alwar district has plain physiographic region has settlements with higher population density. In the tehsils of western part of Alwar, the population density is lower as compared to the tehsils of eastern region. Western region settlements are distributed along the gaps between scattered low hills. (Refer Map No.2.4 &2.5, Table no. 2.1)

Population density distribution in different urban settlements in each tehsil is observed then population density in urban settlements of Alwar tehsil is

¹⁸ Premi. M.K. (2003): Social Demography: A systematic Exposition, jawahar publisher and Distributers, New Delhi.

¹⁹ Khullar. D.R.(2014): India : A comprehensive Geography, kalyani publishers, New Delhi.

highest followed by Ramgarh and Kathumar. Kotkasim, Bansur, Thanagazi and Mandawar Tehsil do not have any urban settlement. Among the tehsils urban settlements in Rajgarh tehsil has lowest population density. It has highest number of total settlement but have lowest population density in the urban settlement. It indicates that most of the population dwells in rural settlement. (Refer Table No. 2.1 & 2.2)

Among 16 scattered urban settlements population density has been compared and it is found that Alwar city again has the highest population density among this category (6665persons/sq.km) in Alwar district. Lowest population density observed in Neemrana that is 985 persons per square km. Diwakari has second highest population density as it is in continuum of Alwar. Population density is decided by many factors among that urban centre is a significant one. Alwar city is district headquarter and located in central location of district so has highest population density, with higher level of functions and services. These services are education, health, recreational, banking services, and transport, administrative and marketing services. Services functions are individually analyzed and discussed in the upcoming chapters of this research study. These services encourage favorable condition for higher population density. (Refer Table No.2.2, Graph No.2.1)

Towns growing rapidly as urban centers are Bhiwadi, Tapookra, and Neemrana. The main cause of rapid urbanization is industrialization. These urban centers are spreading in terms of services developments along with economic and demographic characters inducing potential for contributing in socio economic development and are also contributing in many ways like creation of job opportunities, rising purchasing power. These centers are also causing immigration from inner Alwar and other places.

The findings based on the statistic to observe the growth rate of population in tehsil show that Tijara tehsil has the highest population growth rate, more than 40 percent, followed by Ramgarh, Kishangarh Bas, Alwar, Bansur Thanagazi and

Lachhmangarh have population growth rate of 20 percent and above. In rest of the other tehsils, growth rate of population is fairly below 20 percent. In eastern part of Alwar growth rate is higher compared to northern and southern part of the region. Physiography and industrialization is main cause for this high population growth in Tijara. Tijara tehsil have the urban centers which are spreading because of highest population growth rate and urban center like Bhiwadi. Other urban centers in Tijara Tehsil are Tapookra and Tijara. Mandawar and Kishangarh, has no town whereas Khairthal is only town in Kishangarh and this has attributed to low decadal population growth rate in these tehsils. Refer Table no.2.3 and Map no.2.6

The highest decadal population growth rate town wise is in Bhiwadi followed by Neemrana and Diwakari and lowest rate of decadal population growth rate in Rajgarh followed by Sahajahnpur, Kherli, Govindgarh. Bhiwadi and is 1st order census town, Neemrana is 5th order census town but both post good decadal population growth rate attributed to industrialization. Alwar which is class I census town with 24.23% decadal growth rate. Table is also indicating, the presence of class I, III, IV, & V census town, but there is no class II census town. This indicates the new urban centers are emerging with high growth rate like Bhiwadi. This occurs because of industrial agglomeration in Bhiwadi. Bhiwadi is rapidly growing in terms of population and industrialization it is situated at strategic location between national capital New Delhi and state capital of Rajasthan Jaipur. This region is also witnessing immigration due to industrialization. Second highest population growth rate is visible in Neemrana, being industrialized and also an important tourist place Neemrana fort. Diwakari is near to Alwar city. That's why growth rate is high in Diwakari as it accommodates spilling population pressure from Alwar city such type of town balance the burden of main city or service center. Industrialization in Alwar city is important cause for development such type of town like Diwakari, Desoola and Bhoogar. Lowest percentage of decadal population growth rate is in Rajgarh Sahajahnpur, Kherli, and Govindgarh with no sign of any industrialization, so

there is no effective pull factor in these towns. Reffer Table no.2.4 and Graph no. 2.2

The urban population in each tehsil of Alwar district is distributed with Alwar Tehsil having highest concentration of urban population with half of urban population and followed by Tijara and Kishangarh Tehsil. There is no urban population in Mandawar, Kotkasim, Bansur, Thanagazi. Highest urban population is in Alwar because it is a place for administrative work and districts headquarter with good connectivity and other services. Second highest share of urban population is in Tijara which have class I census town, Bhiwadi also significantly contribute to fair number of urban population. Kishangarh Bas, Khairthal are contributing city for urban population in Kishangarh tehsil. It is evident that urbanization is more prevalent in eastern, south eastern, southern and central part of Alwar district, whereas western part is not urbanized except Behror tehsil. This pattern is attributed to the presence of Aravalis. Alwar tehsil is central in location with administrative center and a major city. Refer Table No-2.5 and Map No-2.7.

Concentration of urban population town wise is highest in Alwar tehsil followed by Tijara tehsil. Out of total urban population of the district, Alwar tehsil has more than half of the urban population because of Alwar city, which is class I town²⁰, contribute in urban population of Alwar tehsil. Rest of the urban population is accounted by Desoola, Bhoogar and Diwakari town in Alwar tehsil. Second highest concentration of urban population is in Tijara Tehsil. Bhiwadi which is Class I census town supporting most of the urban population in Tijara tehsil. Other urban centers in Tijara tehsil are Tapookra and Tijara and Tijara tehsil high urban population because of Industrialization. Alwar carry more urban population because of availability of Infrastructure, job opportunities functions and other centrality functions, and Bhiwadi is an urban center because of industrial area and it is class I census town. (Refer Table No. 2.5)

²⁰ Census of india(2011). District census handbook of Alwar district , Rajasthan.

Table no.2.6 and Graph no.2.3 have the findings on urban settlement distribution of Alwar based on population size class among all tehsils. Alwar tehsils has three type of population size class town. The highest contribution is of class V settlements and class I. Class IV settlements are equitably spread over urban settlements. Whereas Bansur Kotkasim, Manadawar and Thanagazi does not have urban settlements of any class size. Kathumar, Lacchmangarh and Ramgarh fall under class IV urban settlement. Tijara fall under class I & III & class V size census towns.

Table No. 2.7 and Graph No. 2.4 have the findings to support that the percentage of urban population residing in different population class size of urban settlements. Alwar tehsil has highest percentage of urban population under class I urban settlements. Tijara has also significant percentage of urban population among class I census town. Behror and Kishangarh also have significant urban population but fall under Class III census town with Rajgarh carry urban population under class III town. Kathumar Lacchmangarh and Ramgarh also have urban population under Class IV town and there is no urban population distribution in class VI town show that no such class size towns are present in Alwar.

(b) Rural Settlements

Various factors are attributing for the distribution and concentration of population are agricultural economic activity, concentration of service centers in towns and cities, road and rail connectivity, climate, physiographic, and level of infrastructure development but significantly the economic activities that is agriculture has defining impact on the distribution of rural settlements.

Table No. 2.8 and Graph No. 2.5 have the findings from which it can be infer that medium size rural settlement with population size “above 500” and “lesser than 5000” are more in rural settlements. The size class of 10000 and above is less than 2%, among the rural settlements. Six of tehsils have no settlements of higher population size class of 10000 & above. Among the

population size class of less than 500, settlement concentration is high in Thanagazi and Rajgarh. These two tehsil are covered by low hills of Aravali. Small size of settlement and dispersed and are located in this region because of physiography medium size class settlement has highest concentration of settlements is in Mandawar and Bansur.

Graph no. 2.5 can easily let us infer that very less concentration of higher size rural settlement (above 5000) are present in Ramgarh, Behror, Thanagazi, Lachmangarh and Kotkasim. Higher concentration of size class of 500 and above is more in Kishangarh, Lachmangarh, Kotkasim and Kathumar tehsils. Less than 500 size class of settlement has less concentration of this size of settlement and located in Mandawar. And the small size class settlement is less in Mandawar. Plain region has higher size of settlement as compared to hilly region. Settlement distribution is affected by various geographical factors such as relief, physiography, soil, water availability, connectivity, job opportunities other economic activities, and climate along with other factors. As Alwar district comes under Aravali region, having central upland and hilly region (Singh, 1971)²¹ most of the western and south west part of Alwar is covered by Aravali hills topographic features. The eastern side of Alwar has Ramgarh, and south east is covered by Kathumar and Lachmangarh which fall under plain region also have significant role in deciding the concentration and distribution pattern of settlements.

The findings in Table No-2.8 and Graph No-2.5 can be figured out as the tehsils which are located in hilly region, Bansur, Thanagazi, Rajgarh have no any large village because of hilly terrain. Most of the rural settlements in these tehsils are of medium size class. Alwar tehsil which have district headquarter and Alwar city is centrally located in Alwar and have good connectivity thus it possess rural settlement of large size class of population (5000 & above). Rajgarh and

²¹ Singh, R. L. (1971): India: A regional geography, National Geographical Society of India, Varanasi.

Thanagazi are located in hilly terrain having higher concentration of small size of rural settlement. Rainfall distribution pattern also have impact on distribution of rural settlements. Rainfall reduces from east to west has analogy with the concentration and distribution of settlement more in eastern part and gradually decreases as one comes towards east.

Most of the population concentrations are in medium size class of population (1000 to 5000). In Alwar district only Behror have more than half of population of medium size class (2000-4999). Population anywhere creates demand for different services, but for that to emerge threshold population is essential. Service center provides services to population and population creates demand to sustain the services. In higher and medium size of settlement there is fair chance for having better service than to lower size class of settlements.

Among the higher size class population rural settlements, Kathumar and Alwar tehsil have significant concentration of population. Alwar is situated along Aravali with dissected hills, where isolated agricultural lands are dotted in the valleys. The region with small amount of rainfall and rocky terrain does not support high density of population and human settlement (Khullar, 2014)²² whereas Alwar being centrally located well connected have good concentration of population of higher size class settlement and urban population together with all possible services. Refer Graph no. 2.6 and Table No- 2.9.

²² Khullar. D.R.(2014). India : A comprehensive Geography, kalyani publishers, New Delhi.

Table No 2.1
Settlement Distribution in Alwar, 2011

Tehsil	All Settlement		Rural Settlement		Urban Settlements	
	Number	Density persons/sq. km.	Number	Density persons/sq. km.	Number	Density persons/sq. km.
Alwar	201	639	197	219	4	5671
Bansur	147	398	147	536	0	0
Behror	180	492	177	448	3	1442
Kathumar	154	476	153	544	1	2939
Kishangarh Bas	113	498	111	397	2	2019
Kotkasim	117	400	117	400	0	0
Lachhman garh	207	465	206	536	1	2274
Mandawar	146	404	146	404	0	0
Rajgarh	258	270	257	180	1	1065
Ramgarh	178	440	177	420	1	2993
Thanagazi	175	219	175	247	0	0
Tijara	194	592	191	429	3	2015
ALWAR District	2070	428	2054	361	16	2864

Map no. 2.5
Alwar District
Tehsilwise population density distribution

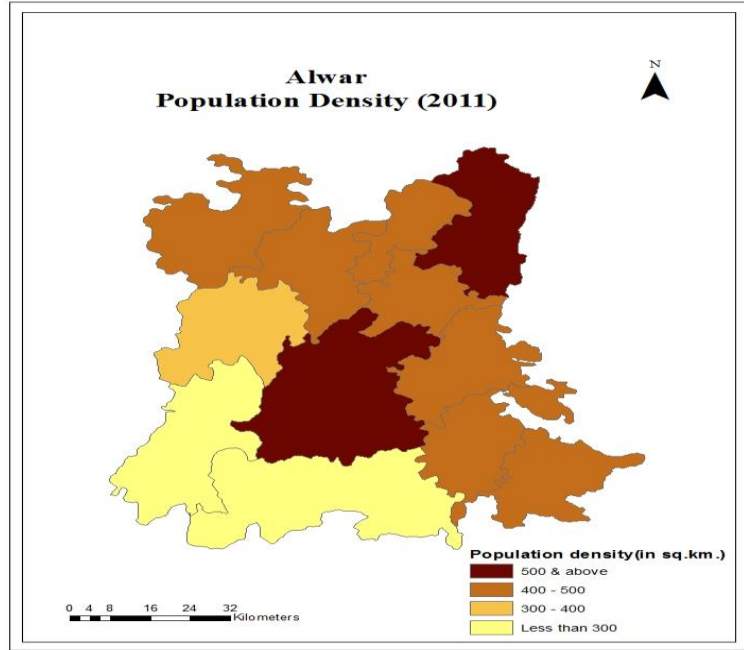


Table no. 2.2
Population Density in Urban Settlement in Alwar
District 2011

Town Name	Density (in persons/sq.km.)
Alwar (M CI + OG)	6665
Diwakari (CT)	3981
Kishangarh (CT)	3076
Ramgarh (CT)	2993
Kherli (M)	2939
Bhiwadi (M)	2381
Tapookra (CT)	2368
Govindgarh (CT)	2274
Behror (M)	1953
Khairthal (M)	1816
Bhoogar (CT)	1489
Desoola (CT)	1424
Tijara (M)	1178
Rajgarh (M)	1065
Shahjahanpur (CT)	995
Neemrana (CT)	985

Graph no. 2.1
Alwar district
Population Density in Towns 2011

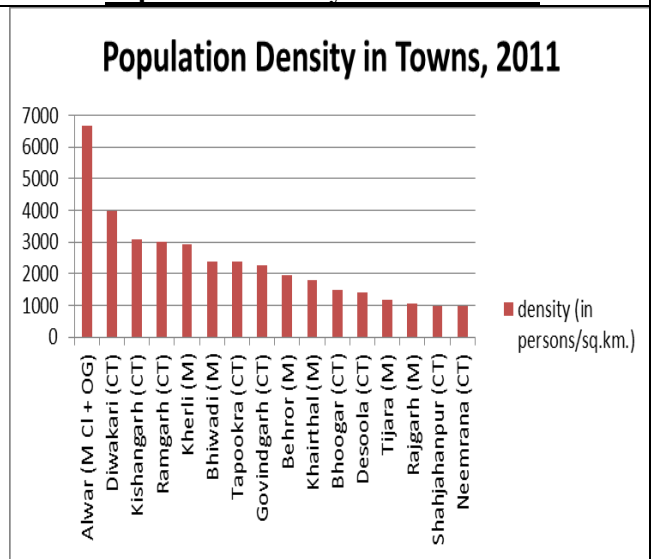


Table No. 2.3
Urban Settlement Distribution

Tehsil	No. of Urban Settlement	Name of Urban Settlement	Population		
			2001	2011	Growth Rate 2001-2011
Alwar	4	Alwar, Diwakari, Bhoogar, Desoola	568530	703856	23.80
Bansur	0		214351	263663	23.01
Behror	3	Behror, Shahjahanpur, Neemrana	305688	359248	17.52
Kathumar	1	Kherli	209139	245193	17.24
Kishangarh Bas	2	Khairthal, Kishangarh	161629	201279	24.53
Kotkasim	0		117687	137339	16.70
Lachhmangarh	1	Govindgarh	237758	288671	21.41
Mandawar	0		197582	231628	17.23
Rajgarh	1	Rajgarh	306226	356727	16.49
Ramgarh	1	Ramgarh	202213	256605	26.90
Thanagazi	0		189977	233395	22.85
Tijara	3	Bhiwadi, Tijara, Tapookra	280772	396575	41.24

Map no. 2.6
Alwar district
Population Growth Rate in Tehsils, 2011

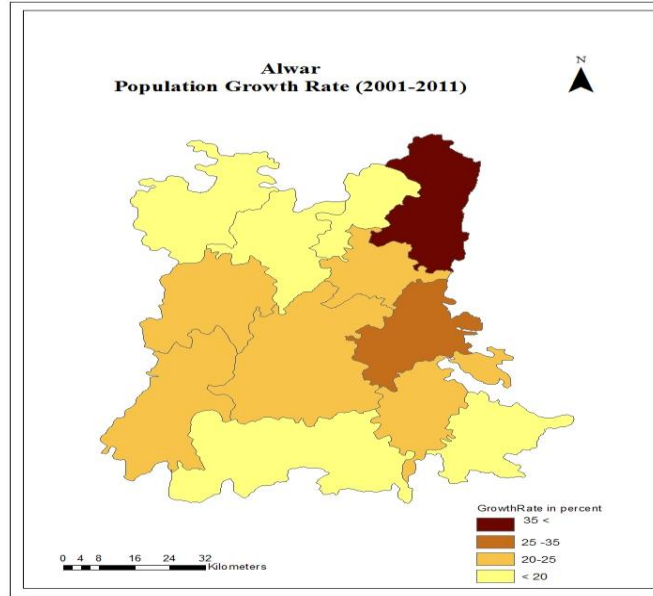


Table no. 2.4
Alwar district
Population Growth Rate in Towns 2011

Town	Growth rate	Population	Order
Bhiwadi	209.71	104921	I
Neemrana	69.39	7143	V
Diwakari	62.85	11188	IV
Desoola	51.73	7306	V
Tapookra	51.03	9471	V
Kishangarh	31.2	12429	IV
Behror	29.2	29531	III
Tijara	24.23	24747	III
Alwar	21.17	322568	I
Khairthal	19.66	38298	III
Ramgarh	19.23	13529	IV
Bhoogar	17.43	7666	V
Govindgarh	14.5	11552	IV
Kherli	13.72	17634	IV
Shahjahanpur	13.3	9837	V
Rajgarh	6.49	26631	III

Graph no. 2.2
Alwar district
Population Growth Rate in Towns 2011

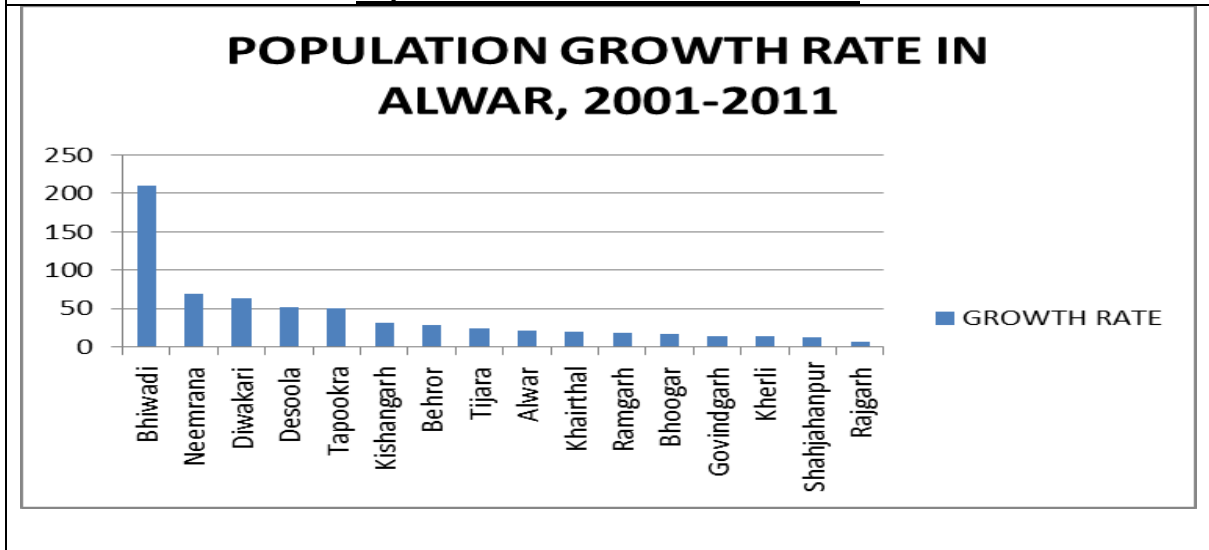


Table No. 2.5
Urban Settlement Characteristics

Tehsil	Percent Urban Population	Concentration of Urban Population
Alwar	49.5	53.3
Bansur	0.0	0.0
Behror	12.9	7.1
Kathumar	7.2	2.7
Kishangarh Bas	25.2	7.8
Kotkasim	0.0	0.0
Lachhmangarh	4.0	1.8
Mandawar	0.0	0.0
Rajgarh	7.5	4.1
Ramgarh	5.3	2.1
Thanagazi	0.0	0.0
Tijara	35.1	21.3

Map no. 2.7

Tehsil wise urban population to total urban population in percentage in Alwar district

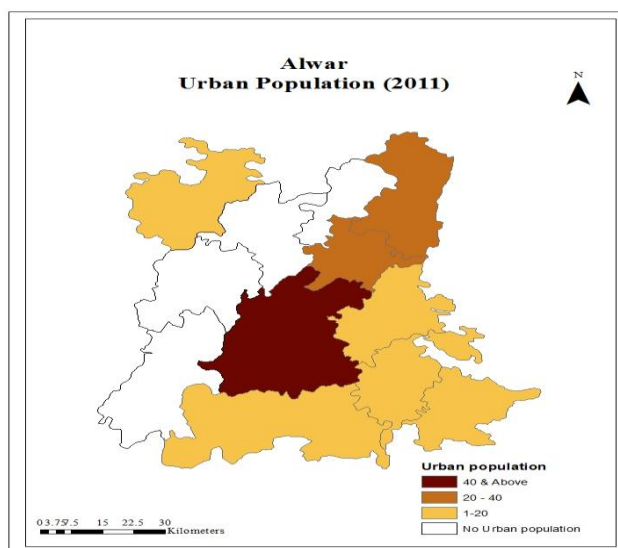


Table no. 2.6

Alwar district

Tehsil wise percent distribution of Urban settlement in population Size class

Tehsil	percent distribution of Urban settlement in Tehsils in population Size class					
	I	II	III	IV	V	VI
	100000 & above	50000-99999	20000-49999	10000-19999	5000-9999	<5000
Alwar	25.0	0.0	0.0	25.0	50.0	0.0
Bansur	0.0	0.0	0.0	0.0	0.0	0.0
Behror	0.0	0.0	33.3	0.0	66.7	0.0
Kathumar	0.0	0.0	0.0	100.0	0.0	0.0
Kishangarh Bas	0.0	0.0	50.0	50.0	0.0	0.0
Kotkasim	0.0	0.0	0.0	0.0	0.0	0.0
Lachhmangarh	0.0	0.0	0.0	100.0	0.0	0.0
Mandawar	0.0	0.0	0.0	0.0	0.0	0.0
Rajgarh	0.0	0.0	100.0	0.0	0.0	0.0
Ramgarh	0.0	0.0	0.0	100.0	0.0	0.0
Thanagazi	0.0	0.0	0.0	0.0	0.0	0.0
Tijara	33.3	0.0	33.3	0.0	33.3	0.0

Source: District census handbook, Alwar, census of India 2011

Graph no.2.3
Tehsil wise percent distribution of urban settlement in population Size class in Alwar district, 2011

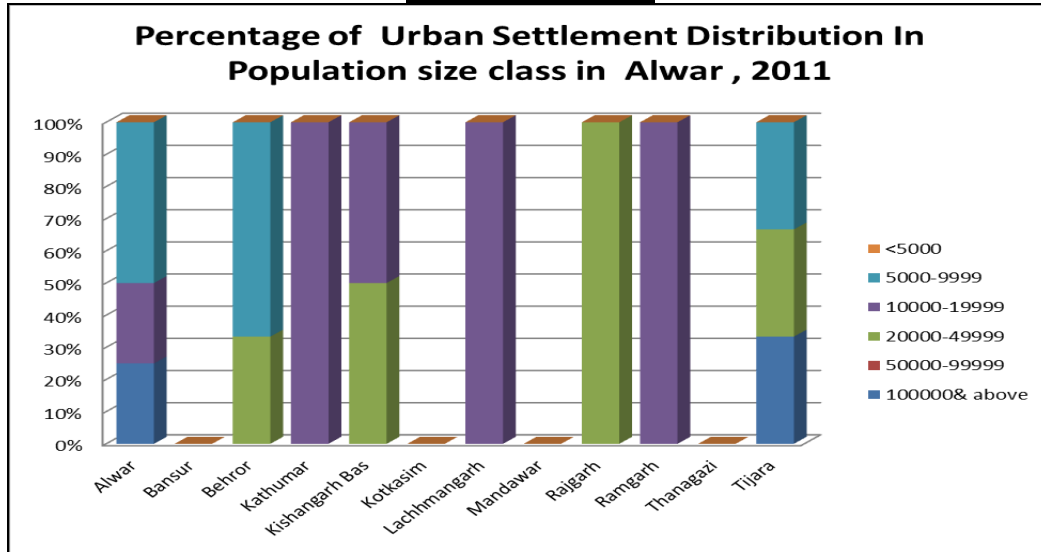


Table no. 2.7
Tehsil wise percent distribution of population in Urban settlement in population Size class

Tehsil	percent of population distribution in population size class of Urban settlements					
	I	II	III	IV	V	VI
	100000& above	50000-99999	20000-49999	10000-19999	5000-9999	<5000
Alwar	92.5	0.0	0.0	3.2	4.3	0.0
Bansur	0.0	0.0	0.0	0.0	0.0	0.0
Behror	0.0	0.0	63.5	0.0	36.5	0.0
Kathumar	0.0	0.0	0.0	100.0	0.0	0.0
Kishangarh Bas	0.0	0.0	75.5	24.5	0.0	0.0
Kotkasim	0.0	0.0	0.0	0.0	0.0	0.0
Lachhmangarh	0.0	0.0	0.0	100.0	0.0	0.0
Mandawar	0.0	0.0	0.0	0.0	0.0	0.0
Rajgarh	0.0	0.0	100.0	0.0	0.0	0.0
Ramgarh	0.0	0.0	0.0	100.0	0.0	0.0
Thanagazi	0.0	0.0	0.0	0.0	0.0	0.0
Tijara	75.4	0.0	17.8	0.0	6.8	0.0

Graph no.2.4
Tehsil wise percent distribution of population in Urban settlement in population
Size class

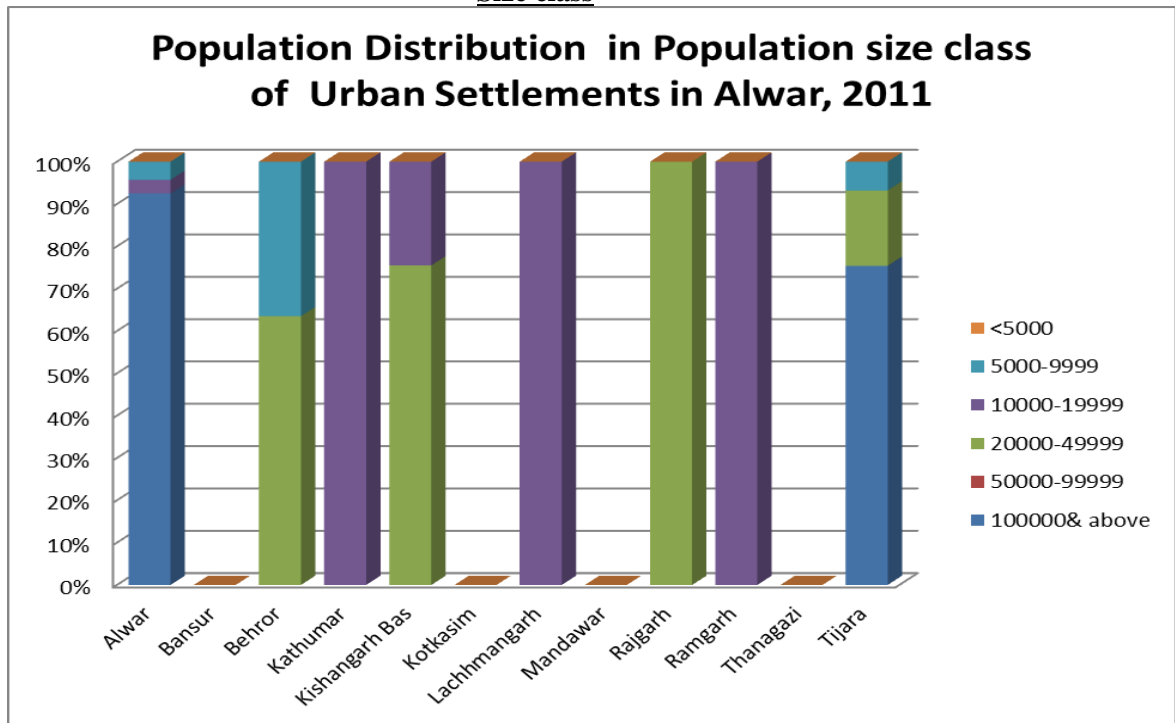


Table no. 2.8
Alwar district

Percentage of rural Settlement in Each Size Class of Population among Tehsils 2011

Tehsil	No. of Rural Settlements	Percent Settlements Population Size					
		Less than 500	500-999	1000-1999	2000-4999	5000 - 9999	10000& ABOVE
Alwar	197	15.74	23.35	30.96	24.87	4.57	0.51
Bansur	147	12.24	21.09	42.18	19.73	4.08	0.68
Behror	177	11.3	20.9	31.64	34.46	1.13	0.56
Kathumar	153	17.64	32.03	32.68	13.73	3.92	0
Kishangarh Bas	111	17.12	35.14	22.52	23.42	1.8	0
Kotkasim	117	21.36	35.04	30.77	11.11	1.71	0
Lachhmanagarh	206	18.44	33.01	33.01	13.11	1.46	0.97
Mandawar	146	8.9	21.92	45.21	21.23	2.74	0
Rajgarh	257	27.62	28.79	24.9	15.95	2.72	0
Ramgarh	177	15.81	32.2	32.2	18.64	0.56	0.56
Thanagazi	175	30.28	24.57	25.71	17.14	1.14	1.14
Tijara	191	16.75	27.75	37.7	15.71	2.09	0

Graph no. 2.5
Alwar district

Percentage of rural Settlement in Each Size Class of Population 2011

Percentage of rural Settlement in Each Size Class of Population among Tehsils in Alwar 2011

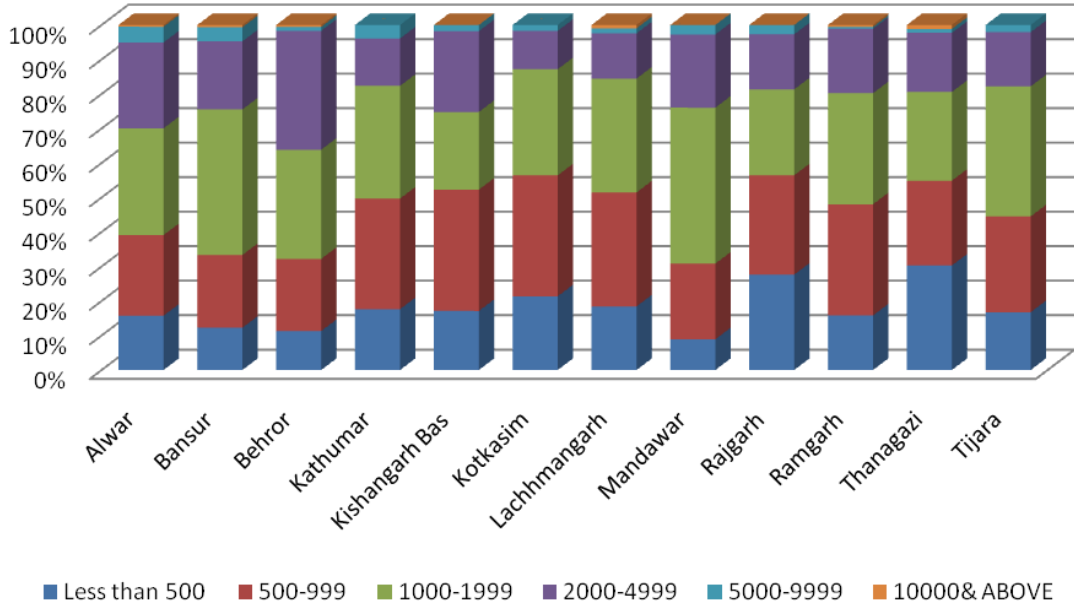
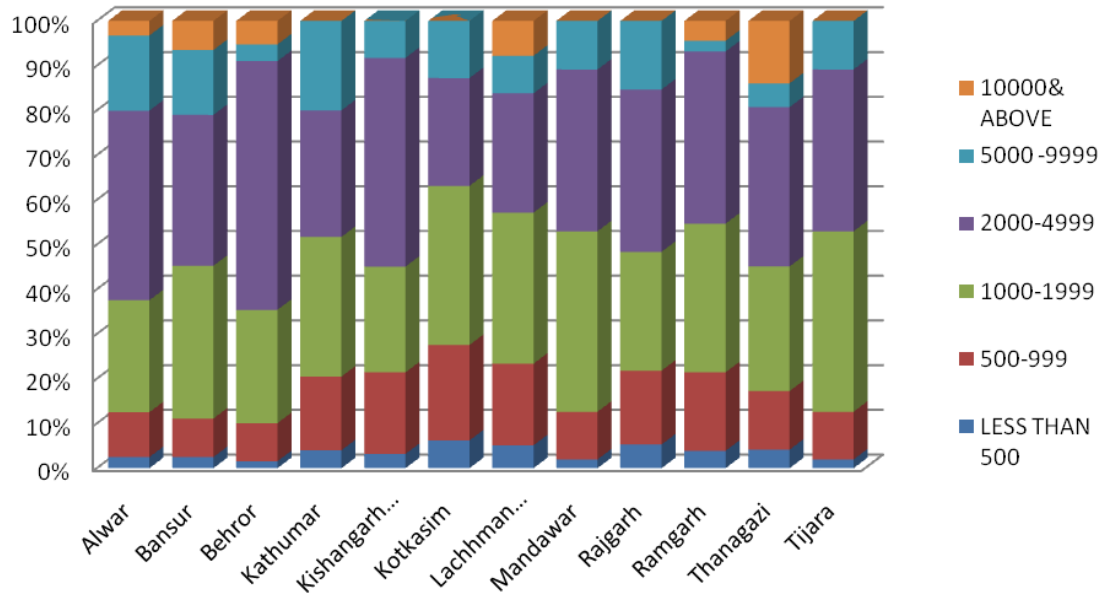


Table no. 2.9
Alwar district
Percentage of population distribution among rural Settlement in Each Size Class of
Population 2011

Tehsil	No. of Rural Settlements	Percent Population					
		Less Than 500	500-999	1000-1999	2000-4999	5000-9999	10000& ABOVE
Alwar	197	2.5	10.0	25.1	42.4	16.8	3.2
Bansur	147	2.5	8.6	34.2	33.7	14.5	6.5
Behror	177	1.6	8.5	25.3	55.6	3.7	5.3
Kathumar	153	4.0	16.5	31.2	28.3	20.0	0.0
Kishangarh Bas	111	3.2	18.2	23.6	46.7	8.3	0.0
Kotkasim	117	6.2	21.3	35.6	24.1	12.8	0.0
Lachhmang arh	206	5.1	18.2	33.8	26.7	8.4	7.8
Mandawar	146	2.0	10.7	40.4	36.2	10.9	0.0
Rajgarh	257	5.3	16.5	26.6	36.3	15.3	0.0
Ramgarh	177	3.9	17.6	33.2	38.5	2.4	4.4
Thanagazi	175	4.1	13.1	27.9	35.6	5.3	13.9
Tijara	191	2.0	10.7	40.4	36.2	10.9	0.0

Graph no. 2.6
Alwar district
Percentage of population distribution among rural Settlement in Each Size Class of
Population 2011

Percentage of population distribution
among rural Settlement in Each Size Class of
Population in Alwar,2011



2.4 Demographic characteristics

Demography is science that deals with human population parameters like population size distribution and growth of population, birth rate, death rate, fertility rate, mortality rate and marriage (Premi, 2003)²³, (Cox,1970)²⁴. In this part of the chapter population, population density, population growth rate, proportion of SC and ST population, literacy and sex ratio are taken as demographic characteristics while analyzing the socio economic condition of Alwar District. Population density and population growth has been studied as characteristics of settlements.

(a) SC & ST population

Caste structure play important role in defining the structure of Indian village together with the level of socioeconomic development as economic prosperity, social status and functional attributes are seen to be linked with caste hierarchy in India (Sen, 2016)²⁵. Social groups and their hierarchy plays important role in determining development in any region.

Among all 16 tehsils highest SC population concentration is found in Kathumar and it is 24.3 percent of total population in this region, and Tijara has lowest percentage at 12.55 percent followed by Bansur, and Thanagazi. More than 26% SC population is in Kishangarh, Kathumar. Kathumar kishangarh bas have high concentration of SC population, SC & ST population concentration combined is high in Rajgarh and Thanagazi and all such tehsils with significant percentage of SC&ST concentration do not have any urban center as growth pole to support development in such region. SC population is highest above 45% in Diwakari town that is near to Alwar city showing the pattern and social structure of towns.

²³ Premi. M.K.(2003): Social Demography: A systematic Exposition, jawahar publisher and Distributers, New Delhi.

²⁴ Cox, peter R. (1970). Demography, (4th edition).Cambridge institute of Actuaries at the university press.

²⁵ Sen, J. (2016): A textbook of Social and Cultural Geography, kalyani publishers, New Delhi.

Ramgarh, Tapookra, Neemrana, Khairthal, Desoola towns have more than 20% of SC population with Kherli town has lowest percentage of SC population at 10%. Other towns have SC population percentage range in 10 to 20 percent,(Refer Table No. 2.10& 2.11, Map No. 2.8, Graph No.2.7)

Highest ST population percentage is in Rajgarh that is near 30.82%. Lowest ST population concentration, below 1% is in Tijara, Kishangarh Bas, Kotkasim. Town wise ST population is highest in Bhoogar that is above 45%, with lowest ST population in Tapookara town that is below 1%, Khairthal, Desoola, Bhiwadi, and Tijara town also have the lowest percentage of ST population. 2nd highest ST population is in Sahjahanpur town. (Refer Table No. 2.10& 2.11, Map No. 2.8, Graph No.2.7)

Diwakari, Desoola with highest concentration of SC population, are class V and IV order town respectively. Bhoogar and Shahjahanpur towns with highest concentration of ST population are class V town. These class IV and V towns are backward in socioeconomic development with respect to other towns of Alwar district. Alwar and Bhiwadi are class I town has less concentration of SC & ST population.

SC concentration is high in south eastern region and northern part of Alwar, whereas ST population concentration is in southern part of district which is covered by hills and less developed region and this may be attributed to ST population not being service class. SC & ST concentration is low in developed tehsils like Tijara, Alwar and Behror.but this concentration is high in backward region of Alwar district, where services are not fully developed.

Table no. 2.10
Alwar district

Distribution of SC and ST population in Tehsil 2011

TEHSIL	Percentage of scheduled castes population to total population	Percentage of scheduled tribes population to total population
Behror	15.07	2.41
Mandawar	20.16	2.92
Kotkasim	20.02	0.69
Tijara	12.55	0.28
Kishangarh Bas	20.73	0.27
Ramgarh	16.39	3.16
Alwar	19.96	4.95
Bansur	14.77	4.57
Thanagazi	14.05	19.13
Rajgarh	18.86	30.82
Lachhmangarh	18.02	11.31
Kathumar	24.3	11.83

Map no. 2.8

Distribution of SC and ST population in Tehsil 2011

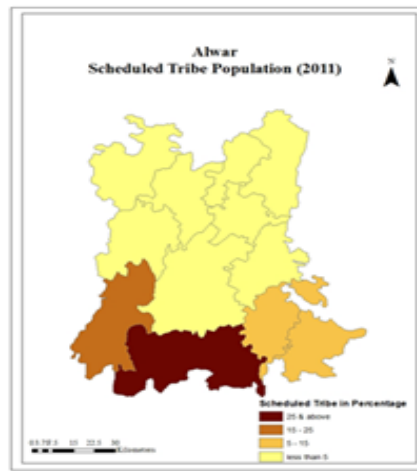
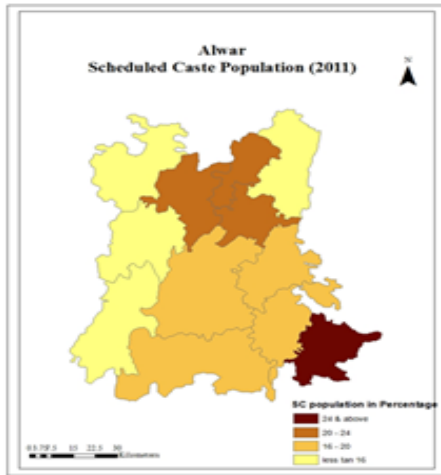


Table no. 2.11

Alwar district

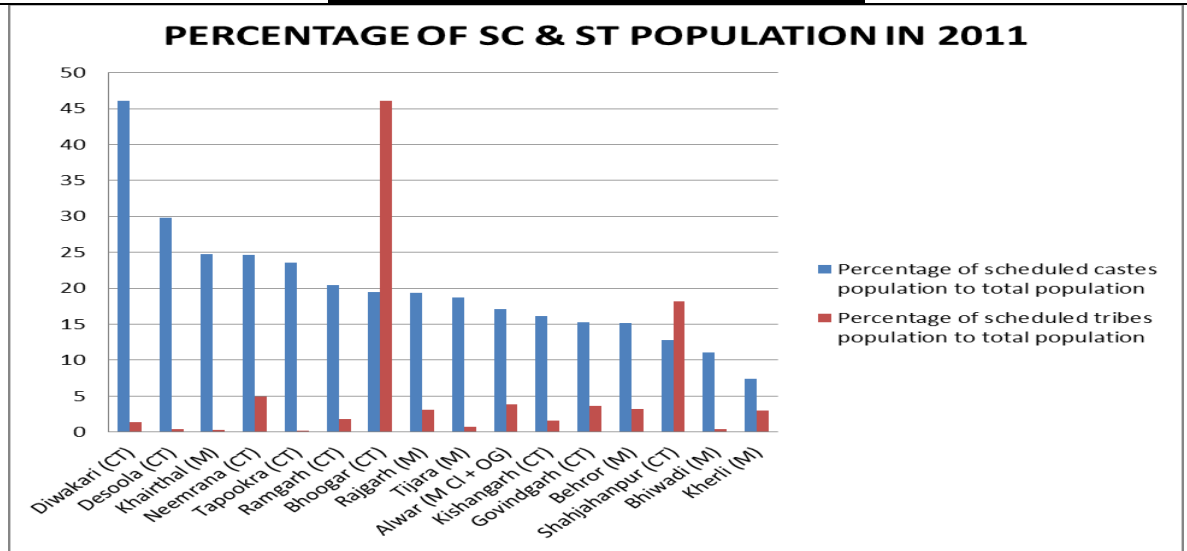
Distribution of SC and ST population in the towns 2011

Name of town	Percentage of scheduled castes population to total population	Percentage of scheduled tribes population to total population
Behror (M)	15.12	3.18
Neemrana (CT)	24.6	4.89
Shahjahanpur (CT)	12.85	18.22
Bhiwadi (M)	11.04	0.42
Tijara (M)	18.76	0.71
Tapookra (CT)	23.61	0.23
Khairthal (M)	24.77	0.31
Kishangarh (CT)	16.15	1.57
Ramgarh (CT)	20.48	1.8
Alwar (M CI + OG)	17.16	3.9
Bhoogar (CT)	19.51	46.11
Diwakari (CT)	46.06	1.37
Desoola (CT)	29.8	0.44
Rajgarh (M)	19.39	3.07
Govindgarh (CT)	15.23	3.64
Kherli (M)	7.46	3.04

Graph no. 2.7

Alwar district

Distribution of SC and ST population 2011



(b) Literacy

Access to knowledge for the people is vital factor in determining the level of human development²⁶. If there is access to knowledge for the citizen of a place then it imbibes awareness. Awareness is a necessary condition for realizing the socioeconomic development anywhere by infusing capability in to the people. Education service has ability to bring awareness leading to change in society, economy and politics of a place. Society, politics, administration, institution and economy all the things are linked with education. Justice, democracy, development, equality, progress and prosperity all those concepts are also connected with education. Education has capacity to restructure the whole population before formulating any plan for improving education the prevailing condition of the variable is required to obtain.

Literacy among the other indicators of development is the most important indicator as it also acts as a vital tool to create awareness for availing education, health, government schemes and policies. According the population commission of United Nations literacy has been defined as the “ability, to both read and write a simple message with understanding of any language, a sufficient basis for classifying a person as literate (census of India, 2011)²⁷.”

The data reveals that Behror has highest literacy rate (79.78%) tehsils and lowest in Thanagazi (60.29%). Behror, Kotkasim, and Alwar have above 75% literacy rate with Ramgarh, Thanagazi below 65% literacy rate. In other tehsils literacy rate is between 65% to 75% interval. (Refer Map No.2.12 , Table No.2.9)

Behror tehsil has two important towns Behror and Neemrana, have highest literacy rate. This fairly good rate of the literacy in these regions has been attributed because of good connectivity to national capital and State Capital Jaipur through NH-8. Industrialization and urbanization has positively contributed in

²⁶ World Development Report, World Bank, 2016.

²⁷ Census of India, 2011

having better percentage of literacy rate. Thanagazi is located in hilly region having lowest literacy rate so the physiographic condition act as barriers to access for education. Physiography may not be the barrier if there is good connectivity in the region, which can support in improving the literacy rate and hence in improving socioeconomic condition.

By observing at the town wise literacy rate, Kherli town has highest literacy (88.08%) and Desoola town with lowest literacy rate (75.73%). Three cities Kherli, Alwar, and Kishangarh has more than 85% literacy rate with Tijara, Bhiwadi, Rajgarh, Ramgarh, Diwakari, Govindgarh, Bhoogor and Desoola towns are 80% literacy rate.

Table No.2.13 and Graph No. 2.8 also explains urban centers wise literacy rate with Behror and Tijara tehsil, have high literacy rate. Others towns like Neemrana, Behror, Tapookara, Tijara and Bhiwadi have good connectivity with national Capital Delhi impacting on literacy rate. Alwar being the districts headquarter and central in location with good connectivity from all side has good literacy rate. Overall the connectivity and urbanization has significant role in deciding literacy rate.

Table no. 2.12 Alwar district Tehsilwise Distribution of Literacy rate		Map no. 2.9 Alwar district Tehsilwise Distribution of Literacy rate	
Tehsil	Literacy rate (in percent)		
Behror	79.78		
Mandawar	74.87		
Kotkasim	76.82		
Tijara	69.12		
Kishangarh Bas	70.56		
Ramgarh	63.17		
Alwar	75.32		
Bansur	67.31		
Thanagazi	60.29		
Rajgarh	67.54		
Lachhmangarh	65.86		
Kathumar	70.1		

Table no. 2.13 Alwar district Literacy rate in Towns		Graph no. 2.8 Alwar district Literacy rate in Towns	
Name of town	Literacy rate (in percent)		
Behror (M)	84.07		
Neemrana (CT)	84.29		
Shahjahanpur (CT)	84.72		
Bhiwadi (M)	79.84		
Tijara (M)	79.94		
Tapookra (CT)	81.72		
Khairthal (M)	82.56		
Kishangarh (CT)	85.01		
Ramgarh (CT)	78.29		
Alwar (M CI + OG)	85.71		
Bhoogar (CT)	77.43		
Diwakari (CT)	78.08		
Desoola (CT)	73.53		
Rajgarh (M)	79.1		
Govindgarh (CT)	77.61		
Kherli (M)	88.08		

(c) Sex Ratio

Sex composition is one of the basic demographic characteristics, which is vital for meaningful demographic analysis. Changes in Sex ratio reflect the changes in socio-economic and cultural pattern of society (Khullar, 2014).

Sex ratio among tehsils in Alwar district based on the findings is highest in Kishangarh and lowest in Tijara Tehsil. Sex ratio is indicator of social condition and in western part of Alwar district Sex ratio is in better condition. But in southern, south eastern and north eastern part of Alwar district the ratio is low and is indicating that developed tehsils like Alwar, Tijara has lower sex ratio thus it can be said that social condition of women does not change with economic development. Refer Map no. 2.10 and table no. 2.14

Among towns of Alwar sex ratio is highest in Tapookra (940) and lowest in Bhiwadi (747) followed by Tijara, Bhoogar, Sahjahanpur, Govindgarh and Tapookra. In Alwar city sex ratio is 892. (Refer Table No2.15, Graph No. 2.9) Alwar and Bhiwadi which are class I town and more developed urban centers have lower sex ratio. This indicates development has not changed the society.

Table no. 2.14 Alwar district Tehsilwise Distribution of Sex Ratio		Map no. 2.10 Alwar district Tehsilwise Distribution of Sex Ratio	
Tehsil	Sex Ratio(no. of female/ 1000 male)		
Behror	902		
Mandawar	904		
Kotkasim	910		
Tijara	866		
Kishangarh Bas	918		
Ramgarh	913		
Alwar	893		
Bansur	898		
Thanagazi	899		
Rajgarh	888		
Lachhmangarh	900		
Kathumar	878		
Table no. 2.15 Alwar district Distribution of Sex Ratio in towns			
Name of town	Sex Ratio(no. of female/ 1000 male)		
Behror (M)	897		
Neemrana (CT)	887		
Shahjahanpur (CT)	923		
Bhiwadi (M)	757		
Tijara (M)	920		
Tapookra (CT)	940		
Khairthal (M)	904		
Kishangarh (CT)	894		
Ramgarh (CT)	908		
Alwar (M CI + OG)	892		
Bhoogar (CT)	922		
Diwakari (CT)	881		
Desoola (CT)	869		
Rajgarh (M)	905		
Govindgarh (CT)	924		
Kherli (M)	869		

(d) Work Force

Work force participation means participation of labour in any economically productive activities with or without compensation, wage or profit (Khullar, 2014).

Among main workers those who are ready to sell their labour the percentage of such worker is highest in Lachmangarh and Behror and lowest in Kathumar and Kotkasim. Marginal worker those who work occasionally such labour have participation rate highest in Kotkasim and lowest in Alwar. The north western region has high work force participation because these regions are covered by industries and the eastern part of Alwar district in plains and agricultural landscapes have lowest rate. The highest work force participation rate is in Bansur and Kotkasim and lowest work force participation rate is in Alwar, Tijara and Kishangarh Bas tehsils. Refer Map No.2.11 and Table No. 2.16

Highest main worker distribution among towns show Bhiwadi town at the top as it is industrialized and provides job opportunities not only to Bhiwadi but to other tehsils and regions, followed by Desoola, Tijara, Khairthal and Govindgarh. Lowest main worker's distribution is in Diwakari followed by Rajgarh, Shahajahanpur, Ramgarh, Bhoogor. Marginal worker is lowest in Alwar, Kherli and Bhiwadi towns highest percentage of marginal worker is in Shahajahanpur. Work force can be estimated as Demographic dividend and the pattern of employment opportunity available to different types of settlements. Refer table no.2.17 Graph No.2.10).

Table no. 2.16
Alwar district

Tehsilwise Distribution of work force participation Rate

TEHSIL	Main worker (in percent)	Marginal (in percent)	non workers (in percent)
Behror	34.06	15.20	50.74
Mandawar	31.68	17.21	51.11
Kotkasim	27.27	27.21	45.52
Tijara	31.94	13.61	54.45
Kishangarh Bas	31.85	12.77	55.38
Ramgarh	32.19	13.83	53.98
Alwar	32.49	8.77	58.74
Bansur	33.09	17.15	49.76
Thanagazi	31.17	14.99	53.84
Rajgarh	32.06	14.93	53.00
Lachhmangarh	34.30	14.57	51.13
Kathumar	28.89	18.28	52.82

Map no. 2.11
Alwar district

Tehsilwise Distribution of work force participation Rate

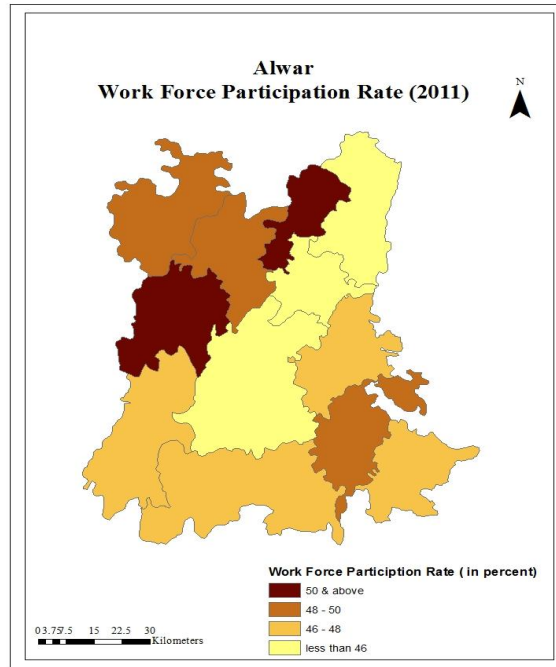


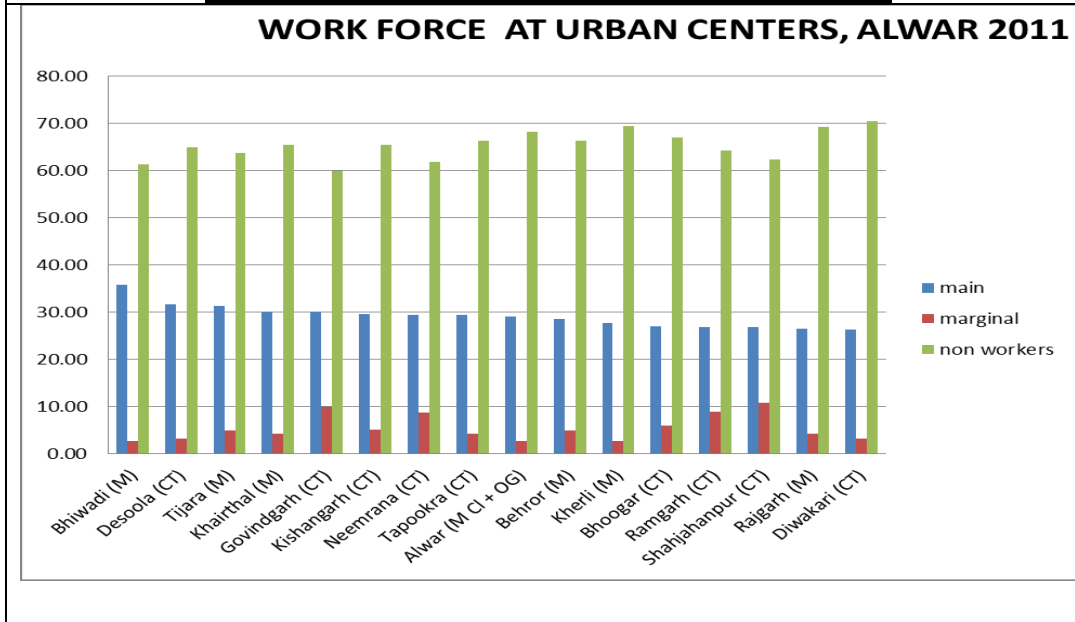
Table no. 2.17
Alwar district

Distribution of work force participation Rate in Towns

Name of town	Main (in percent)	Marginal (in Percent)	non workers(in percent)
Behror (M)	28.65	5.00	66.34
Neemrana (CT)	29.48	8.68	61.84
Shahjahanpur (CT)	26.80	10.89	62.32
Bhiwadi (M)	35.83	2.78	61.39
Tijara (M)	31.35	4.90	63.76
Tapookra (CT)	29.45	4.19	66.36
Khairthal (M)	30.18	4.30	65.52
Kishangarh (CT)	29.53	5.09	65.38
Ramgarh (CT)	26.82	8.86	64.31
Alwar (M CI + OG)	29.04	2.79	68.17
Bhoogar (CT)	26.96	5.96	67.08
Diwakari (CT)	26.34	3.16	70.50
Desoola (CT)	31.69	3.31	65.00
Rajgarh (M)	26.47	4.24	69.30
Govindgarh (CT)	30.08	9.94	59.98
Kherli (M)	27.80	2.76	69.44

Graph no. 2.10
Alwar district

Distribution of work force participation Rate in Towns



2.5 Conclusion

- **Distribution of Settlements**

Majority of settlements are found in medium size class of population (500-1999), which have only 15 percent of total population. But majority of population that is around 68 percent are found in 10000 and above class size of population in Alwar.

Tehsil wise studies again show that higher concentration of settlement is found in medium size class of settlement. Among large and small size of settlement are only a few of settlement. Thanagazi and Rajgarh have significant concentration of small size class (less than 200 of population) settlement. Thus the distribution pattern is not even in all of Alwar and it is affected by the centrality and availability of different economic function. The settlements patterns are also limited by graphical features.

- **Demographic characteristics**

- ❖ **Distribution of population**

Highest percentage of population concentration is in population size class of 1000 - 4999. In population size class of 5000 & above significant concentration of population is in Bansur, Kathumar, Laxmangarh.

- ❖ **Distribution of population density**

Highest population density is in Alwar city followed by Diwakari that is also having highest SC population. Tehsil wise Alwar has highest population density, followed by Tijara. Thanagazi has lowest population density.

- ❖ **Population growth rate**

Population growth rate is highest in Tijara tehsil and lowest in Rajgarh tehsil. Population growth rate town wise is highest in Bhiwadi followed by

Neemrana and Diwkari. Population growth rate is lowest in Rajgarh, followed by Shahjahanpur.

❖ Distribution of urban population

Urban population distribution is highest in Alwar Tehsil followed by Tijara. There is no urban population in Mandawar, Kotkasim, Bansur and Thanagazi tehsil. Among towns Alwar has highest concentration of urban population followed by Bhiwadi. It is lowest in Bhoogar city.

❖ SC & ST population

SC population percentage is highest in Kathumar, kishangarh, Kotkasim, and Mandawar and lowest in Behror industrial town. ST population percentage is highest in Rajgarh, and lowest is in kishangarh and Tijara.

❖ Literacy

Literacy rate is highest in Behror followed by Kotkasim and Alwar and lowest literacy rate is in Thanagazi and Ramgarh. Among towns of Alwar district, highest literacy is in Kherli and Alwar with lowest in Desoola and Bhoogar.

❖ Sex Ratio

Sex ratio is highest in Kishangarh and Ramgarh and lowest sex in Tijara followed by Kathumar. Among all the towns sex ratio is highest in Tapookra and lowest in Bhiwadi.

❖ Work Force

Main worker participating in workforce are highest in Behror and Lachhmangarh and lowest in Kotkasim and Kathumar. Among all towns Bhiwadi has highest main workers participation and lowest main worker participation in Rajgarh, diwakari, bhoogar and Ramgarh.

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Chapter 3

CENTRAL FUNCTIONS AND THEIR DISTRIBUTION PATTERN

3.1 Introduction

Central functions are the functions supporting the economy and developmental need of a central place. These functions are specialized in providing services of different kinds in higher order central places, and not specialized or absent in lower order center place (Losch.A,1954)¹. Different types of functional (Education, Health etc.) requirements emerged automatically in any settlement with population threshold even when the region is not planned, and such unplanned development results in regional disparities leading to the low level equilibrium trap which perpetuates low incomes, low demand for services and cause disincentives for the investors and bring the region in to a trap of circular causation of poverty hence reflect a bad shape of socioeconomic development. To get rid of such circular causation of poverty (Nurkse, 1953)² and destitution, regional planning became indispensable. In the process of such planning, the identification of centrality function is required to bring structural change for accommodating transition from less developed to a developed region with rising level of income (Hollis B. Chenery)³. The identification of the centrality function is followed by the finding of level of agglomeration of these central functions for accessing the order of central place. This order of the central place decides the level of service, it can provide and the requirement for introducing any new functional services to improve the income of the people in the surroundings and hence ensuring their socio economic development. Central functions have its impact on connectivity and on other complementary functions in the central place and in the surrounding settlements.

¹ Losch, A. (1954). *The Economics of Location* (Translated by W. H. Waglom and W. F. Stolper). New Haven.

²Ragnar Nurkse, *Problems of Capital Formation in Underdeveloped Countries*, Oxford, 1953,

³ Chenery, Hollis. 1979. *Structural change and development policy*. A World Bank research publication. Washington, DC: World Bank.

In this study various statistical procedures are used to identify central function in rural and urban settlements in Alwar district. Different indicators are taken to calculate central function and to access the centrality of settlement.

Identification of central function is followed by accessing location concentration and distribution of central functions. The variable taken to access the functions of centrality while calculating central function are as

- (a) Education
- (b) Health
- (c) Banking services,
- (d) Recreations
- (e) Population.

Combined effects of these variables are calculated to identify central places and assessment of benefit accruing to the people living in settlement itself in the settlements in its surrounding. Each function variables has been sub divided to capture wide and deep effect of it as a main function.

- (1) Education: primary, middle, secondary and senior secondary, college education.
- (2) Health: dispensary, family welfare center, hospital and maternity and child welfare center
- (3) Banking services: credit facilities; bank branches.
- (4) Recreation: cinema, stadium, Auditorium, public library, public reading room.
- (5) Population: population density

3.2 Distribution of Educational Facilities

The composite Human Development Index (HDI) integrates three basic dimensions of human development. Life expectancy at birth reflects the ability to lead a long and healthy life. Mean years of schooling and expected years of schooling reflect the ability to acquire knowledge. And gross national income per capita reflects the ability to achieve a decent standard of living.⁴

Access to knowledge for the people is vital factor in determining the level of human development⁵. If there is access to knowledge for the citizen of a place then it imbibes awareness. Awareness is a necessary condition for realizing the socioeconomic development anywhere by infusing capability in to the people. Education service has ability to bring awareness leading to change in society, economy and politics of a place. Society, politics, administration, institution and economy all the things are linked with education. Justice, democracy, development, equality, progress and prosperity all those concepts are also connected with education. Education has capacity to restructure the whole population. It creates elites, redefine rights and create obligation for members. Education also guides judicious and equitable resource allocation in any society (Meyer, 1977)⁶. Services of education can be provided through the availability of institutional services like primary school, middle school, secondary school, senior secondary and college.

⁴ UNDP (2016). Human Development for everyone. HDR, 2016

⁵ Ibid.

⁶ Meyer, John W. (1977). The Effects of Education as an Institution, American Journal of Sociology, Vol. 83, No. 1 (Jul.), pp. 55-77.

(a) Educational Facilities in tehsils

The identification of educational institution has been done tehsilwise in Alwar District to access the availability of educational services institution like primary, middle, secondary, senior secondary and college by observing the statistic in Table 3.1 and Graph 3.1 calculated as per the census, 2011⁷. This observation bring out information about the level of availability of different educational institution services in each tehsil of Alwar.

The findings for primary school reveals that highest coverage under this section scored by the settlement of Mandawar, Behror and Bansur tehsils. Primary schools percentage is lowest in the settlements of Thanagazi and Rajgarh. Settlement covered by middle school is highest in Mandawar followed by Behror and it is at lowest in settlements of Tijara, Thanagazi, Kotkasim, and Kathumar.

Settlement covered by secondary school and senior secondary schools are again highest in Mandawar and Behror with the lowest percentage coverage in Rajgarh, Tijara, Kishangarh bas, and Lacchmangarh Tehsils. Secondary school in the settlements of Lachhamangarh and Thangazi tehsil is at its lowest.

Settlements covered by college is highest in kishangarh bas followed by Behror and lowest in Kotkasim followed by settlements of Thanagazi, Rajgarh, Kathumar, and Lacchmangarh tehsil. All tehsils have less than 1% of settlements covered by college.

The statistical comparison can be used to make a statement that Mandawar and Behror tehsil have comparatively better availability of educational services institution of all types whereas settlements of Tijara tehsil remains at the lowest coverage in every educational services. Mandawar and Behror have better coverage of all type of educational functions (institutions) among all tehsils, and can be attributed to industrial complexes, inspite of that there is visible contrast in

⁷ Census of India (2011). District Census Handbook of Alwar District, Directorate of Census Operation Rajasthan.

terms of coverage and in terms of literacy rate which is fairly high in these three tehsils and Tijara did not fall much behind these even with low coverage by education services can be attributed to its connectivity. It fall in proximity of NH-8 and Express highway which connect two main city Jaipur and Delhi. Which can be one of the supportive reason for mobility of the population seeking education. Immigration from surrounding States for job oppurtunities in Behror also help to boost the demand of different educational service because there is lasting effect of expanded and institutionalized education on the knowledge and personal capability development (Meyer, 1977) ⁸.

(b) Educational Facilities in Rural Settlement

Population size act as the threshold for presence of any service or for creating demand for any services, education service being one of the important service and its demand depend primarily on the size of population but in our case the size should not matter in providing the education services especially the primary and secondary education because in our country primary and secondary education is universal in nature⁹. The census based statistics in table No-3.2 and Graph No- 3.2 is presenting the picture of relation between the presence of different education institutionl services and population size class in rural settlements of Alwar and coverage of such settlement under primary school is absent in less than 200 population size class settlement which is an important concern to be adressed. Whereas it is at 100% in, above 1000 population size class. Settlement less than 200 are not covered under middle school. Size class of between 200 and 499 is having negligible coverage by education functions and it is below 1%. Size class of 5000 & above have full coverage under middle school. Less than 200 class size population settlements is again facing shortage of

⁸ Meyer, John W. (1977). The Effects of Education as an Institution, American Journal of Sociology, Vol. 83, No. 1 ,Jul., pp. 55-77.

⁹ Constitution of India (Article 21)

secondary school, senior secondary school and colleges. But 5000 & above size class of population settlement have full coverage of secondary & senior secondary school. But settlement covered by colleges are less, which is 16.1%.

The results in Table No- 3.2 and Graph No- 3.2 clearly indicate that as population size class increase the educational facilities coverage also increased so larger population size settlements have complete coverage under the schools whether smallest size settlements have no coverage any educational function. These pattern of linkages among population size class and educational facilities explains that population act as threshold to create demand for services(Christaller, 1933), is working in Alwar. Thus educational service even being one of the vital in human development follow the demand and supply rule may be one of the factor acting as a barrier to socioeconomic development of the region.

(c) Educational Facilities at Urban Centers

Findings in Table No- 3.3 and representation of that on Graph No- 3.3 give a picture of educational facilities at urban centers it is comparatively at its best in Alwar city followed by Bhiwadi town. Graphic representation shows a visible difference in terms of all the educational facilities available in towns. In number of middle school and secondary school Bhiwadi is at second place. Kherli town is second in term of having senior secondary schools followed by Behror and Rajgarh. Ramgarh is at second place for college followed by Kherli, Behror, Rajgarh and Neemrana. Primary schools are very less at Desoola, Ramgarh, Diwakari, Neemrana, and Kishangarh town. Middle schools are less in number at Desoola, Ramgarh, Diwakari, and Neemrana town. Secondary schools are less in number at Bhoogar, Desoola, and Ramgarh town that is below 2%, Senior secondary schools are absent in Diwakari and smallest in number and College is absent at Diwakari, Bhoogar and Desoola town this may be because these are closed to Alwar.

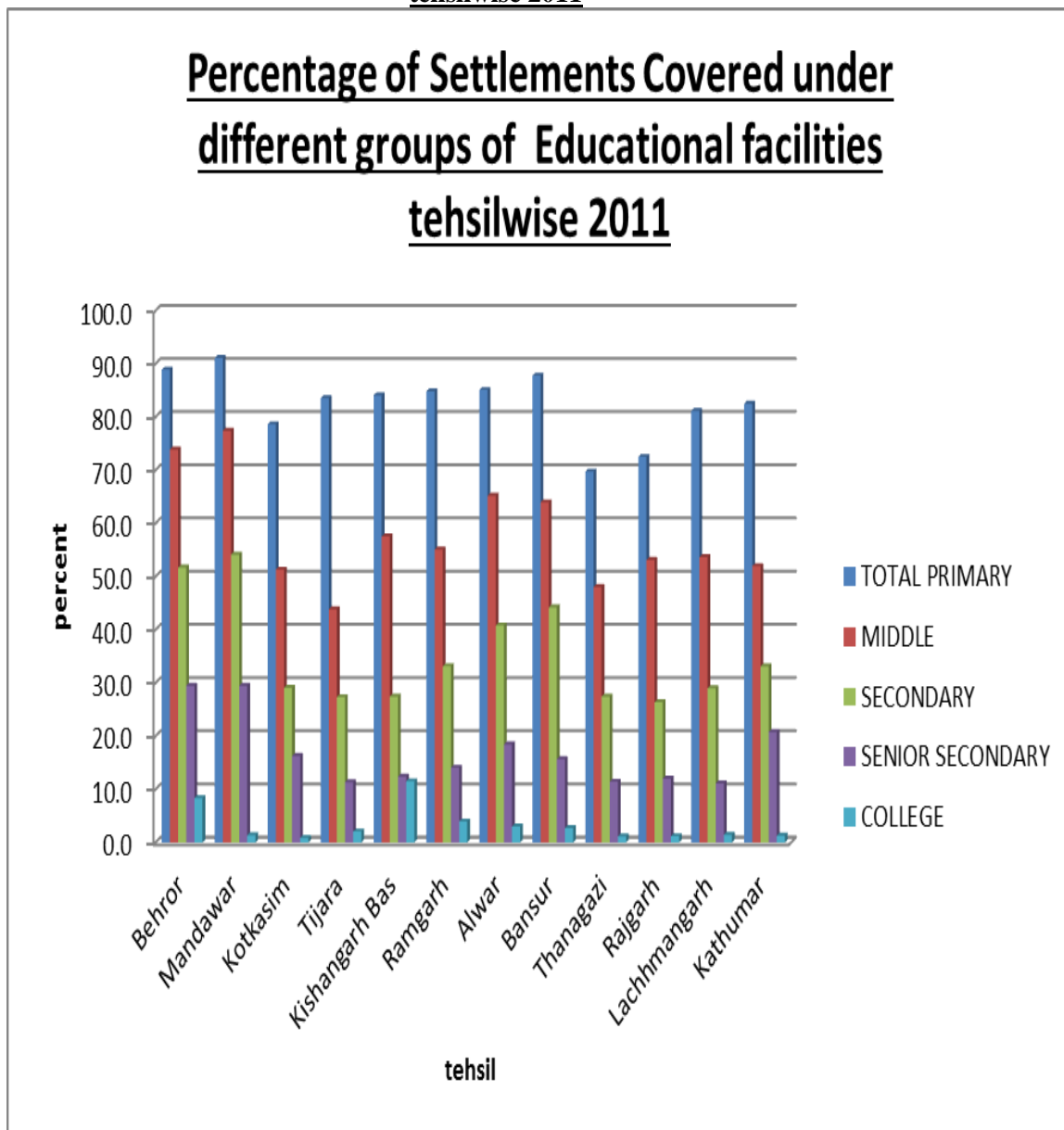
Alwar is number one in all type of educational facilities among all the tehsils followed by Bhiwadi and Rajgarh. But Alwar have highest share of concentration of education facilities among all urban center of Alwar district as Alwar is district headquarter and class I census town. Bhiwadi is also class I census town and rapidly growing town with very high growth rate but still not as important as Alwar explains the contrast. Bhiwadi is growing rapidly because of industrial complexes and nearness to Delhi. This study indicates that the relation among urban hierarchies, population, infrastructure and connectivity enhance different type of service accessibility.

Table 3.1
Alwar district
Percentage of Settlements Covered under different groups of Educational facilities
tehsil wise 2011

Tehsil	Education indicators					
	Total settlement	Primary School	Middle School	Secondary School	Senior secondary School	College
Behror	180	88.9	73.9	51.7	29.4	8.3
Mandawar	146	91.1	77.4	54.1	29.5	1.4
Kotkasi m	117	78.6	51.3	29.1	16.2	0.9
Tijara	194	83.5	43.8	27.3	11.3	2.1
Kishang arh Bas	113	84.1	57.5	27.4	12.4	11.5
Ramgarh	178	84.8	55.1	33.1	14.0	3.9
Alwar	201	85.1	65.2	40.8	18.4	3.0
Bansur	147	87.8	63.9	44.2	15.6	2.7
Thanag azi	175	69.7	48.0	27.4	11.4	1.1
Rajgarh	258	72.5	53.1	26.4	12.0	1.2
Lachhman garh	207	81.2	53.6	29.0	11.1	1.4
Kathumar	154	82.5	51.9	33.1	20.8	1.3

Source: District Census Handbook, Alwar, Census of India, 2011

Graph No. 3.1
Alwar district
Percentage of Settlements Covered under different groups of Educational facilities
tehsilwise 2011



Source: District Census Handbook, Alwar, Census of India, 2011

Table No. 3.2

Alwar district

Percent of rural settlement covered under educational facilities in 2011

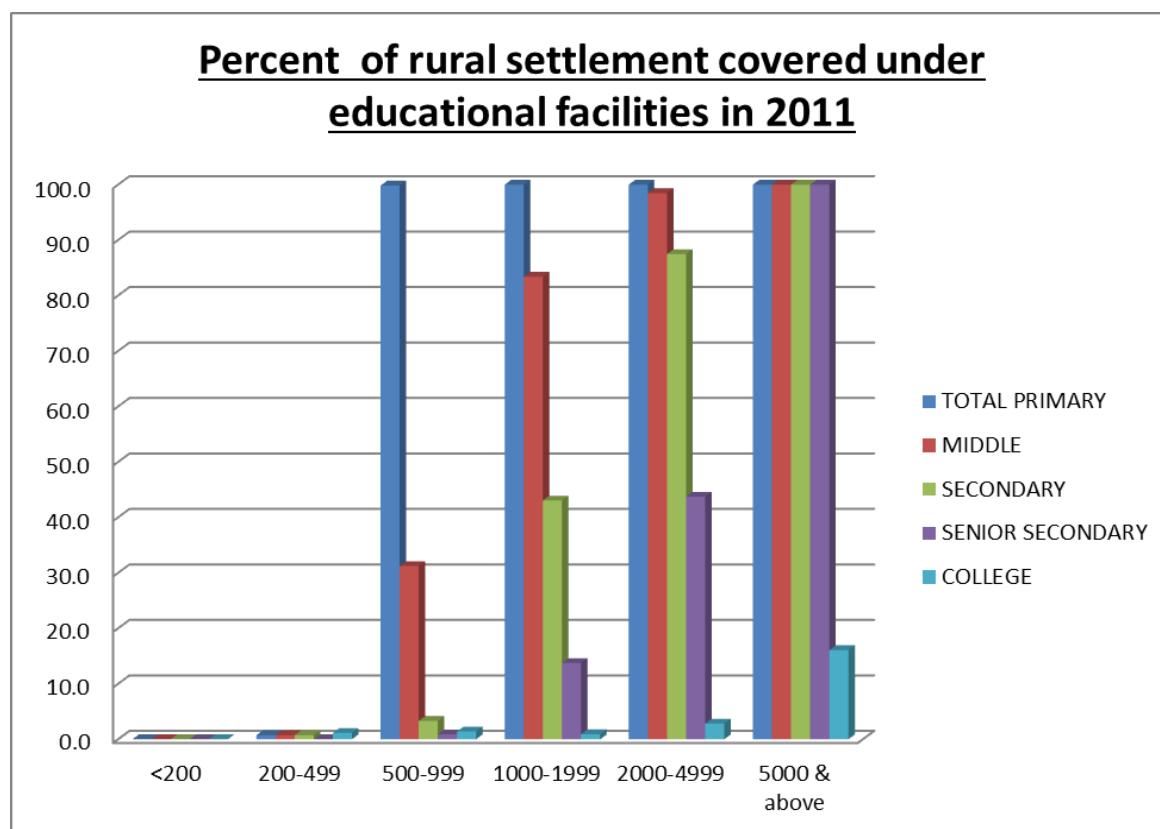
Size of rural settlement	Education indicators				
	Primary school	Middle school	Secondary school	Senior secondary school	College
<200	0.0	0.0	0.0	0.0	0.0
200-499	0.8	0.8	0.8	0.0	1.1
500-999	99.8	31.2	3.3	0.9	1.4
1000-1999	100.0	83.4	43.1	13.7	0.9
2000-4999	100.0	98.5	87.5	43.7	2.8
5000 & above	100.0	100.0	100.0	100.0	16.1

Source: District Census Handbook, Alwar, Census of India, 2011

Graph no3.2

Alwar district

Percent of rural settlement covered under educational facilities in 2011



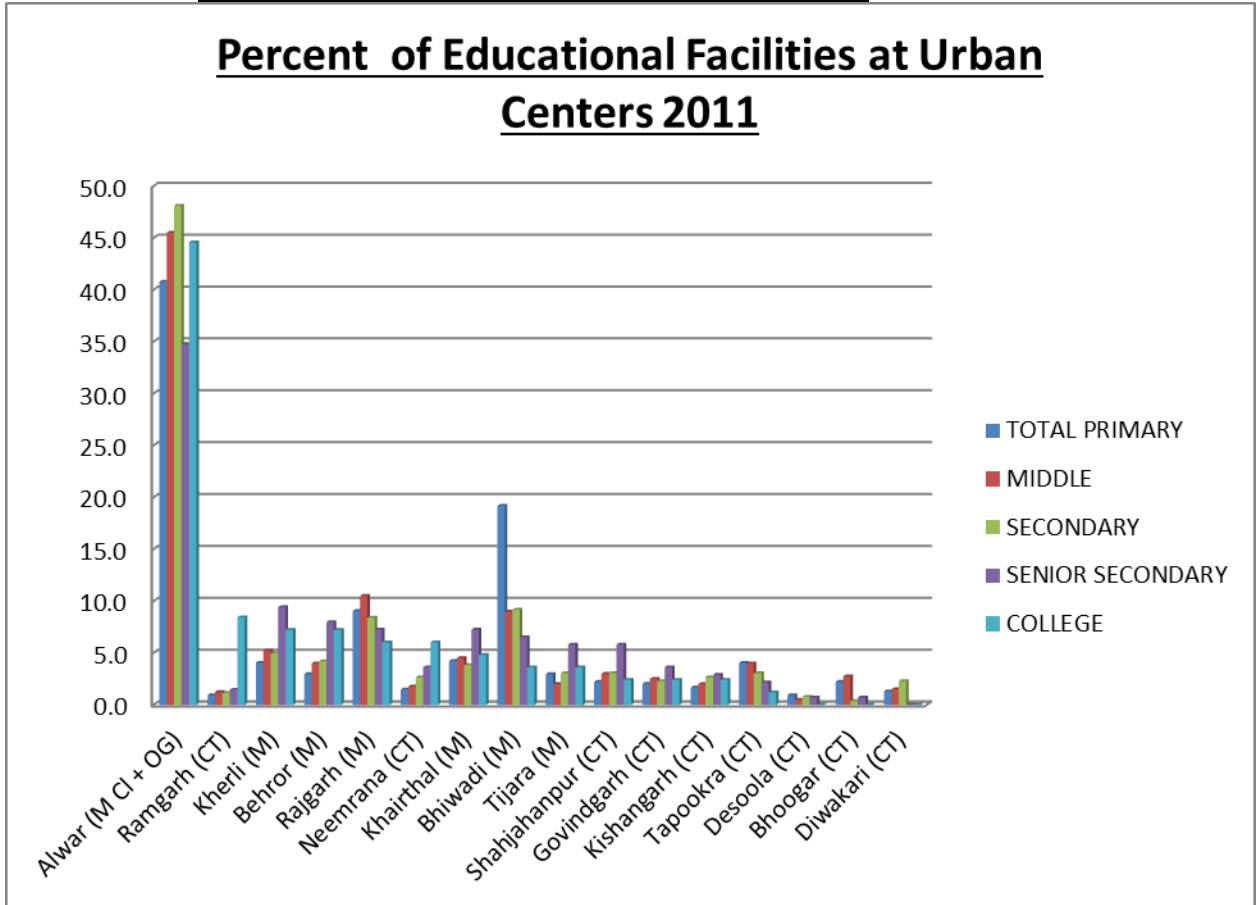
Source: District Census Handbook, Alwar, Census of India, 2011

Table No. 3.3
Alwar district
Percent of educational facilities at urban centers 2011

Town name	Education Indicators				
	Primary School	Middle School	Secondary School	Senior secondary School	College
Alwar (M CI + OG)	40.8	45.5	48.1	34.8	44.6
Ramgarh (CT)	0.9	1.3	1.1	1.4	8.4
Kherli (M)	4.1	5.3	5.0	9.4	7.2
Behror (M)	3.0	4.0	4.2	8.0	7.2
Rajgarh (M)	9.0	10.5	8.4	7.2	6.0
Neemrana (CT)	1.5	1.8	2.7	3.6	6.0
Khairthal (M)	4.2	4.5	3.8	7.2	4.8
Bhiwadi (M)	19.2	9.0	9.2	6.5	3.6
Tijara (M)	3.0	2.0	3.1	5.8	3.6
Shahjahanpur (CT)	2.2	3.0	3.1	5.8	2.4
Govindgarh (CT)	2.0	2.5	2.3	3.6	2.4
Kishangarh (CT)	1.7	2.0	2.7	2.9	2.4
Tapookra (CT)	4.1	4.0	3.1	2.2	1.2
Desoola (CT)	0.9	0.5	0.8	0.7	0.0
Bhoogar (CT)	2.2	2.8	0.4	0.7	0.0
Diwakari (CT)	1.3	1.5	2.3	0.0	0.0

Source: District Census Handbook, Alwar, Census of India, 2011

Graph No. 3.3
Alwar district
Percent of educational facilities at urban centers 2011



Source: District Census Handbook, Alwar, Census of India, 2011

3.3 Distribution of Health Facilities

A great economist while explaining the interaction between the consumer of the 'good' (health service) and the producer of the good speak about the nature of it in the market in his famous book called 'A Theory of Moral Sentiments'¹⁰, that it is such a vital service in demand very closed to the ethics and humanity that market mechanism usually land itself in a region of confusion.

“It is not from the benevolence of the butcher, the brewer and the baker, that we expect our dinner, but from their regard to their own interest. We address ourselves, not to their humanity, but to their self-love, and never talk to them of our necessities but to their advantages”¹¹

Health is also one of the indicators of Human development Index ¹² and in settlement geography it is considered as one of the basic services. Such service like health care has its demand but the market for it depends on the threshold of population and level of income, connectivity and technology. At the same time in India the level of income is low to restrict it within the group of middle income countries. Middle income group country which are defined as having a per capita gross national income of US\$1,026 to \$12,475 (2011) are a diverse group by size, population, and income level¹³

Health service in any region is vital for the realization of development otherwise the region will remain very backward in terms of socio-economic development as health has a cascading effect on all other indicators of the development. The

¹⁰ Smith, A. (1976). A Theory of Moral Sentiments. Oxford: Clarendon Press. I, pp. 26-7.

¹¹ Smith, A. (1976). An Inquiry into the Nature and Causes of a Wealth of Nations. Oxford: Clarendon Press. I, pp. 26-7.

¹² Op.cit. No. 4.

¹³ World bank (2016) World Bank Report.

expenditure on health is incur upon from the precautionary portfolio of individual and any region if backward in terms of any of the services like income opportunities, education, connectivity, credit facilities and other services of higher order then the region dooms to remain in a loop of underdevelopment. Thus while assessing the level of regional development based on spatial arrangement of the services it is important to look at the availability and distribution of a range of health services like hospital, dispensary, family welfare center and maternity homes, observing the level health services is vital, before the formulation of any model of regional development.

The scenario of health services under different group of services has been observed at in Alwar district as percentage of coverage of such services tehsilwise, there distribution in different settlements with respect to population class size, rural and town wise.

(a) Health Facilities in Tehsils

The findings based on the statistic analyzed from census data¹⁴ and presented in (Table No-3.4 and Graph No-3.4) show that Alwar tehsil has the highest percentage coverage under hospital services, followed by Behror and Bansur, have above 15% coverage. The percentage of health services coverage is lowest in Kotkasim followed by Lacchmangarh. Settlement covered under dispensary as a health facility is highest in Behror, and Bansur followed by Alwar. All these tehsil have health services coverage above 10%. Lowest percentage coverage for dispensary is in Kishangarh Bas followed by Kotkasim has less than 4% coverage. Settlement covered under family welfare center is also highest in Alwar (7.5%) followed by Bansur, Behror, Kathumar and Ramgarh. Lowest coverage is at Kotkasim, Thanagazi, Lacchmangarh, and Kishangarh Bas, with less than 4% coverage. Settlement under maternity and child welfare is

¹⁴ Op. cit., No. 7.

highest in Alwar tehsil followed by Behror and lowest coverage for settlements in Kotkasim, followed by Lacchmangarh.

Overall health facilities coverage for the settlements is highest in Alwar tehsil as it is a district headquarter and only city of highest order, the services in Alwar are comparatively better than Behror. Coverage for the settlements in Kotkasim tehsil is very poor, this can be attributed to absence of town and such finding is establishing the fact that health services supply is dependent on market mechanism. Urbanization creates conducive environment for development of health services by the means of infrastructure and connectivity. Alwar is central in location with good connectivity and better infrastructure and is class I census town thus creating enough demand for health services.

(b) Health Facilities in Rural settlements

All the health facilities like hospital, dispensary, family welfare center and maternity and child welfare center are absent in those settlements which have the population size class less than 200. In the settlements of population size class between 200-499, dispensary, family welfare center and coverage hospital is less than 1%. Settlement of population size class between (500-999 range), have negligible coverage for hospital, at (0.2%) and other health facilities are absent in this class of settlement. Settlement of population size class between (1000-1999 range), have hospital coverage less than 1%. Other health facilities are absent in this class of settlement. (Refer Table No-3.5 and Graph No-3.5)

Settlements of population size classes of 5000 and above are fully covered under all types of health related services. Coverage for dispensary in this class is 85.7% thus large size of settlement has higher accessibility of health services. In large settlement population concentration is higher, so more population is covered in these settlements.

(c) Health Facilities at urban centers

In terms of coverage of health facilities, in towns of Alwar hospital facilities are highest in Alwar (24.5%) and lowest in Bhoogar, Desoola, Shahjahanpur at 1.9%. Dispensary facilities are highest in Bhiwadi (23.1%) followed by Alwar (19.2). In the rest of towns it is lowest with share of (3.8%) except Bhoogar with (7.7%). Family welfare facilities are highest in Alwar (21.1%) followed by Rajgarh, Behror, and Neemrana town. The facility of family welfare is absent in Bhoogar, Desoola, Shahjahanpur. Maternity and child welfare services are highest in Alwar, followed by Rajgarh, Behror and Neemrana and absent in Bhoogar, Desoola, Shahjahanpur town. (Refer, Table No-3.6, Graph No-3.6)

Alwar have better share of overall health service infrastructure followed by Bhiwadi, Rajgarh, Behror and Neemrana. Alwar and Bhiwadi are class I census town and all these towns are having good connectivity. Behror, Neemrana and Bhiwadi all these are having industrial complexes.

After the data based findings it is easy to infer that health services distribution in the different categories of settlements in Alwar is based on the availability of other related factors like population size, connectivity infrastructure, and other services which are highly conducive for any market to work but for insuring the development of region 'government intervention' (Maynard, 1991) ¹⁵ in providing health services is required.

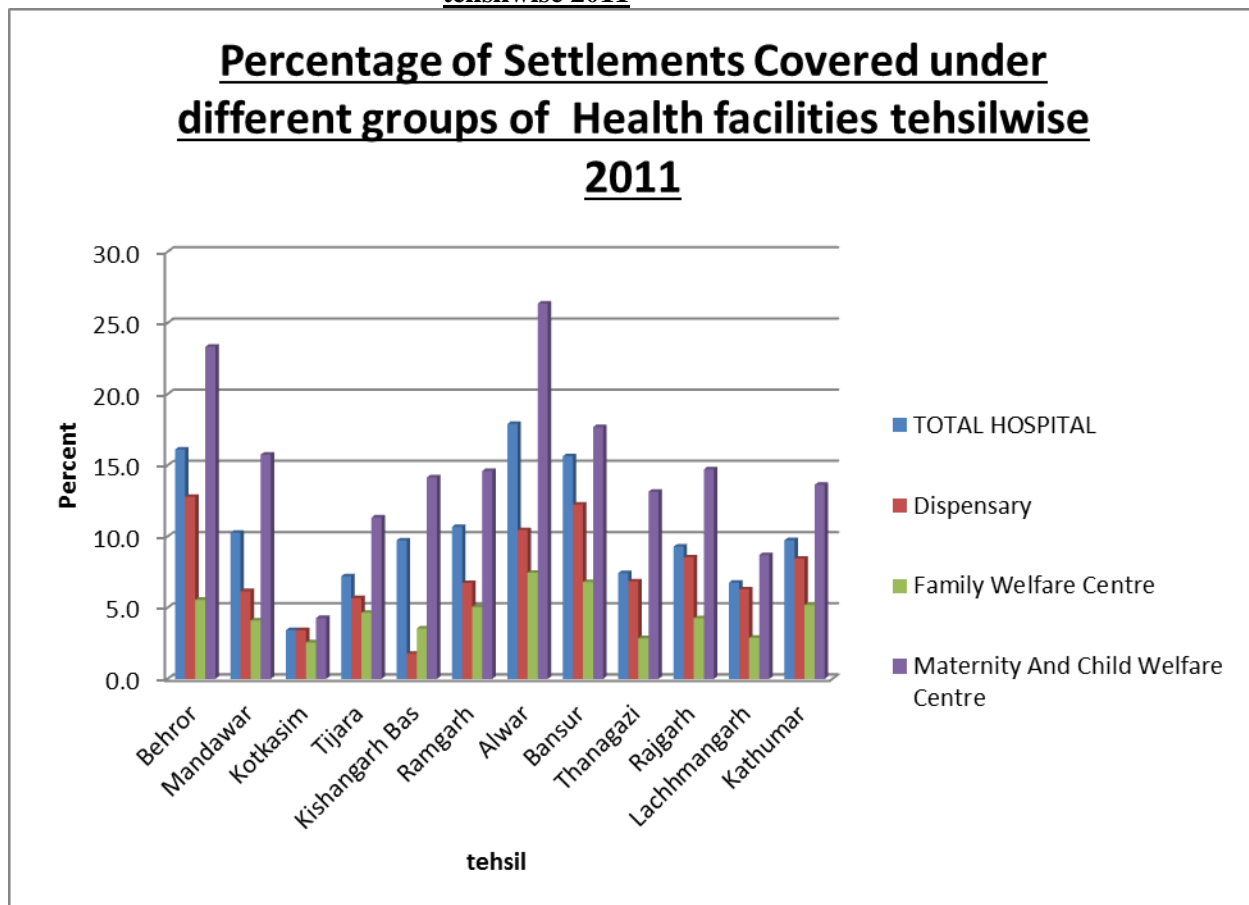
¹⁵ Maynard, Alan (1991). Developing the Health Care Market. *The Economic Journal*, Vol. 101, No. 408, p. 1277-1286.

Table No. 3.4
Alwar district
Percentage of Settlements Covered under different groups of health facilities
tehsilwise 2011

Tehsil	Health indicators				
	Total settlement	Total hospital	Dispensary	Family welfare centre	Maternity and child welfare centre
Behror	180	16.1	12.8	5.6	23.3
Mandawar	146	10.3	6.2	4.1	15.8
Kotkasim	117	3.4	3.4	2.6	4.3
Tijara	194	7.2	5.7	4.6	11.3
Kishangarh Bas	113	9.7	1.8	3.5	14.2
Ramgarh	178	10.7	6.7	5.1	14.6
Alwar	201	17.9	10.4	7.5	26.4
Bansur	147	15.6	12.2	6.8	17.7
Thanagazi	175	7.4	6.9	2.9	13.1
Rajgarh	258	9.3	8.5	4.3	14.7
Lachhmangarh	207	6.8	6.3	2.9	8.7
Kathumar	154	9.7	8.4	5.2	13.6

Source: District Census Handbook, Alwar, Census of India, 2011

Graph No. 3.4
Alwar district
Percentage of Settlements Covered under different groups of health facilities
tehsilwise 2011



Source: District Census Handbook, Alwar, Census of India, 2011

Table No.3.5
Alwar district
Percent of rural settlement covered under health facilities 2011

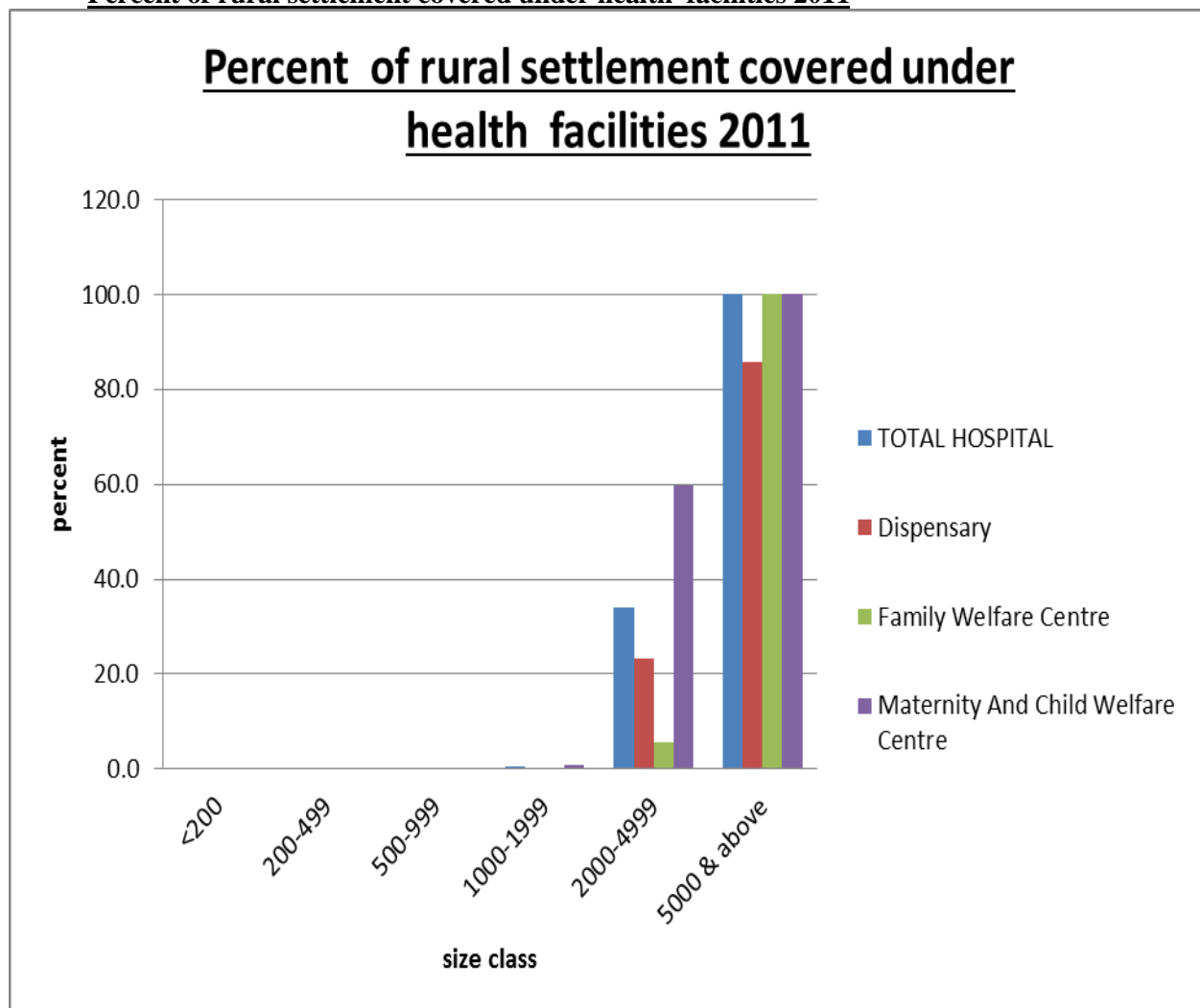
Size of rural settlement	Total hospital	Dispensary	Family welfare Centre	Maternity and child welfare Centre
<200	0.0	0.0	0.0	0.0
200-499	0.4	0.0	0.0	0.0
500-999	0.2	0.0	0.0	0.0
1000-1999	0.6	0.0	0.0	0.8
2000-4999	34.0	23.3	5.6	59.8
5000 & above	100.0	85.7	100.0	100.0

Source: District Census Handbook, Alwar, Census of India, 2011

Graph No. 3.5

Alwar district

Percent of rural settlement covered under health facilities 2011



Source: District Census Handbook, Alwar, Census of India, 2011

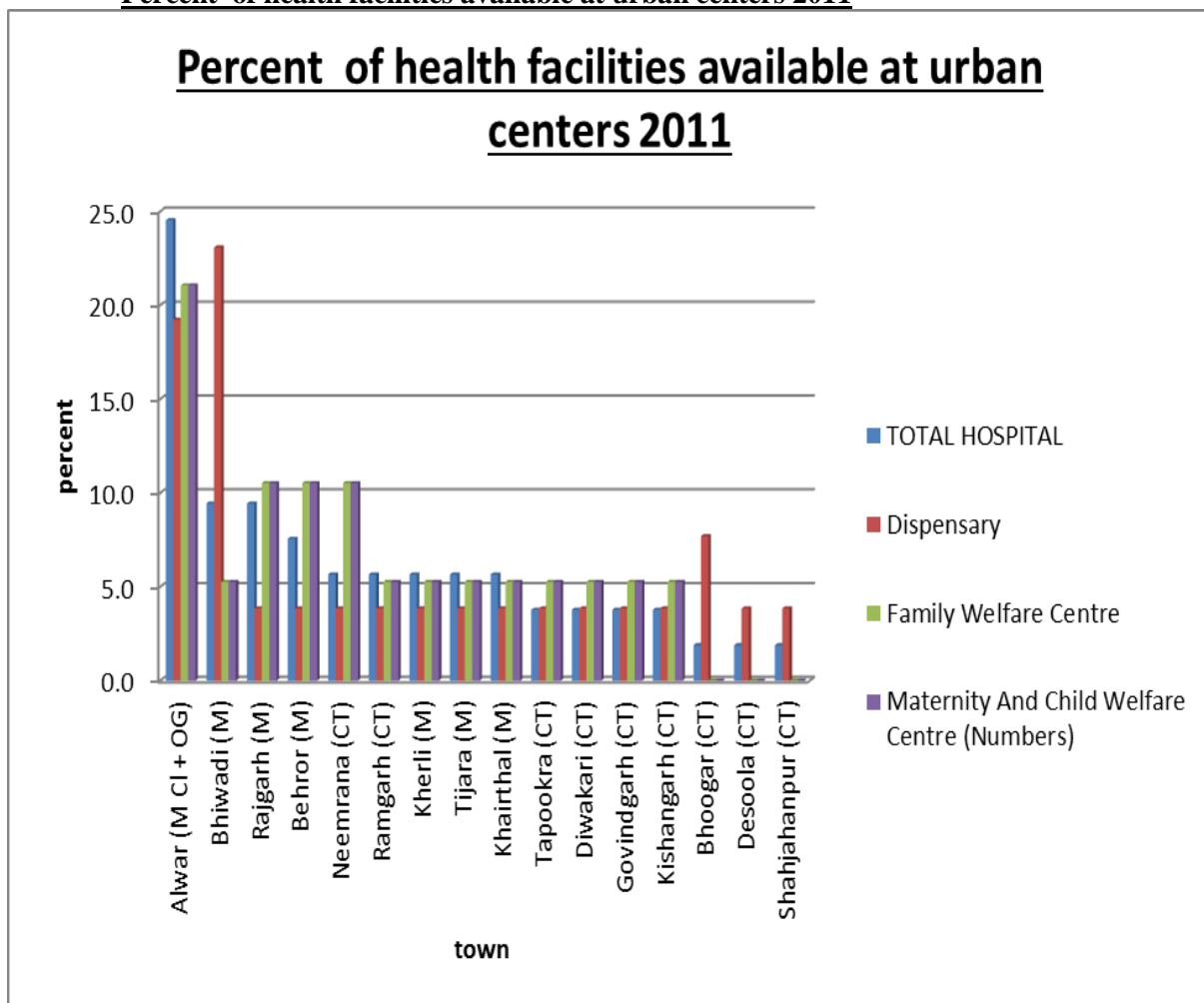
Table No. 3.6
Alwar district

Percent of health facilities available at urban centers 2011

Town name	Health Indicators			
	Hospital	Dispensary	Family welfare centre	Maternity and child welfare centre
Alwar (M CI + OG)	24.5	19.2	21.1	21.1
Bhiwadi (M)	9.4	23.1	5.3	5.3
Rajgarh (M)	9.4	3.8	10.5	10.5
Behror (M)	7.5	3.8	10.5	10.5
Neemrana (CT)	5.7	3.8	10.5	10.5
Ramgarh (CT)	5.7	3.8	5.3	5.3
Kherli (M)	5.7	3.8	5.3	5.3
Tijara (M)	5.7	3.8	5.3	5.3
Khairthal (M)	5.7	3.8	5.3	5.3
Tapookra (CT)	3.8	3.8	5.3	5.3
Diwakari (CT)	3.8	3.8	5.3	5.3
Govindgarh (CT)	3.8	3.8	5.3	5.3
Kishangarh (CT)	3.8	3.8	5.3	5.3
Bhoogar (CT)	1.9	7.7	0.0	0.0
Desoola (CT)	1.9	3.8	0.0	0.0
Shahjahanpur (CT)	1.9	3.8	0.0	0.0

Source: District Census Handbook, Alwar, Census of India, 2011

Graph No.3.6
Alwar district
Percent of health facilities available at urban centers 2011



Source: District Census Handbook, Alwar, Census of India, 2011

3.4 Distribution of Banking Facilities

Capital either economic (financial) or noneconomic (human) is important component of investment and hence of economic growth and so accumulation of capital is unavoidable in the parlance of any growth theory or developmental model.¹⁶ For the development of a region capital is always needed without it no development can be thought about as it is the factor of production. Among all type of capital the most tangible and always in demand at the first place is finance. Finance for development project and other such activities are attracted through the system of capital or financial market where people park their monetary assets for the capital gain, paid to them via interest rate.

Banking is an institution of financial services having the reach up to the lowest end in any economy, it includes a range of services which cater the need of saver and investor of any settlement and is vital for channelizing the saving in to investment in agriculture, manufacturing, medium and small scale industries in any region so that the level of economic growth in agriculture and industry are realized side by side. Besides all the cause this service is required by every individual as this let them manage their savings on different portfolios. Providing banking services should not be based on the market mechanism especially in less developed or developing countries as such country lack funds for investment which in turn hinders the income generation through production process. And for that to achieve, Government of India is focusing on providing a wide range of banking services irrespective of the settlement size and remoteness, to the masses so that the saving can get fully captured in long run¹⁷.

Absence of banking service has correlation with presence of poverty in any settlement with lack of such service leading to competition rather than cooperation among public and such competition hinder the formation of

¹⁶ Robinson, J. (1956). *The Accumulation of Capital*. London: Macmillan.

¹⁷ Ministry of Finance, (2016). Reports on Financial inclusion. Department of Financial services, Government of India.

cooperative society in a far of settlement, in turn this keep such settlement void of the required funds for generating important services. This problem of competition hindering the formations of any types of cooperative society can be bridge by introducing market for credit that through banking system¹⁸. The creation of the banking and related facilities in changed scenario, strong and viable financial institutions are needed to cater to the requirements of finance for building the necessary institutional and marketing infrastructure¹⁹.

It is imperative to access the availability and distribution of banking and related services in Alwar to understand the financial capacity that can turn post demand for other related services of higher order and how the region is showing up the need for financial inclusion settlements wise. To carry this study the availability of banking and credit services are analyzed in Alwar tehsil wise, rural and urban settlement wise.

(a) Banking Facilities in Tehsils

Settlements of Alwar tehsil have banking facility coverage of 26% which is highest followed Behror. Banking service coverage is lowest in the settlements from Kotkasim, Lacchmangarh below 10%. Mandawar, Behror, Kathumer and Lacchmangarh gradually falling percentage of settlements covered under the banking services with lowest coverage in the settlements of Tijara and Thanagazi. (Refer – Table No-3.7, Graph No-3.7)

Banking services facilities are better in Alwar tehsil and Behror tehsil because of good degree of urbanization and connectivity. It is poor in Kotasim, Tijara and Thanagazi and can be correlated with hilly topography and near absence of urbanization and distance from the main city hinders the development of banking

¹⁸ Korten, David C. (1980) Community Organization and Rural Development: A Learning Process Approach *Public Administration Review*, Vol. 40, No. 5, pp. 480-511.

¹⁹ Mohan, Rakesh (2006) Agricultural Credit in India: Status, Issues and Future , Economic and Political Weekly, Vol. 41, No. 11, pp. 1013+1015-1017+1019-1023

services and infrastructure. Because of physiography, connectivity is not well developed in Thanagazi. Under developed town in Kotkasim discourage the supply of banking services.

(b) Banking Facilities in Rural Settlements

Population size class(rural settlements) wise distribution of banking facility is observed form the census data analysis and it reveals that the market mechanism dominating in deciding the services distribution like banking thus supporting the spatial arrangement theories as explained by Losch ²⁰, and the causes of market failure for credit in rural area a study by world bank²¹

In rural settlement of less than 1000 population size class, coverage of banking services is absent. It indicates that lower size classes of settlements have no banking service facilities. 5000 and above size class of settlement have full coverage of banking services facilities. It is showing direct relation with size of settlement and availability of credit services.

Banking and credit services follow market rule, and at the place of higher order agglomeration can only be affirmed after looking at the trend of its distribution in the urban settlements. The census statistic gives the picture of its distribution.

(c) Banking Facilities at Urban Centers

Among urban centers banking facility is highest in Alwar city, followed by Bhiwadi. Banking facility is lowest in Bhoogar followed by Shahajahanpur, Govindgarh and Diwakari. Alwar and Bhiwadi city settlements are at the top in availing banking services among all urban centers whereas it is at its lowest in the settlements of Rajgarh, Tapookara, Neemrana, Desoola, Shahjahanpur and Bhoogar. (Refer Graph No.3.9 and Table No. 3.9)

²⁰ Op. cit. No. 1.

²¹ Besley, Timothy (1994). How Do Market Failures Justify Interventions in Rural Credit Markets? *The World Bank Research Observer*, Vol. 9, No. 1, pp. 27-47.

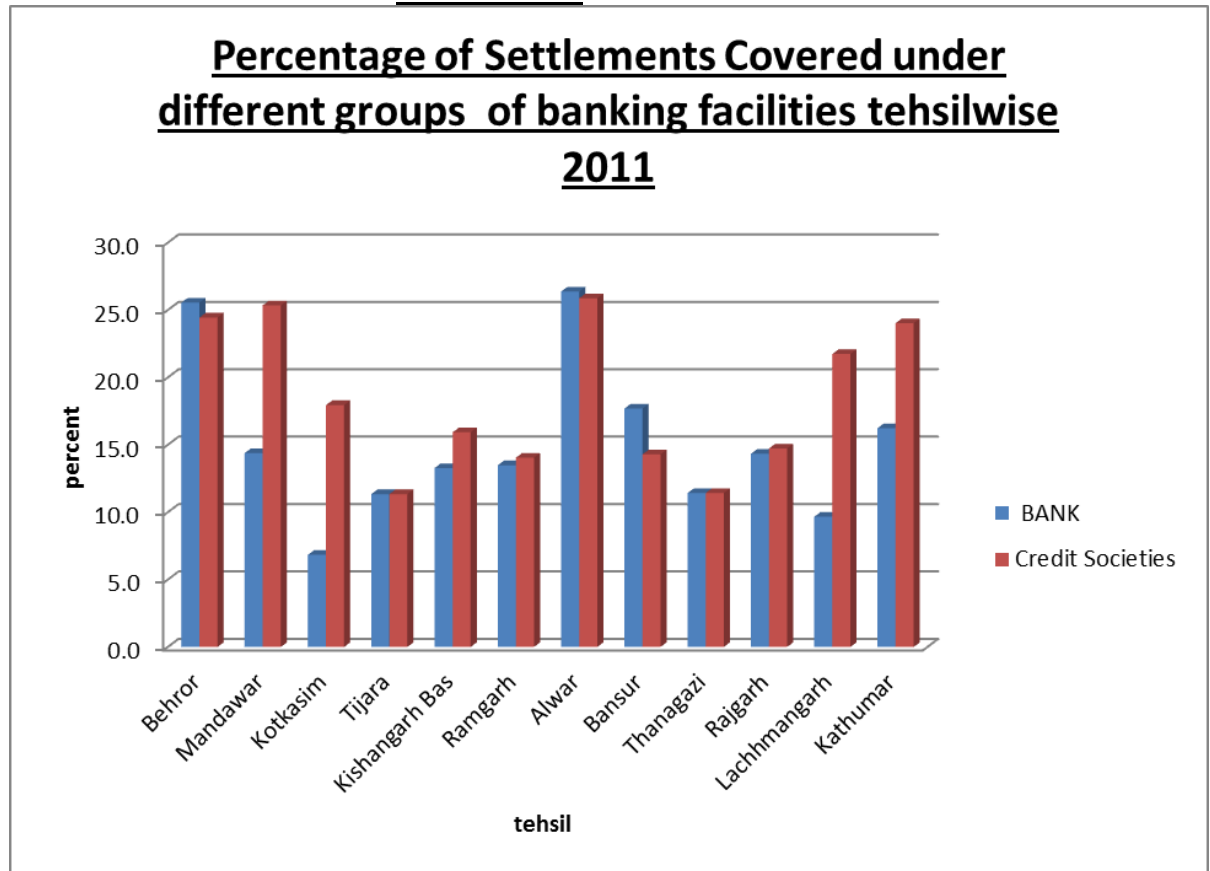
The distribution of banking services in the settlements has direct positive correlation with urban hierarchies and urbanization. Alwar and Bhiwadi are class I town and having good connectivity and infrastructure which is conducive for establishment of banking service facilities. Government schemes also play important role in deciding the distribution of banks to assure financial inclusion. It can be concluded that government intervention is indispensable in bringing financial inclusion by opening innovative banking services and economically viable option for banking institutions. At the same time government can think of regional planning for creating innovative urban location by introducing connectivity infrastructure of missing functions of centrality in small urban areas so that banking service became viable for the providers.

Table No. 3.7
Alwar district
Percentage of Settlements Covered under different groups of banking facilities
tehsilwise 2011

Tehsil	Banking facility indicator		
	Total settlement	Bank	Credit societies
Behror	180	25.6	24.4
Mandawar	146	14.4	25.3
Kotkasim	117	6.8	17.9
Tijara	194	11.3	11.3
Kishangarh Bas	113	13.3	15.9
Ramgarh	178	13.5	14.0
Alwar	201	26.4	25.9
Bansur	147	17.7	14.3
Thanagazi	175	11.4	11.4
Rajgarh	258	14.3	14.7
Lachhmangarh	207	9.7	21.7
Kathumar	154	16.2	24.0

Source: District Census Handbook, Alwar, Census of India, 2011

Graph No. 3.7
Alwar district
Percentage of Settlements Covered under different groups of Banking facilities
tehsilwise 2011



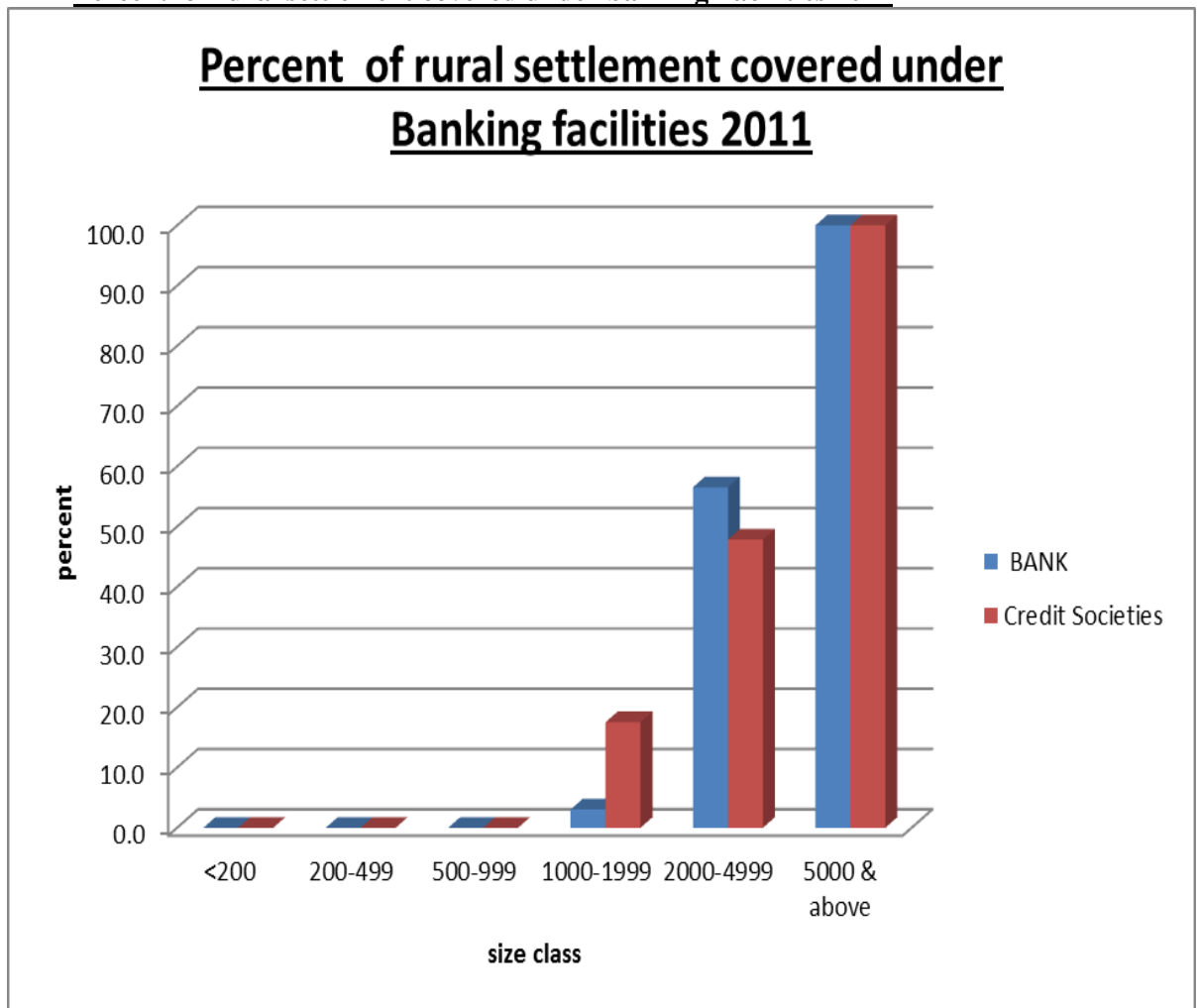
Source: District Census Handbook, Alwar, Census of India, 2011

Table No.3.8
Alwar district
Percent of rural settlement covered under banking facilities 2011

Size of rural settlement	Credit indicators	
	Bank	Credit societies
<200	0.0	0.0
200-499	0.0	0.0
500-999	0.0	0.0
1000-1999	3.0	17.5
2000-4999	56.5	47.8
5000 & above	100.0	100.0

Source: District Census Handbook, Alwar, Census of India, 2011

Graph 3.8
Alwar district
Percent of rural settlement covered under banking facilities 2011



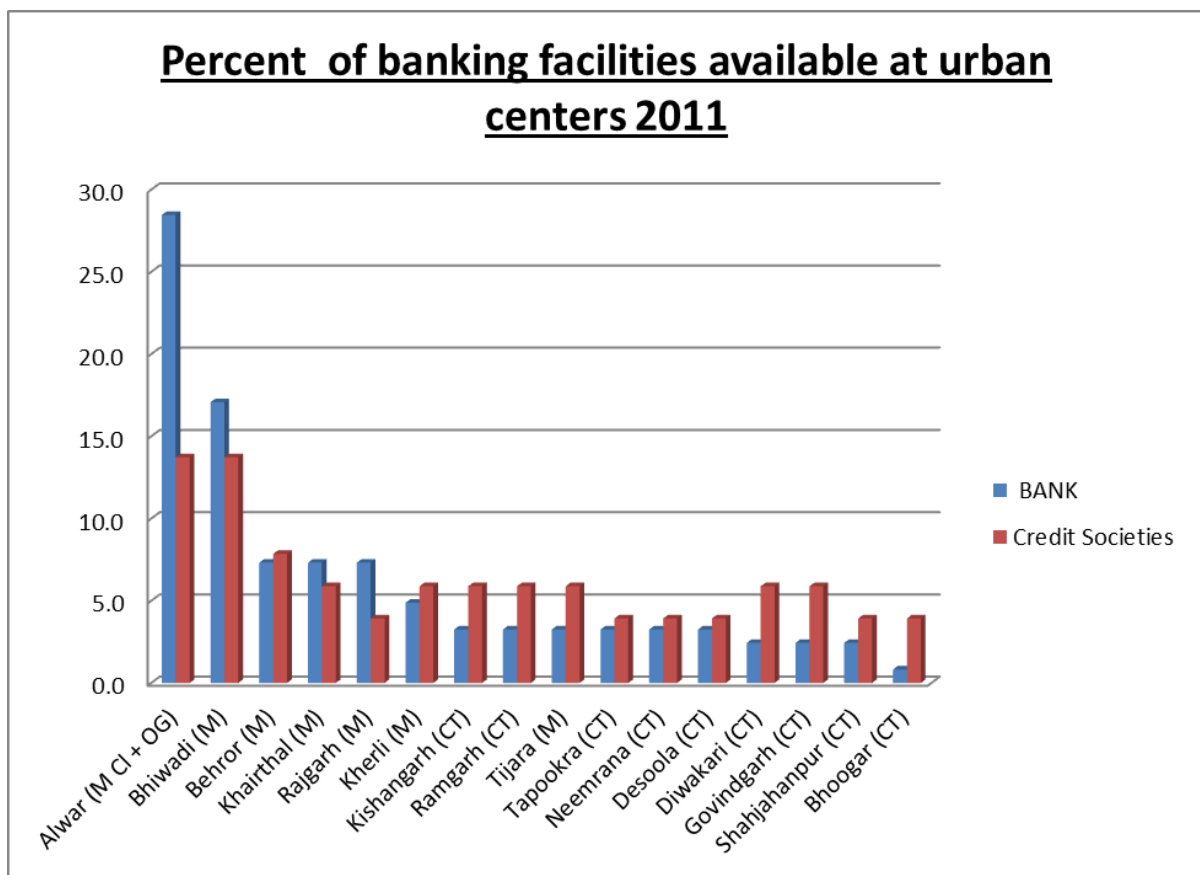
Source: District Census Handbook, Alwar, Census of India, 2011

Table No.3.9
Alwar district
Percent of Banking facilities available at urban centers 2011

Town name	Credit indicators	
	Bank	Credit societies
Alwar (M CI + OG)	28.5	13.7
Bhiwadi (M)	17.1	13.7
Behror (M)	7.3	7.8
Khairthal (M)	7.3	5.9
Rajgarh (M)	7.3	3.9
Kherli (M)	4.9	5.9
Kishangarh (CT)	3.3	5.9
Ramgarh (CT)	3.3	5.9
Tijara (M)	3.3	5.9
Tapookra (CT)	3.3	3.9
Neemrana (CT)	3.3	3.9
Desoola (CT)	3.3	3.9
Diwakari (CT)	2.4	5.9
Govindgarh (CT)	2.4	5.9
Shahjahanpur (CT)	2.4	3.9
Bhoogar (CT)	0.8	3.9

Source: District Census Handbook, Alwar, Census of India, 2011

Graph No. 3.9
Alwar district
Percent of banking facilities available at urban centers 2011



Source: District Census Handbook, Alwar, Census of India, 2011

3.5 Distribution of Recreation Facilities.

The recreation service is a service mostly demanded by the city dweller in a classical case as it serves as leisure service for people in the settlement. It is considered that every service developed because of growth point concept²² and growth points concept mostly developed from the study of industrialization and economic growth hence it can be infer that the same growth point concept is equally applicable for the creation of outdoor recreation services²³.

Any crowded confinement of urban space importantly needs the service of recreational space, so such services must be more in demand in the urban space. To access the capacity of urban places in Alwar district for availability and distribution of recreation services, the census²⁴ data has been analyzed. The findings are presented tehsil wise, rural and urban wise and it includes cinema theater, auditorium, stadium, public library and public reading rooms.

(a) Recreation Facilities in tehsils

There are more settlements around the Alwar tehsil is covered by recreational facilities like cinema and followed by Rajgarh. Cinemas are absent in Mandawar and it is lowest in Behror. Auditorium facility is at the top level in the settlement of Ramgarh and followed by Alwar. Auditorium facility is absent in Mandawar, Kotkasim, Bansur, Thanagaji and Rajgarh tehsil. Stadium facility is absent in most of tehsils like Behror, Mandawar, Kishangarh Bas, Bansur, Thanagazi, and Lacchmangarh. Library and public reading room, service coverage is more in

²² Hirschmann, Albert O., (1961) *The Strategy of Economic Development*. New Haven, Connecticut: Yale University Press, pp. 183-187.

²³ Harper, Robert A., Schmudde, Theodore H. and Thomas, Frank H. (1966). Recreation Based Economic Development and the Growth-Point Concept , *Land Economics*, Vol. 42, No. 1 , pp. 95-101.

²⁴ Op. cit., No.7.

settlements of Alwar and in Mandawar, Lacchmangarh, Kishangarh Bas and Tijara settlements have lowest coverage of such services. Alwar tehsil have the highest percentage of settlements covered under the recreational services. And for this the most appropriate reason can be its place at the highest order city and also have well developed other services generating the threshold to create demand for recreational services.

(b) Recreation Facilities in Rural Settlements

The distribution of recreational service in the settlements of Alwar district according to the population size class. It is evident that less than 200 size class of population has not any recreational facilities. Population size classes of (200-499 range) settlement are covered by cinema theatre at the level of 1% and class size of 200 or less than 5000, Population size class coverage under cinema theatre is less than 1%. Cinema being one of the less times consuming and less costly recreational services hence more in demand by the relatively lower order settlements.

Auditorium and stadiums are absent in all size class of settlement. Public library and public reading room facility is absent in all the settlement less than 2000 population size class. It is only 9.5% in settlement of population size class above, 2000-4999. Population size class of 5000 and above is fully covered by public library and public reading room, indicating direct relation between large size settlement and recreation facilities.

(c) Recreation Facilities in urban centers

At urban center highest cinema theatre facility is in Bhiwadi as it is one of the industrial town with migrant laborers followed by Alwar and Neemrana town. In Kherli, Diwakari, Ramgarh, Desoola, Bhoogar and Shahjahanpur this facility is not available. Auditorium facility is more in the settlements of Alwar followed by Tijara, Govindgarh and Tapookra, in rest of thesil such availability is only 4%. Stadium facility is at 12.5% in Bhiwadi, Alwar, Tijara, Behror, Khairthal and

Kherli with highest in Rajgarh as it has more non-agricultural open space and near to Alwar. In rest of urban center, this facility is absent. Public library and public reading room is not available in Neemrana, Tapookra, Desoola, Bhoogar and Shahjahnpur but such facilities are more in Alwar city.

Alwar and Bhiwadi is far ahead in terms of recreation facilities among all urban center, as these urban centers are class I census town. These towns have sufficient infrastructure, connectivity and population for development of recreation service centers. Desoola, Bhoogar and Shahjahanpur are class V order of census town which have no threshold population, connectivity and infrastructure. But these town helps the I order towns in developing economy of the Alwar city by providing labour and other services.

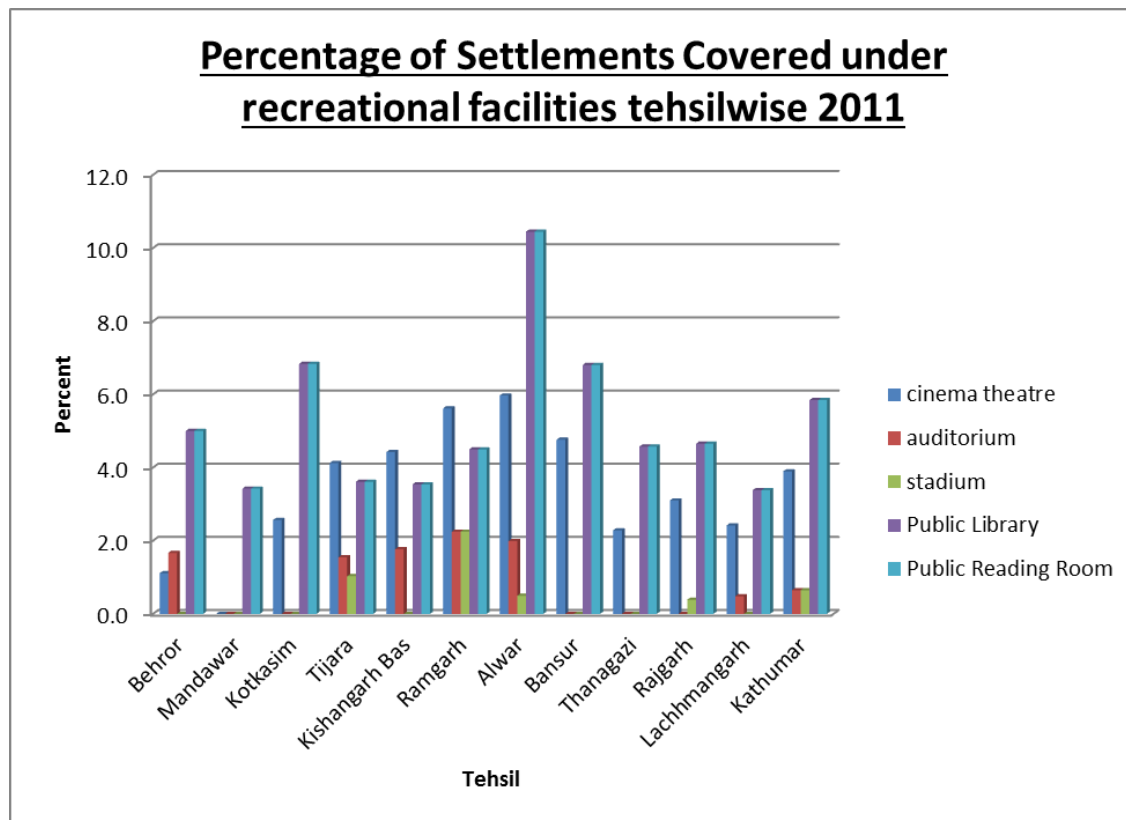
Table No.3.10
Alwar district

Percentage of Settlements Covered under recreational facilities tehsilwise 2011

Tehsil	Recreation indicators					
	Total settlement	Cinema theatre	Auditorium	Stadium	Public library	Public reading room
Behror	180	1.1	1.7	0.0	5.0	5.0
Mandawar	146	0.0	0.0	0.0	3.4	3.4
Kotkasim	117	2.6	0.0	0.0	6.8	6.8
Tijara	194	4.1	1.5	1.0	3.6	3.6
Kishangarh Bas	113	4.4	1.8	0.0	3.5	3.5
Ramgarh	178	5.6	2.2	2.2	4.5	4.5
Alwar	201	6.0	2.0	0.5	10.4	10.4
Bansur	147	4.8	0.0	0.0	6.8	6.8
Thanagazi	175	2.3	0.0	0.0	4.6	4.6
Rajgarh	258	3.1	0.0	0.4	4.7	4.7
Lachhmanagarh	207	2.4	0.5	0.0	3.4	3.4
Kathumar	154	3.9	0.6	0.6	5.8	5.8

Source: District Census Handbook, Alwar, Census of India, 2011

Graph No. 3.10
Alwar district
Percentage of Settlements Covered under recreational facilities tehsilwise 2011



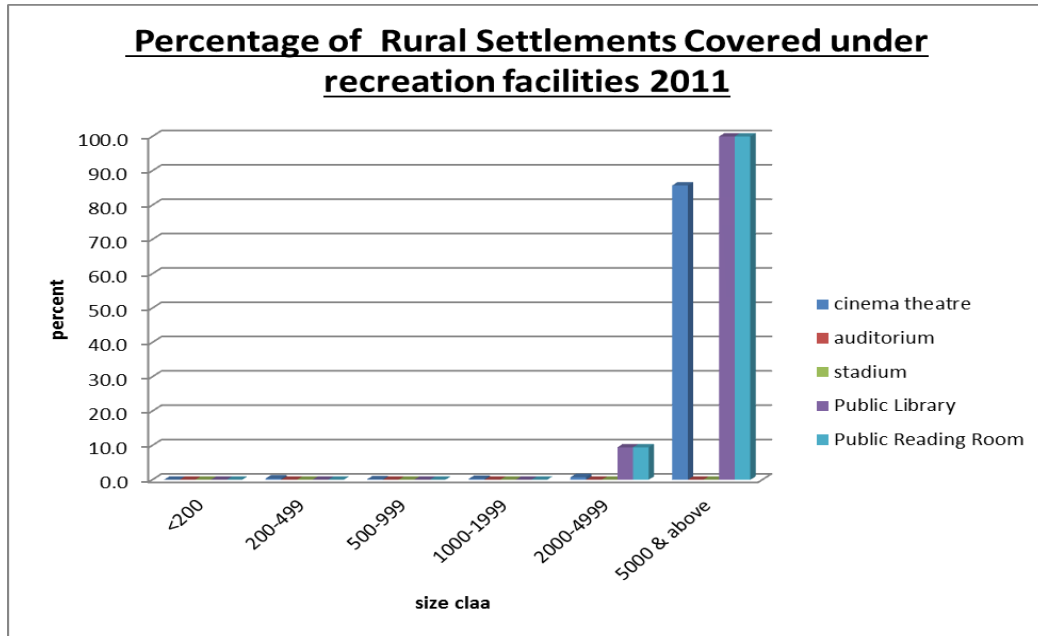
Source: District Census Handbook, Alwar, Census of India, 2011

Table No.3.11
Alwar district
Percentage of Rural Settlements Covered under recreation facilities 2011

Size of rural settlement	Recreation indicators				
	Cinema theatre	Auditorium	Stadium	Public Library	Public Reading Room
<200	0.0	0.0	0.0	0.0	0.0
200-499	0.4	0.0	0.0	0.0	0.0
500-999	0.2	0.0	0.0	0.0	0.0
1000-1999	0.3	0.0	0.0	0.0	0.0
2000-4999	0.8	0.0	0.0	9.5	9.5
5000 & above	85.7	0.0	0.0	100.0	100.0

Source: District Census Handbook, Alwar, Census of India, 2011

Graph No. 3.11
Alwar district
Percentage of Rural Settlements Covered under recreation facilities 2011



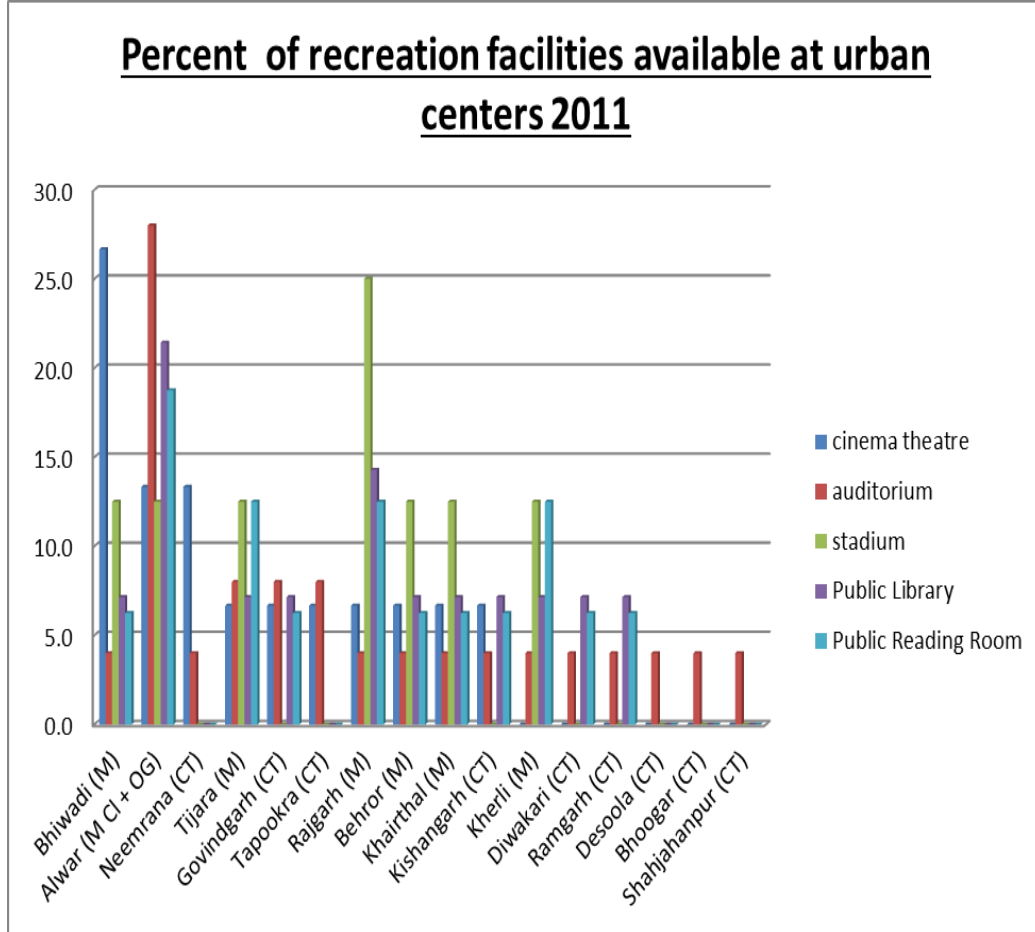
Source: District Census Handbook, Alwar, Census of India, 2011

Table No. 3.12
Alwar district
Percent of recreation facilities available at urban centers 2011

Town Name	Recreation indicators				
	Cinema theatre	Auditorium	Stadium	Public Library	Public Reading Room
Bhiwadi (M)	26.7	4.0	12.5	7.1	6.3
Alwar (M CI + OG)	13.3	28.0	12.5	21.4	18.8
Neemrana (CT)	13.3	4.0	0.0	0.0	0.0
Tijara (M)	6.7	8.0	12.5	7.1	12.5
Govindgarh (CT)	6.7	8.0	0.0	7.1	6.3
Tapookra (CT)	6.7	8.0	0.0	0.0	0.0
Rajgarh (M)	6.7	4.0	25.0	14.3	12.5
Behror (M)	6.7	4.0	12.5	7.1	6.3
Khairthal (M)	6.7	4.0	12.5	7.1	6.3
Kishangarh (CT)	6.7	4.0	0.0	7.1	6.3
Kherli (M)	0.0	4.0	12.5	7.1	12.5
Diwakari (CT)	0.0	4.0	0.0	7.1	6.3
Ramgarh (CT)	0.0	4.0	0.0	7.1	6.3
Desoola (CT)	0.0	4.0	0.0	0.0	0.0
Bhoogar (CT)	0.0	4.0	0.0	0.0	0.0
Shahjahanpur (CT)	0.0	4.0	0.0	0.0	0.0

Source: District Census Handbook, Alwar, Census of India, 2011

Graph No. 3.12
Alwar district
Percent of recreation facilities available at urban centers 2011



Source: District Census Handbook, Alwar, Census of India, 2011

3.6 Conclusion

Distribution of Educational Facilities

- Percentage of settlement covered under primary school is higher in Mandawar, Behror and Bansur and lower in Thanagazi and Rajgarh. settlement covered under middle school is higher in Mandawar followed by Behror and lower in Tijara, Thanagazi, Kotkasim, Kathumar. Coverage of secondary school, senior secondary school are again higher in Mandawar Behror and lower in Rajgarh, Tijara, kishangarh bas, Lacchmangarh for secondary school and lowest in Lachhamangarh and Thangazi for senior secondary school. For college it is higher in kishangarh bas, Behror and lower in Kotkasim followed by Thanagazi, Rajgarh, Kathumar, Lacchmangarh. Mandawar and Behror are having better coverage of all type of educational institutions among all tehsils .Tijara is having least coverage of educational institution.
- Coverage of settlement under primary school is absent in less than 200 population size class settlement. It is 100% or fully covered in 1000 and above population size class. Settlement less than 200 are not covered under middle school. Size class of between 200 and 499 is having negligible coverage below 1%. Size class of 5000 & above is having full coverage under middle school. Less than 200 is again lacking with secondary school, senior secondary school and colleges. But 5000 & above size class again having full coverage of settlement by secondary & senior secondary school. But settlement coverage by colleges are less , which is 16.1%.
- Educational facilities at urban center are highest at Alwar city followed by Bhiwadi. Alwar is highest in educational facilities in comparison other town in terms of all the educational facilities. In terms of middle school

and secondary school Bhiwadi is second highest. In terms of senior secondary Kherli is second highest followed by Behror & Rajgarh. College concentration is second highest in Ramgarh followed by Kherli, Behror, Rajgarh and Neemrana. Primary school is lowest in Desoola & Ramgarh followed by Diwakari, Neemrana, Kishangarh. Middle school is lowest in Desoola followed by Ramgarh, Diwakari, Neemrana etc. Secondary school is lowest in Bhoogar followed by Desoola, Ramgarh all these are below 2%. Senior secondary is absent in Diwakari and lowest in Bhoogar & Desoola. College is absent in Desoola, Bhoogar & Diwakari and lowest in Tapookra with 1.2%.

Distribution of Health Facilities

- Percentage of settlement covered under hospital is highest in Alwar followed by Behror & Bansur, which is above 15%. It is lowest in Kotkasim followed by Lacchmangarh. Settlement covered under dispensary is highest in Behror, Bansur followed by Alwar. All these Tehsil coverage is above 10%. Lowest coverage under dispensary is in Kishangarh Bas followed by Kotkasim which are less than 4%. Settlement covered under family welfare center is highest in Alwar (7.5%) followed by Bansur, Behror, Kathumar and Ramgarh. Lowest coverage are in Kotkasim, Thanagazi, Lacchmangarh, Kishangarh Bas, which is less than 4%. coverage of settlement under maternity & child welfare is highest under Alwar tehsil followed by Behror. It is lowest in Kotkasim, followed by Lacchmangarh. Overall health facilities coverage is better in Alwar tehsil then Behror. Coverage is very poor in Kotkasim tehsil. Kotkasim tehsil has no town.
- In population size class between 200-499, dispensary, family welfare center and coverage hospital is less than 1%. Settlement of population size class between (500-999), covered under hospital is negligible (0.2%) and other health facilities are absent in this class of settlement. Settlement of

population size class between (1000-1999), covered under hospital is less than 1%. Other health facilities are absent in this class of settlement. Population size class 5000 & above are fully covered by hospital, family welfare center and maternity and child welfare center. Coverage for dispensary in this class is 85.7%.

- Hospital facilities are highest in Alwar (24.5%). It is lowest in Bhoogar, Desoola and Shahjahanpur with 1.9%. Dispensary facilities are highest in Bhiwadi (23.1%) followed by Alwar (19.2%) and in the rest of towns it is lowest with some percent of share (3.8%) except Bhoogar (7.7%). Family welfare facilities are highest in Alwar (21.1%) followed by Rajgarh, Behror and Neemrana. This facility of family welfare is absent in Bhoogar, Desoola and Shahjahanpur. Maternity & child welfare facility is highest in Alwar followed by Rajgarh, Behror and Neemrana and no such facility in Bhoogar, Desoola, Shahjahanpur.
- Alwar is having better share of overall health service infrastructure followed by Bhiwadi, Rajgarh, Behror and Neemrana.

Distribution of Banking service Facilities

- Alwar has coverage of settlement under banking facility is highest followed Behror. It is lowest in Kotkasim, Lacchmangarh, which are less than 10%. It is lowest in Tijara and Thanagazi. Banking facilities coverage is better in Alwar tehsil and Behror tehsil as these are town of higher order.
- In rural settlement of less than 1000 population size class, banking facilities are absent. It is indicating lower size classes have no banking facilities. 5000 & above size class is having full coverage under banking & credit facilities.

- Among urban centers, highest banking facility is in Alwar, followed by Bhiwadi. Banking facility is lowest in Bhoogar followed by Shahajahanpur, Govindgarh and Diwakari. Banking facility is highest in Alwar and Bhiwadi among all urban centers. It is lowest in Rajgarh, Tapookara, Neemrana, Desoola, Shahjahanpur and Bhoogar.

Distribution of Recreation Facilities

- Cinema theatre facility, are covering more settlement in Alwar followed by Rajgarh. It is absent in Mandawar and lowest in Behror. For auditorium facility coverage of settlement is highest in Ramgarh, followed by Alwar. It is absent in Mandawar, Kotkasim, Bansur, Thanagaji, Rajgarh tehsil. Stadium facility is absent in most of tehsils. These are Behror, Mandawar, Kishangarh Bas, Bansur, Thanagazi and Lacchmangarh. For library & public reading room, coverage of settlement is highest in Alwar. It is lowest in Mandawar, Lacchmangarh followed by Kishangarh Bas and Tijara.
- In less than 200 size class of settlement, here is absence of type of recreational facilities. Population size class between 200-499 coverage under cinema theatre is less than 1% between 200 to less than 5000. Population size class coverage under cinema theatre is less than 1%.
- Coverage under auditorium and stadium is absent in all size class of settlement. Public library & public reading room facility is absent in all the settlement less than 2000 population size class. It is only 9.5% in settlement of population size class 2000-4999. Size class 5000 & above is fully covered by public library & public reading room.
- At urban center highest cinema theatre facility is in Bhiwadi, followed by Alwar and Neemrana. In Kherli, Diwakari, Ramgarh, Desoola, Bhoogar & Shahjahanpur this facility is not available. Auditorium facility is highest in

Alwar followed by Tijara, Govindgarh, and Tapookra. In rest of these availability is 4%. Stadium facility is 12.5% in Bhiwadi, Alwar, Tijara, Behror, Khairthal and Kherli. It is highest in Rajgarh. In rest of urban center, this facility is not available. Public library & public reading room is not available in Neemrana, Tapookra, Desoola, Bhoogar and Shahjahnpur. These facilities are highest in Alwar city.

- City and town presence or any place developed as central place is the main reason for availability of many services function, if all such services depends on town and central places then it is obvious that some of the most important services function will be absent for most of the population like health, education, banking facilities which are required realizing socio economic development of Alwar region. Most of the SC/ST population dominating settlements lacks in primary education infrastructure causing disparities at the basic level. And dependency on cities and town is more for almost every type of services.

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Chapter - 4

IDENTIFICATION OF CENTRAL PLACES AND THEIR SPATIAL ORGANIZATION

4.1 Introduction

Central place is a place of higher significance as compared to the surroundings in terms of availability of economic activities, administration services, population density, emerging settlement pattern, services and opportunities. Such place with almost all the required central services act as growth points¹ and it may lead to innovation of new services or extension of existing services in the nearby settlements generating economies of scale². Present chapter studies the identification of different type of service centers on the basis of ranking of settlements of Alwar district. In this process of identification of centrality several variable of centrality which can provide a range of goods and services³ are taken in to account for statistical analysis. First section of the chapter covers methodology and different indicators for each variable, are studied independently. Further in the chapter central place based on services, function and related variables are identified. While calculating central place, appropriate weights is assigned to the each sub function variable. Identification and ranking of settlements are based on composite index of different socio-economic indicators.

Chapter has also identified central place for each centrality variable. Their distribution in rural settlements, urban settlements and among tehsils has been studied already in Chapter 3. Central place are ranked in different orders based on their composite score. Further based on this classification, the order for hierarchy is calculated for the central place. In this way this chapter identifies the settlement based on ranking and study the distribution and pattern of central places in Alwar district. Further this chapter identifies settlement based on combined score of all the variables to assess the level of service. In this way central places system of

¹ Hirschmann, Albert O. (1961) *The Strategy of Economic Development*, New Haven, Connecticut: Yale University Press, pp. 183-187.

² Friedmann, John (1963) *Economic Policy for Developing Areas*, Papers and Proceedings of the Regional Science Association, 1963, pp. 44-46.

³ Berry, B. J. L. & Garrison, W. L. (1958) *The Functional Bases of the Central Place Hierarchy*, *Economic Geography*, pp. 145- 154.

Alwar district has been identified and there spread influence has been analyzed in contributing to socio-economic development.

Rank size rule⁴ is calculated to examine the urbanization pattern and chapter also identifies network efficiency and connectivity in Alwar district. It examines the relation of central places with connectivity and network efficiency. To calculate network efficiency Alpha, Beta, Gama index and cyclometric number are calculated.

4.2 Identification of Service Center

The variables are taken based on the central place theory⁵ for calculating composite score of different services impacting economic activities. Population is taken as variable, because it provides threshold, which is defined as minimum supporting population size for starting the economic activities and set in the process of commercialization for different economic activities that act as a growth point. This section explains the method to calculate composite score based on various variables. In this study five sets of variables are taken for calculating centrality and each of the variables is sub divided to expand the coverage which can be referred to Table No.4.1. The variables selected are combined to calculate composite index for identifying central places. This whole process involves the mentioned steps.

- a) All composite index of each indicator is calculated.
- b) For the calculation of composite Score of each indicator weight is given to each function.
- c) Weight is calculated for each function by scarcity value method⁶.

⁴ Zipf, G.K. (1946) . The Pi p_j/D Hypothesis on the Inter City Movements of persons, American Social Review, Vol.II..

⁵ Dacey, Michael F. (1965). The Geometry of Central Place Theory. Geografiska Annaler. Series B, Human Geography, Vol. 47, No. 2 pp. 111-124.

⁶ Mahmood, Aslam (1998). *Statistical Methods in Geographical Studies*, Rajesh publications, New Delhi.

d) Combined score of each function is calculated. To remove biasness of scale z score⁷ is used and clubbed and arranged all variables in descending order.

e) Classification of different orders is done to identify central places with different order based on natural break point.

e) Classification of central places based of hierarchy is done.

The study for the connectivity analysis in Alwar follows the mentioned steps.

a) Alpha, Beta, Gama index and Cyclometric number is calculated⁸.

b) Ranking of the network score obtained from different indices is done based on Kendall Ranking method⁹.

c) Different ranking obtained are clubbed to study network efficiency in Alwar

Definition of scarcity value method¹⁰ is given as, higher is the scarcity higher is the value of the function and lower the scarcity lower the value, this method is used in process of assigning weight to each function.

The procedure also involved clubbing the different indicators in that process the biasness of scale¹¹, has been removed by dividing each function by its mean.

⁷Ibid.

⁸ Ibid.

⁹ Ibid.

¹⁰Ibid.

¹¹ Ibid.

Table No. 4.1
Alwar district

Set of Indicators to calculate composite index 2011

Education Indicators	Health Indicators	Population Indicators	Credit Indicators	Recreation Indicators
Primary school	Hospitals	Population Density	Banks	Cinema theatre
Middle school	Dispensaries			Stadium
Secondary school	Family welfare center			Auditorium
Senior secondary school	Maternity child and welfare center			Public library
College				Public reading room

4.3 Education service center

The education as a service and a function of centrality has been observed for the number of primary, middle, secondary, senior secondary and college are observed in all the settlements of study area. Order of the education services then gives a clear understanding of distribution of education service and Alwar stand at first order education service center as the settlements, there have all level of educational services infrastructure. Second order education service centers are present in Rajgarh, Kherli, Bhiwadi and Behror settlements. Third order education service centers are in Khairthal, Ramgarh, Lacchmangarh, Neemrana, Narayanpur, Tijara and Thanagazi settlements. 4th order education service center are in Mandawar, Shahjahanpur, Kasba Bansur, Govindgarh, Kishangarh, Tapookara, Pinan, Baroda Meo, Bardod, Malakhera, Madhosinghpura, Kotkasim and Beejwa settlements. Order of education service centers are decided by various factors. These factors are population density, connectivity, and infrastructure, availability of other related service,

physiographic, urbanization and socio economic condition which together influence the demand for education services.(Refer Table no- 4.2 and Map No.4.1)

Alwar is comparatively more urbanized city among all tehsils it has highest number of urban population and centrally located with better connectivity. All these factors support for having higher score of education's composite index and placed it at highest order among education service centers. Rajgarh and Kherli have good connectivity through road and railways, class III and IV census town respectively with lower population growth rate, still they have significantly good score in order of education services, and for this the supporting factor may be the connectivity and low concentration of SC and ST population. Good connectivity may feed in to the threshold population for having higher order services by attracting people from nearby settlement thus the low population growth may not create problem of threshold if there is good connectivity. And low concentration of socially and economically backward population, the demand for education services would already be high because people from socially low strata seldom demand for education¹², thus this particular factor may be enforcing the education service demand up, due to comparatively less concentration of SC and ST population. Bhiwadi and Behror, both are on strategic location with highway connecting Delhi to Jaipur. NH-8 passes through Behror and both centers have industrial hub. Bhiwadi is fastest growing center in terms of population growth rate in Alwar district and has many industrial complexes. All these factors make conducive environment for the establishment of infrastructure like education.

The hierarchy score of education service center present the picture as 1st order education service center is only one, and four 2nd order, seven 3rd order and

¹²Singh, Vikram (2014). Pattern and determinants of social exclusion in schools among children of scavenger community at primary level education in India. *Voice of dalit*, vol. 7 issue 1, p.81-93.

thirteen 4th order educational service centers. Fifth and sixth order service centers are 475 & 1570 respectively.(Refer Table No. - 4.3, Map No.-4.1)

As per the findings only service center is of first order, which is Alwar city. Alwar has highest urban population because of immigration of students in Alwar from surrounding settlements hence required population threshold achieved, for creating demand for education services and being a city it may have all the other supporting services. Urban population also acts as threshold to create education service centers so being a town matter for having educational services, but for higher order education services, sufficient threshold is needed and is provided by higher order service centers like Alwar.

Distribution of education service centers based on hierarchy also support the hypothesis made in explanation. First order education service center is in Alwar tehsil. Second order education service centers are in Kathumar, Behror, Rajgarh and Tijara tehsils. Third order education service centers are distributed in Behror, Kishangarh Bas, Lacchamangarh, Ramgarh, Thanagzi and Tijara. Fourth order education service centers are distributed in most of tehsils except, Kathumar, Mandawar, Thanagazi. Fifth and sixth order service centers are distributed in all the tehsils of Alwar district. Only Alwar tehsil has first order service center. Around half of the population of the Alwar tehsil is urbanized being centrally located and connected from different directions through roads and railways and have presence of all other services. Rajgarh and Kherli have good connectivity through roads and railways. Behror and Tijara are near to New Delhi and on the roads which connect state capital Jaipur and New Delhi. Level of urbanization is also comparatively high in Tijara.(Refer Table No.-4.4, Map No.-4.1)

With the statistic analyzed in the above explanation it can be inferred that educational services in the settlements of Alwar follows the centrality principle and it is based in the settlements which are more urbanized and connected along with the threshold population. And towns with lower order of hierarchy have either some kinds of education services or other based on the population

threshold. Some settlements in Alwar have comparatively better education services because of social structure and connectivity.

Table No. 4.2
Alwar district
Order of Education service center 2011

Settlement	Education service score	Order
Alwar (M Cl + OG)	41.05	I
Rajgarh (M)	6.84	II
Kherli (M)	6.33	II
Bhiwadi (M)	6.31	II
Behror (M)	5.75	II
Khairthal (M)	4.62	III
Ramgarh (CT)	4.35	III
Laxmangarh	4.09	III
Neemrana (CT)	3.89	III
Narayanpur	3.44	III
Tijara (M)	3.33	III
Thanagazi	3.33	III
Mundawar	2.97	IV
Shahjahanpur (CT)	2.83	IV
Kasba Bansur	2.60	IV
Govindgarh (CT)	2.29	IV
Kishangarh (CT)	2.13	IV
Tapookra (CT)	1.91	IV
Pinan	1.69	IV
Baroda Meo	1.58	IV
Bardod	1.28	IV
Mala Khera	1.15	IV
Madhosinghpura	1.14	IV
Kotkasim	1.09	IV
Beejwa	1.09	IV
Jahar Khera	1.01	IV

Source: District census Handbook of Alwar, Census of India, 2011

Map No. 4.1
Alwar district
Order of Education service center 2011

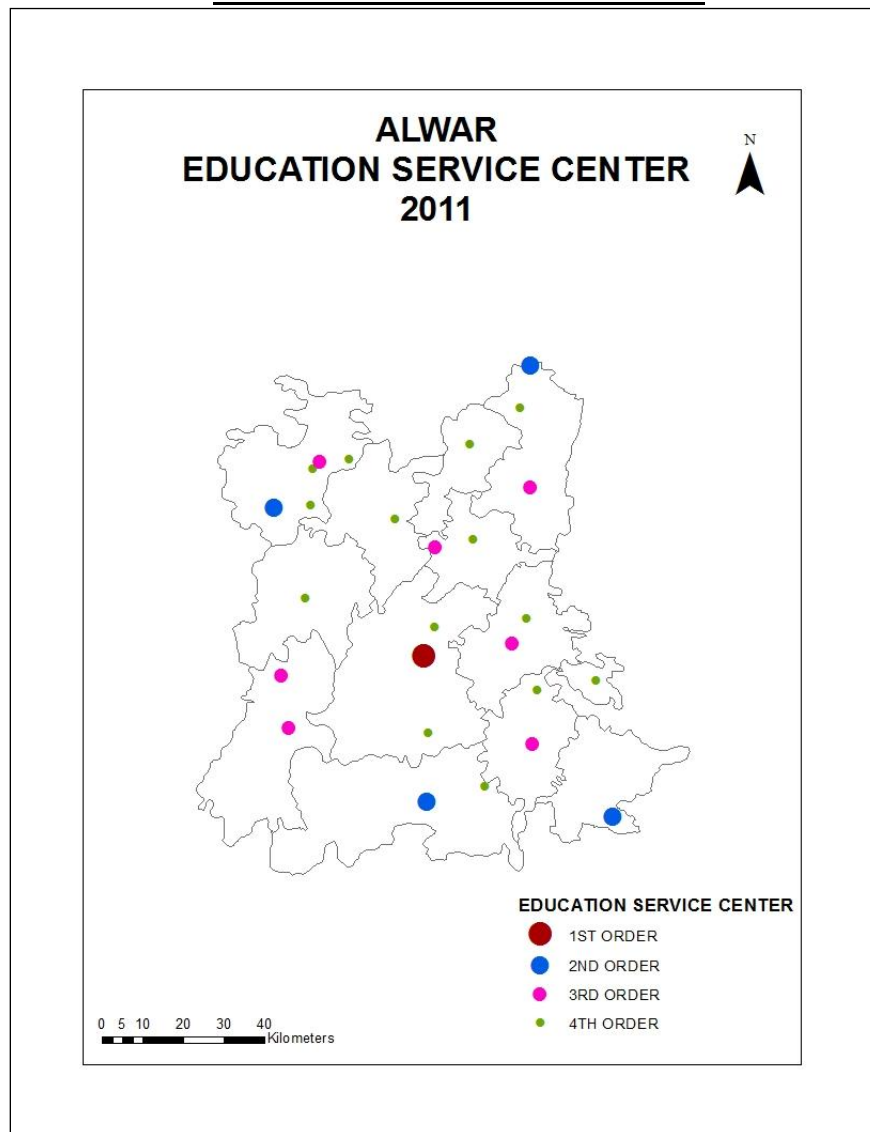


Table No. 4.3
Alwar district
Hierarchy of Education service center 2011

Order	Education Service Center (in numbers)
I	1
II	4
III	7
IV	13
V	475
VI	1570

Source: District census Handbook of Alwar, Census of India, 2011

Table No. 4.4
Alwar district
Distribution of Education service center 2011

Tehsil	Education service centers order (in numbers)					
	I	II	III	IV	V	VI
Alwar	1	0	0	2	59	139
Bansur	0	0	0	1	46	100
Behror	0	1	1	3	74	101
Kathumar	0	1	0	0	41	112
Kishangarh Bas	0	0	1	1	18	93
Kotkasim	0	0	0	1	22	94
Lachhmangarh	0	0	1	2	30	174
Mandawar	0	0	0	0	55	91
Rajgarh	0	1	0	1	44	212
Ramgarh	0	0	1	1	30	146
Thanagazi	0	0	2	0	30	143
Tijara	0	1	1	1	26	165

Source: District census Handbook Of Alwar, Census of India, 2011

4.4 Health service center

Health care facility distribution is based on many factors like order and hierarchy of the settlements and the efficient network¹³. Statistical analysis has been kept simple to make an observation on the location and order based health service distribution in Alwar but many a literature has been refer to establish the relation between facts and variables used to depict the clarity on any such relations. (Taket¹⁴, Schultz¹⁵, Morrill and Schultz¹⁶, Revelle¹⁷)

The statistics observed for the health services as per the order of the centrality in tehsils. Table No.4.5 and map no- 4.2. First order health service center is in the settlements of Alwar tehsil. At 2nd order Bhiwadi, at 3rd order Rajgarh, Behror and Neemrana at 4th order Tijara, Khairthal, Ramgarh and Kherli. In providing health service center, there distribution is supported by population threshold and government policy and schemes along with physical landscape and connectivity. Other factor is better infrastructure facility with urbanization. Alwar and Bhiwadi both have significant level of urbanization because of their location. Bhiwadi is urbanized because of industrialization which in turn causes immigration of work force to provide population threshold and better infrastructure facilities. Together all these create the supply condition for health service an important factor to promote the growth of health service centers, in terms of connectivity Rajgarh Behror and Neemrana towns have good connectivity support the supply condition.

¹³ Mehrez, A., Sinuany, S., Z., Geva T. A. & Binyamin, S. (1996). On the Implementation of Quantitative Facility Location Models: The Case of a Hospital in a Rural Region. *The Journal of the Operational Research Society*, Vol. 47, No. 5, pp. 612-625.

¹⁴ Taket, A. R. (1989) Equity and access: exploring the effects of hospital location on the population served-a case study in strategic planning, *J. Opl Res. Soc.* 40, 1001-1009.

¹⁵ Schultz, G. P. (1970). The logic of health care facility planning. *Socio-Economic Planning Sci.* 4, p. 383-393.

¹⁶ Morrill, R. L. & Schultz, R. (1971) The transportation problem and patient travel to physicians and hospitals. *Ann. Reg. Sci.* 5(1), p. 11-24.

¹⁷ Revelle, C.S. (1968). Central facilities location. Report No. 1002, Center for Environmental Quality Management, Cornell University.

Hierarchy of health service centers show that there is only one 1st order and 2nd order health service center, three 3rd order, four 4th order and 5th order health service centers are 160 and 6th orders are 1901. This first order center is Alwar and second order service center is Bhiwadi. This outcome suggests that there is sign of centrality based distribution of health services. Refer Table No. 4.6 and Map No- 4.2

Statistics of order for the health service is based on the availability of all type of health related services, which are considered in this study and if settlements having all types of health service then it will be of the order one in term of health services. Distribution of health service centers tehsilwise reveals that 1st order health service center is located in Alwar tehsil. 2nd order service center are in Tijara tehsil. 3rd order service center are distributed in Behror and Rajgarh. 4th order service center are distributed in Kathumar, Kishangarh Bas, Ramgarh and Tijara. 5th and 6th order service centers are distributed in all the tehsils. Alwar tehsil is again having first order service center as it has Alwar city. Tijara tehsil have second order service center which is Bhiwadi. Urbanization, industrialization, population size and connectivity are deciding for distribution of higher and lower order health service centers, higher order health services in higher order settlements is supporting the centrality hypothesis. Population density is also high in the settlements in higher orders health centers. Kotkasim, Bansur, Mandawar and Thanagazi are far behind in the development of higher order health service centers. Physiography, urbanization and connectivity are obstacles in the diffusing the development among these tehsils which in turn led to low income and low affordability and thus low demand for health services. Bansur and Thanagazi fall under region of dissected low hills and settlements there are also sparsely populated, so there is less connectivity as compared to other tehsils. There is no urban population in Bansur, Mandawar, Thanagazi and Kotasim tehsils, significantly contribute for not having higher order health service centers. Refer Table No.4.7 Map No- 4.2

Many factors of centrality affect the distribution of health related services in Alwar region and together with this the growth pole hypothesis is working in deciding the emergence of health related market. Any cause whatever it may be should not be let to set in, so that it decides health related service distribution based on market or on centrality in developing regions. Because such situation could lead to drop out of the settlements in availing health related services and, such an important indicator of human development that any developing nation cannot afford to ignore. Regional planning must take in to the consideration for health related services.

Table No. 4.5
Alwar district
Order of Health service center 2011

Settlement	Health score zi	Order
Alwar (M CI + OG)	20.80	I
Bhiwadi (M)	10.52	II
Rajgarh (M)	7.92	III
Behror (M)	7.30	III
Neemrana (CT)	6.68	III
Tijara (M)	4.59	IV
Khairthal (M)	4.59	IV
Ramgarh (CT)	4.59	IV
Kherli (M)	4.59	IV

Source: District census Handbook of Alwar, Census of India, 2011

Map No. 4.2
Alwar district
Order of Health service center 2011

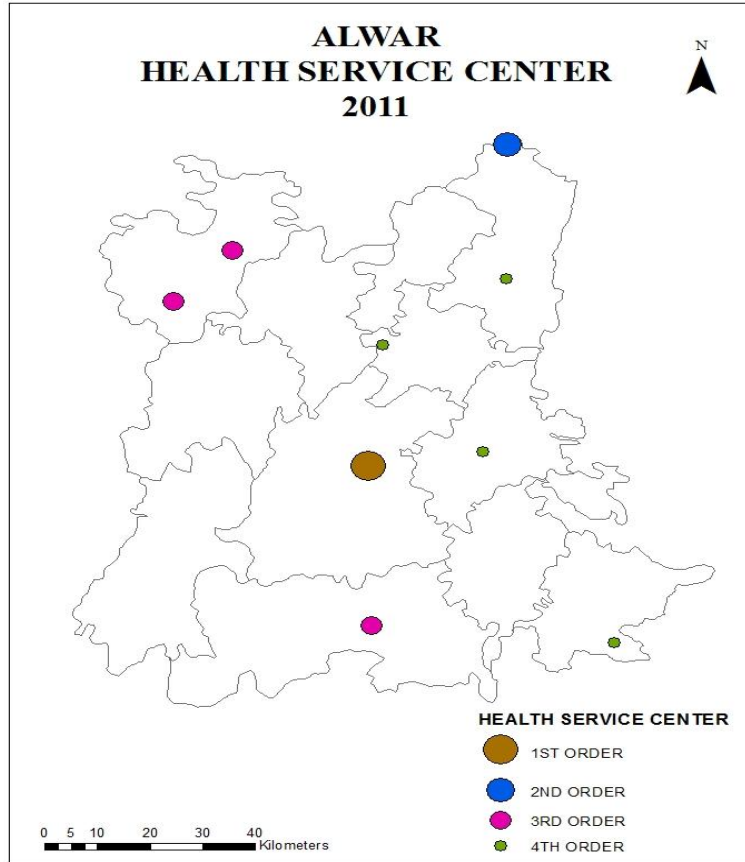


Table No. 4.6
Alwar district
Hierarchy of Health service center 2011

Order of health service center	Health Service Center (in numbers)
I	1
II	1
III	3
IV	4
V	160
VI	1901

Source: District census Handbook of Alwar, Census of India, 2011

Table No. 4.7
Alwar district
Tehsil wise Distribution of Health service center 2011

Tehsil	Health service centers in Order (in numbers)					
	I	II	III	IV	V	VI
Alwar	1	0	0	0	23	177
Bansur	0	0	0	0	18	129
Behror	0	0	2	0	22	156
Kathumar	0	0	0	1	13	140
Kishangarh Bas	0	0	0	1	3	109
Kotkasim	0	0	0	0	3	114
Lachhmangarh	0	0	0	0	14	193
Mandawar	0	0	0	0	10	136
Rajgarh	0	0	1	0	23	234
Ramgarh	0	0	0	1	8	169
Thanagazi	0	0	0	0	13	162
Tijara	0	1	0	1	10	182

Source: District census Handbook of Alwar, Census of India, 2011

4.5 Banking service center

Banking is an institution of financial services having the reach up to the lowest end in any economy, it includes a range of services which cater the need of saver and investor of any settlement and is vital for channelizing the saving in to investment in agriculture, manufacturing, medium and small scale industries in any region so that the level of economic growth in agriculture and industry are realized side by side. Besides all the cause, this service is required by every individual as this let them manage their savings on different portfolios. Providing banking services should not be based on the market mechanism especially in less developed or developing countries, as such country lack funds for investment which in turn hinders the income generation inhibit production process.

Banking is a vital service which feed in to production process directly through many sector of economy importantly through agriculture, manufacturing and industry. Thus it is important to access the level of banking services in the settlements using the statistic, obtained for order of the banking services by combining and finding their presence in all settlements, and hierarchy of the service based on the order.

The 1st order banking service centers are distributed in the settlements of Alwar, Bhiwadi have 2nd order banking service center. Third order banking service centers are in Behror, Khairthal, Rajgarh and Kherli. 4th order banking service centers are in Tijara, Kishangarh, Ramgarh, Diwakari and Govindgarh. Again Alwar and Bhiwadi are having higher order banking service centers because of level of urbanization, infrastructure availability, connectivity and industrialization. (Refer Table No.-4.8, Map No. - 4.3)

To account for the hierarchy number of settlements based on order is required so it is observed that there is one 1st order banking service center which is Alwar and one 2nd order banking service center which is Bhiwadi. There are four 3rd order banking service centers and five 4th orders, 5th and 6th order banking service center are 210 and 1849 respectively. (Refer Table No.-4.9, Map No. - 4.3)

Findings for order wise distribution of services, explains the distribution of banking service centers among tehsils 1st order banking service centers are located in Alwar tehsil which is Alwar city. 2nd order isin Tijara tehsil which is Bhiwadi town. 3rd order banking service centers are distributed in Behror, Kathumar, Kishangarh Bas and Rajgarh tehsil. 4th order banking service centers are distributed in Alwar, Kishangarh Bas, Lacchmangarh, Ramgarh and Tijara tehsil. 5th & 6th order is distributed in all the thesils of Alwar district. Alwar and Tijara tehsil are having higher order centers which are Alwar city and Bhiwadi town. Again Bansur, Kotkasim, Thanagazi and Mandawar, have no such higher order services as these are no urbanization. Bansur and Thanagazi are in the region of lower hills. Eastern Alwar is also partly under hilly region, but because of being district headquarter and centrally located have most of the services. Refer Table No. 4.10 and map No- 4.3

Such population size based and urban growth center based distribution of banking and related services give reason in support of the centrality rule and market mechanism in service distributions. If this is the condition then the vision of financial inclusion will hang in the oblivion. So creating innovative central place to increase the coverage of services can be tried.

Table No.4.8
Alwar district
Order of banking service center

Settlement	Banking score zi	Order
Alwar (M CI + OG)	24.91	I
Bhiwadi (M)	17.39	II
Behror (M)	8.17	III
Khairthal (M)	7.24	III
Rajgarh (M)	6.31	III
Kherli (M)	5.63	III
Tijara (M)	4.56	IV
Kishangarh (CT)	4.56	IV
Ramgarh (CT)	4.56	IV
Diwakari (CT)	4.02	IV
Govindgarh (CT)	4.02	IV

Source: District census Handbook of Alwar, Census of India, 2011

Map No. 4.3
Alwar district
Order of Banking service center 2011

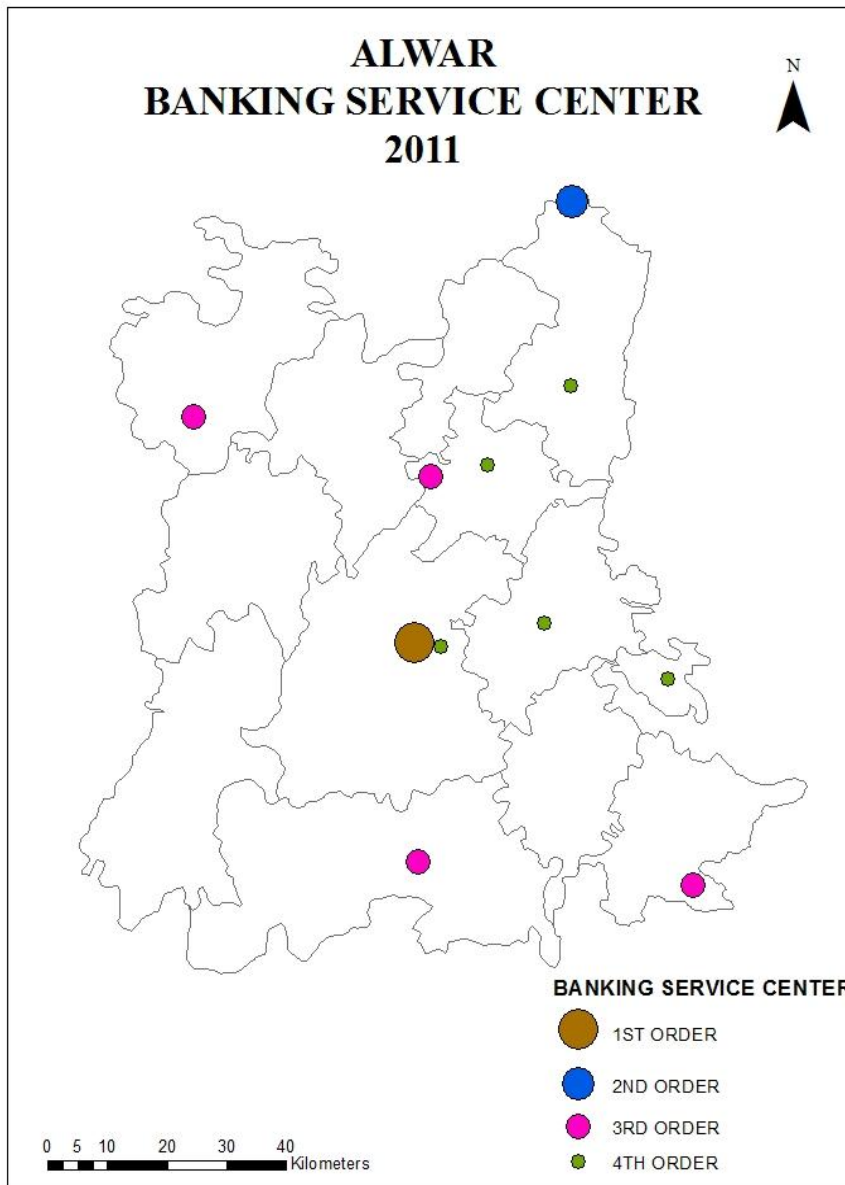


Table No.4.9
Alwar district
Hierarchy of Banking service center

Order	Banking Service Center
I	1
II	1
III	4
IV	5
V	210
VI	1849

Source: District census Handbook of Alwar, Census of India, 2011

Table No. 4.10
Alwar district
Distribution of Banking service center 2011

Tehsil	Banking Service center in Order (in numbers)					
	I	II	III	IV	V	VI
Alwar	1	0	0	1	36	163
Bansur	0	0	0	0	18	129
Behror	0	0	1	0	29	150
Kathumar	0	0	1	0	19	134
Kishangarh Bas	0	0	1	1	7	104
Kotkasim	0	0	0	0	8	109
Lachhmangarh	0	0	0	1	16	190
Mandawar	0	0	0	0	16	130
Rajgarh	0	0	1	0	23	234
Ramgarh	0	0	0	1	13	164
Thanagazi	0	0	0	0	14	161
Tijara	0	1	0	1	11	181

Source: District census Handbook of Alwar, Census of India, 2011

4.6 Recreation service center

Recreation is one of the services which are taken in to the consideration for accessing the centrality and order of this service is based on many sub indicators for recreation, clubbed together.

Any crowded confinement of urban space importantly needs the service of recreational space so such services must be more in demand in the urban space. To access the capacity of urban places in Alwar district for availability and distribution of recreation services the census¹⁸ data has been analyzed.

The study explains the distribution of recreation centers in Alwar district. 1st order recreation service center is in Alwar city, 2nd order recreation service center is in Rajgarh town and 3rd order recreation service centers are in Tijara, Bhiwadi, Behror, Khairthal and Kherli. 4th order service centers are in Govindgarh, Tapookara, Kishangarh Bas, Neemrana, Ramgarh and Diwakari settlements. Bhiwadi is far behind in terms of recreation services order in comparison to other services even being a class I census town. Rajgarh is class III census town but it is in good position for recreation services because being a single town of tehsil. Refer Table No. 4.11, Map No. 4.4

The hierarchy of recreation service centers for recreation suggests that there is one 1st order recreation service center and one 2nd order recreation service center, and five 3rd order recreation service center. Fourth order recreation service centers are six. 5th and 6th order service centers are 103 and 1954 respectively. Alwar is class I census town and Rajgarh is class III town with most of recreation services. Refer Table no- 4.12.

The distribution of different order of recreation service centers among tehsils of Alwar district. 1st order recreation service centers are distributed in the settlements of Alwar tehsil as it is Alwar city. 2nd order recreation service centers are located in

¹⁸ Census of India (2011). District Census Handbook of Alwar District, Directorate of Census Operation, Rajasthan.

Rajgarh tehsil having only one town. 3rd order service centers are distributed in Behror, Kathumar, Kishangarh Bas and Tijara. 4th order service center are distributed in Alwar, Bansur, Kishangarh Bas, Lachhmangarh, Ramgarh and Tijara tehsils. 5th and 6th order recreation service centers are distributed in all the tehsils. Recreation services are at its lowest in Thanagazi, Kotkasim and Mandawar. Refer Table No.4.13, Map No. 4.4.

Such a distribution of recreational service based on their order made it clear that services in this category are mainly concentrated in cities and towns or in its surrounding. And factors leading to such distribution are mainly urban population but now the focus is more on health and yoga the demand for recreation services of different order may rise even in low order settlements.

Table No. 4.11
Alwar district
Order of recreation service center 2011

Settlements	Recreation Score zi	Order
Alwar (M CI + OG)	26.65344	I
Rajgarh (M)	18.56085	II
Tijara (M)	13.39418	III
Bhiwadi (M)	13.05026	III
Behror (M)	10.70106	III
Khairthal (M)	10.70106	III
Kherli (M)	10.42063	III
Govindgarh (CT)	6.044974	IV
Tapookra (CT)	5.031746	IV
Kishangarh (CT)	3.854497	IV
Neemrana (CT)	3.624339	IV
Ramgarh (CT)	3.071429	IV
Diwakari (CT)	3.071429	IV

Source: District census Handbook of Alwar, Census of India, 2011

Map No. 4.4
Alwar district
Order of Recreation service center 2011

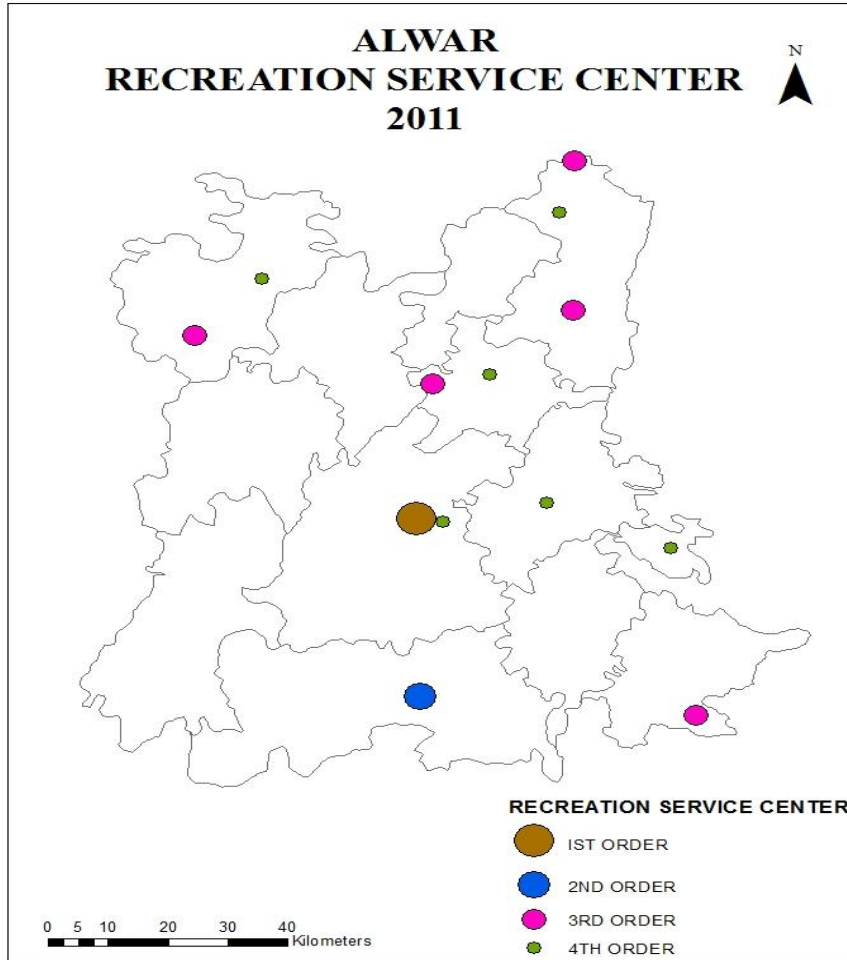


Table No. 4.12
Alwar district
Hierarchy of Recreation service center

Order	Recreation Service Center (in numbers)
I	1
II	1
III	5
IV	6
V	103
VI	1954

Source: District census Handbook of Alwar, Census of India, 2011

Table No. 4.13
Alwar district
Distribution of Recreation service center 2011

Tehsil	Recreation Service Center in order (in Numbers)					
	I	II	III	IV	V	VI
Alwar	1	0	0	1	22	177
Bansur	0	0	0	0	10	137
Behror	0	0	1	1	9	169
Kathumar	0	0	1	0	8	145
Kishangarh Bas	0	0	1	1	3	108
Kotkasim	0	0	0	0	8	109
Lachhmangarh	0	0	0	1	6	200
Mandawar	0	0	0	0	5	141
Rajgarh	0	1	0	0	11	246
Ramgarh	0	0	0	1	7	170
Thanagazi	0	0	0	0	8	167
Tijara	0	0	2	1	6	185

Source: District census Handbook of Alwar, Census of India, 2011

4.7 Population Service Center

Population is the root cause of all social, economic and political phenomenon that always remain the force behind generating new and driving old existing service centers. To determine the level of threshold for driving any central functions population density is a proper candidate.

Based on the study the population density based order of the center, Alwar city is at 1st and Diwakari at 2nd, Patti Beena, Kishangarh, Ramgarh, Kherli Ganj, and Govindgarh are at 3rd and Sitapura, Rayli, Gadpur, Guwara Lesava, Behror, Khairtal, Bas Dhikhda, Kootooki, Narwas, Pathredi, Gola ka Bas, and Guwara Dabar at 4th order. Refer Table No.4.14, Map No. 4.5.

It means most of the urban population is concentrated in cities, it may be because of higher concentrations of many central services and related infrastructure. And thus the hierarchy can be easily seen as there is one 1st order and one 2nd order population density based center. With nine 3rd order and fourteen 4th orders, eight hundred four 5th order population density wise service center others are of 6th order of service center. Population order and its hierarchy also support the centrality model. Refer Table No.4.15

The study explains the distribution of population service centers among tehsils of Alwar district. There is one 1st and 2nd order service center in Alwar tehsil. And 3rd order service centers are distributed in Kathumar Kishangarh Bas, Kotkasim, Lacchmangarh, Rajgarh, Ramgarh and Tijara tehsils. Fourth order service centers are distributed in all the tehsil except Kathumar, Kotkaim, Mandawar and Ramgarh. 5th & 6th order service center are distributed in all the tehsils of Alwar district. Alwar tehsil has highest population density among all the tehsils so it is of higher order population service center. Thanagazi has not any higher order service center because of low population density. Physiography is the main cause of low population density in Thanagazi, which also hinder urbanization. That's why Thanagazi don't have urban population. Refer Table No. 4.16 and Map No. 4.5

Table No. 4.14
Alwar district
Order of Population service center

Settlement	Population density based score	Order
Alwar (M CI + OG)	17.99892	I
Diwakari (CT)	10.22172	II
Patti Beena	9.917306	III
Kishangarh (CT)	7.598508	III
Ramgarh (CT)	7.356932	III
Kherli (M)	7.2	III
Ganj	7.142053	III
Bhiwadi (M)	5.583539	III
Tapookra (CT)	5.544203	III
Shahpur	5.371981	III
Govindgarh (CT)	5.272509	III
Sitapura	4.998295	IV
Rayli	4.954196	IV
Gadpur	4.936419	IV
Itarna (Rural)	4.704756	IV
Guwara Lala Bhaiya	4.500557	IV
Guwara Leswa	4.405797	IV
Behror (M)	4.342343	IV
Khairthal (M)	3.94473	IV
Bas Dhekda	3.914455	IV
Kootooki	3.778049	IV
Narwas	3.681159	IV
Pathredi	3.67018	IV
Gola Ka Bas	3.506394	IV
Guwara Dabar	3.111801	IV

Source: District census Handbook Of Alwar, Census of India, 2011

Map No. 4.5
Alwar district
Order of Population service center 2011

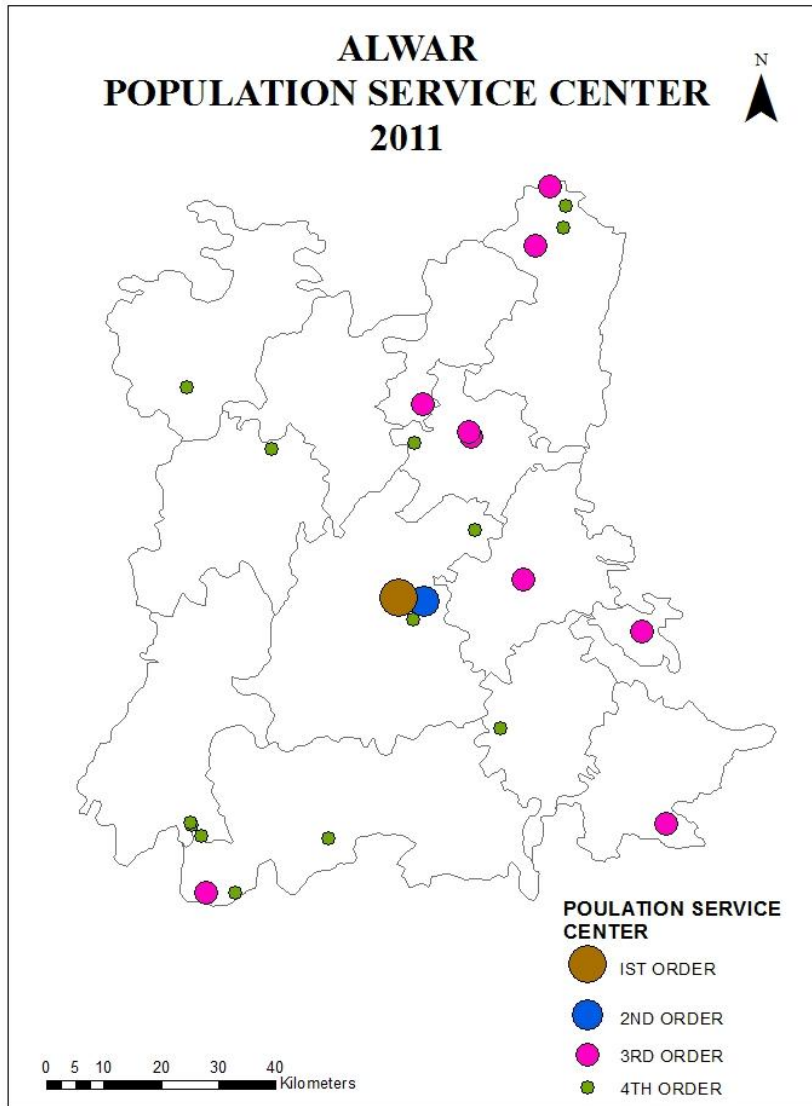


Table No. 4.15

Alwar district

Hierarchy of Population based service center

Order	population Service Center (in Numbers)
I	1
II	1
III	9
IV	14
V	804
VI	1241

Source: District census Handbook Of Alwar, Census of India, 2011

Table No. 4.16

Alwar district

Distribution of Population service center

Tehsil	Population based Service Center (In Numbers)					
	I	II	III	IV	V	VI
Alwar	1	1	0	1	91	107
Bansur	0	0	0	1	53	93
Behror	0	0	0	1	86	93
Kathumar	0	0	1	0	56	97
Kishangarh Bas	0	0	2	1	42	68
Kotkasim	0	0	1	0	38	78
Lachhmanagarh	0	0	1	1	81	124
Mandawar	0	0	0	0	64	82
Rajgarh	0	0	1	4	85	168
Ramgarh	0	0	1	0	67	110
Thanagazi	0	0	0	3	48	124
Tijara	0	0	2	2	93	97

Source: District census Handbook Of Alwar, Census of India, 2011

4.8 Combined service center

The study explains the distribution of combined service centers in Alwar district. By combining all the services a composite index is calculated. Combined index based 1st order service center is Alwar and 2nd order combined service center is Bhiwadi and 3rd order combined are Rajgarh, Behror, Kherli and Khairthal. 4th order combined service centers are Tijara, Ramgarh, Kishangarh,

Diwakari, Govindgarh, Tapookra Neemrana, Lachmangarh, Bansur,itarana (rural), Narayanpur, Thanagazi, Shahjahanpur and Baroda Meo. Alwar and Bhiwadi are class I census town. Behror, Tijara, Khairthal and Rajgarh are class III census town. Diwakari, Kishangarh, Ramgarh, Govindgarh and Kherli are class IV census town this has the impact on the combined index for obtaining the order. Refer Table No.4.17,Map No. 4.6

Study based combined services order through map is shown to depict that there is no first to fourth order service center in Mandawar and Kotkasim tehsil. There is no homogenous distribution of service centers among the tehsils. Alwar is only first order service center because of various factors, being centrally located, administrative headquarter, well connected to other tehsils and to national and state capital through railway and road ways. Alwar city carry highest share of urban population to total urban population with highest population density among all the centers in Alwar district. Also in education, health, credit, recreation and population services, it stood at first order thus Alwar is first order service center. Refer Map No. 4.6

Bhiwadi town is an industrial hub in Tijara Tehsil. Bhiwadi is rapidly growing as a city. It has highest decadal growth rate (209.71%) in 2001-2011. Because of industrialization job opportunities are created and immigration positively contributing to population growth. This town is connected to Alwar city through state highway SH- 25 and also act as agglomeration centre for economic activities fueled by rapid industrialization. This is class I census town. In 1971 Bhiwadi was a rural settlement with 1624 of population Rajasthan Government decide to develop it as industrial center because it is in proximity of Delhi, to take the advantage of location¹⁹.

The hierarchy for combined service centers in Alwar district. There only one 1st order service center and one 2nd order service center four 3rd order service

¹⁹Govt. of Rajasthan. (2010) draft master plan 2031, Master Plan for Bhiwadi-Tapookara-Khushkhera Complex. Jaipur: Town Planning Department, Rajasthan,.

centers. 4th and 5th order are 14 and 71 respectively, other tehsils have 6th order service centers. Hierarchy of service centers explains that central place theory propounded by Christaller is not applicable on Alwar district in terms of hierarchy. Refer Table No.4.18.

Study about the distribution of combined service centers among tehsils in Alwar district. 1st order combined service center is in Alwar tehsil which is Alwar city. 2nd order combined service center is distributed in Tijara tehsil, 3rd order combined service centers are distributed in, Behror, Kathumar, Kishangarh Bas and Rajgarh tehsil, 4th order combined service centers are not present in Kathumar Kotkasim, Mandawar and Rajgarh. 5th and 6th order combined service centers are distributed among all the tehsils. Alwar and Tijara is having higher order service center because of Alwar city and Bhiwadi town in Tijara. Urbanization is crucial to develop a region. Any urban center may act as a growth pole, from where development can trickle down or pick up in surrounding. Physical as well as social infrastructure can be developed through the urbanization. Multiplier effects of urbanization act as pull factor for the development in the region. There is no urban center in Bansur, Kotkasim, Mandawar and Thanagazi, hence no urbanization. It indicates no urban population is residing in these tehsils. The demand by urban population creates physical as well as social infrastructure. Refer Table No.4.19, Map No.4.6

Table No. 4.17
Alwar district
Order of combined service center

Settlement Name	Total Population of Village	Composite score	order
Alwar (M CI + OG)	322568	131.4143	1
Bhiwadi (M)	104921	52.84863	2
Rajgarh (M)	26631	41.39748	3
Behror (M)	29531	36.26439	3
Kherli (M)	17634	34.16173	3
Khairthal (M)	38298	31.09085	3
Tijara (M)	24747	27.96167	4
Ramgarh (CT)	13529	23.92038	4
Kishangarh (CT)	12429	22.11063	4
Diwakari (CT)	11188	21.67088	4
Govindgarh (CT)	11552	21.59521	4
Tapookra (CT)	9471	20.08979	4
Neemrana (CT)	7143	19.36797	4
Laxmangarh	11306	13.29571	4
Kasba Bansur	17131	11.74552	4
Itarna (Rural)	8271	11.51965	4
Narayanpur	19079	11.25986	4
Thanagazi	13468	10.99375	4
Shahjahanpur (CT)	9837	10.79561	4
Baroda Meo	10296	10.267	4

Source: District census Handbook of Alwar, Census of India, 2011

Map No. 4.6
Alwar district
Order of Combined service center 2011

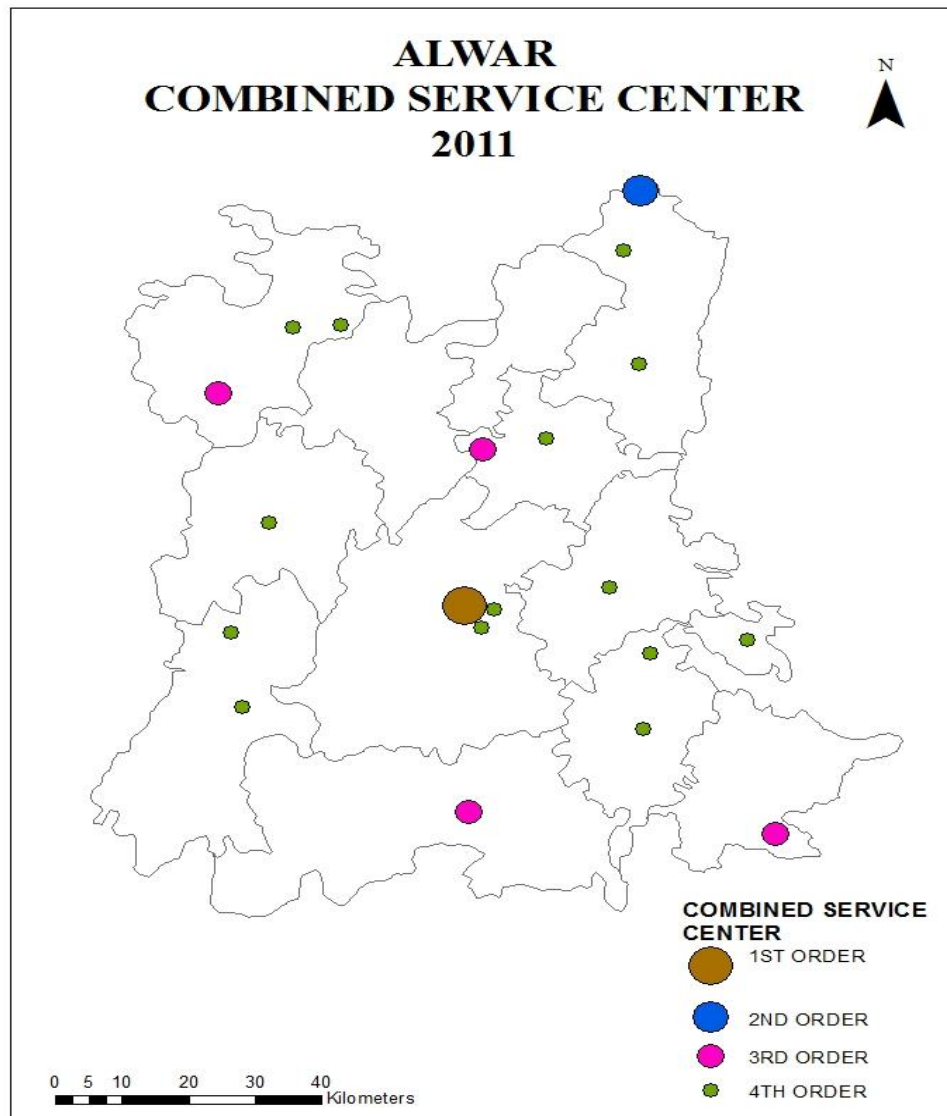


Table No. 4.18
Alwar district
Hierarchy of combined service center, 2011

Order	Composite Service Center (in Number)
I	1
II	1
III	4
IV	14
V	71
VI	1979

Source: District census Handbook of Alwar, Census of India, 2011

Table No. 4.19
Alwar district
Tehsil wise Distribution of combined service center, 2011

Tehsil	Combined Service Center in order (in Number)					
	I	II	III	IV	V	VI
Alwar	1	0	0	2	14	184
Bansur	0	0	0	1	7	139
Behror	0	0	1	2	6	171
Kathumar	0	0	1	0	7	146
Kishangarh Bas	0	0	1	1	3	108
Kotkasim	0	0	0	0	3	114
Lachhmangarh	0	0	0	3	3	201
Mandawar	0	0	0	0	5	141
Rajgarh	0	0	1	0	10	247
Ramgarh	0	0	0	1	3	174
Thanagazi	0	0	0	2	5	168
Tijara	0	1	0	2	5	186

Source: District census Handbook of Alwar, Census of India, 2011

4.9 Population size and service center

Population and services are closely associated, population positively impact to create the demand for the services and development. It usually supports the development of services related function. Development also impact population in improving their socio economic condition. In this study relationship between population and service center is done by cross classification of service centers with population size class according to census of India.

Table No. 4.20
Alwar district

Cross classification of service center with population size class

	Class	100000& above	50000- 99999	20000- 49999	10000- 19999	5000- 9999	<50000
Order		I	II	III	IV	V	VI
	Total	2	0	4	17	53	1998
I	1	1	0	0	0	0	0
II	1	1	0	0	0	0	0
III	4	0	0	3	1	0	0
IV	14	0	0	1	9	4	0
V	71	0	0	0	3	49	19
VI	1979	0	0	0	4	0	1979

Source: District census Handbook of Alwar, Census of India, 2011

Table No. 4.20 from the study explains the cross classification of combined service centers and census town of different population size class. Towns according to population size class do not match thus do not follow any pattern of their distribution. First order service center match with Class I census town, which is Alwar. Second order census match with Class I census town, which is Bhiwadi in Tijara Tehsil. There is no class II census town in Alwar District. Third order census towns are four among those class III census towns are 3, as Behror, Rajgarh and Khairthal. Class IV census town is Kherli. One third order service center is in class IV town which is Kherli. There are 14 fourth order service centers. One fourth order service center which is class III census town is Tijara. Other Fourth order service centers are class IV and V census town. Among which nine centers are class IV census town and 4 are class V town. Fifth order service

centers are 71 which are class IV, V and VI census town. Sixth order Service centers are 1979, among which class IV census town are 4. Other six order centers are VI census town. Thus there is no pattern of exact matching between order and class.

4.10 Konig number

Konig number is number of edges from a node to the farthest node. It indicates about the centrality of the node. Lesser the konig number of a node, higher the centrality of the region.

Table No. 4.21
Alwar district
Konig number for service center 2011

Settlement name	Order	Konig number
Alwar (M Cl + OG)	1	12
Diwakari (CT)	4	13
Itarna (Rural)	4	14
Khairthal (M)	3	14
Narayanpur	4	15
Kishangarh (CT)	4	16
Kasba Bansur	4	16
Ramgarh (CT)	4	17
Thanagazi	4	17
Rajgarh (M)	3	19
Tijara (M)	4	20
Govindgarh (CT)	4	20
Behror (M)	3	21
Baroda Meo	4	21
Tapookra (CT)	4	22
Neemrana (CT)	4	23
Shahjahanpur (CT)	4	23
Bhiwadi (M)	2	24
Kherli (M)	3	26
Laxmangarh	4	26

Source: District census Handbook of Alwar, Census of India, 2011

Lowest konig number score is for Alwar city followed by Diwakari, Itarana, Khairthal. It depicts higher centrality and connectivity of these regions. Alwar has highest centrality and central in the location in Alwar district in Alwar Tehsil. Diwakari and Itarana are extension of Alwar city. These settlements are located at the outskirts of Alwar City. However these settlements are fourth order service center but because of their location and closeness to Alwar city, have good connectivity and higher centrality. Khairthal is also having higher centrality and is located in Kishangarh Tehsil.

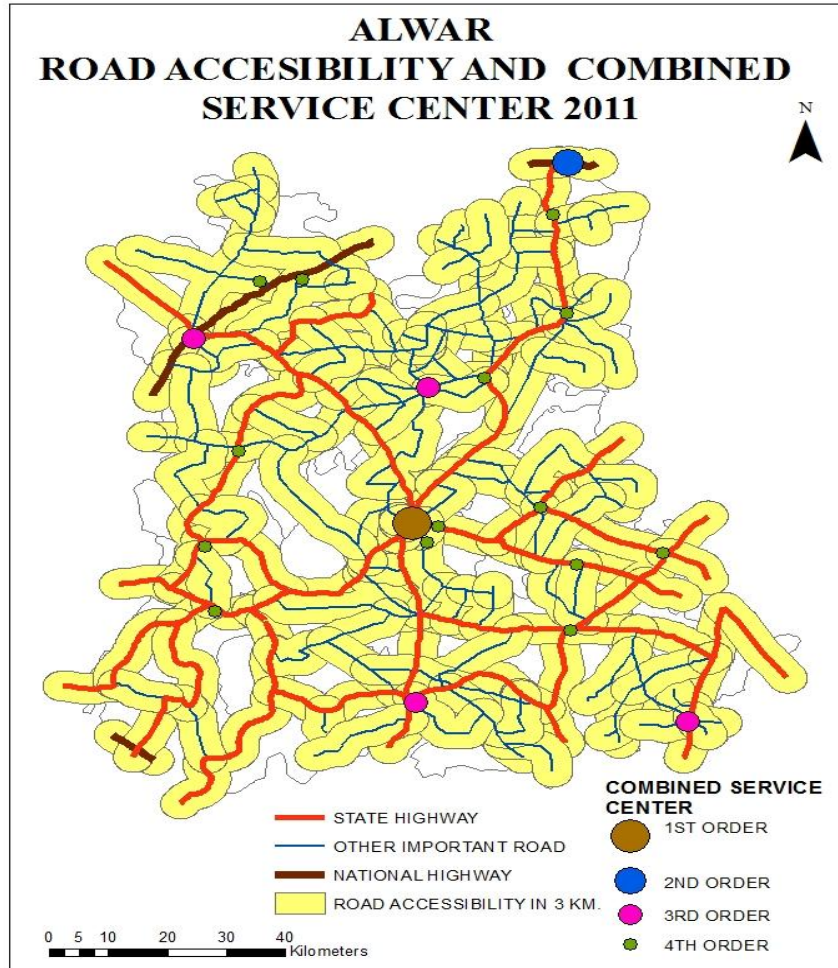
HighestKonig number is in Lacchmangarh and Kherli, explaining that these centers have lesser centrality and lower connectivity. This is followed by Bhiwadi, Shahjahanpur and Neemrana. These centers are rapidly growing because of industrialization and situated at strategic location. Neemrana and Bhiwadi are industrial hub and growing rapidly. But these centers are located at periphery of Alwar district, so these centers are less central.

4.11 Road accessibility and service center

Connectivity plays important role in distribution of service centers and spreading the development in surrounding backward region. Map drawn from the study of Alwar depicts the relationship about service centers and road accessibility. First order service center Alwar is well connected from all direction through state highway and other important roads. Alwar is first order in all the services, one vital reason for being first order is connectivity. There are 2 fourth order centers near to Alwar city are Diwakari and Itarana.

Some parts of Alwar district have less accessibility of roads. These regions lie in western and south western direction from Alwar city. The main cause of less connectivity is rugged terrain and hilly region. This region is covered by the dissected low altitude hilly region which is not conducive for the connectivity. Some pockets of eastern and north eastern part of Alwar also have less road accessibility.

Map No. 4.7
Alwar district
Road Accessibility in Combined service center 2011

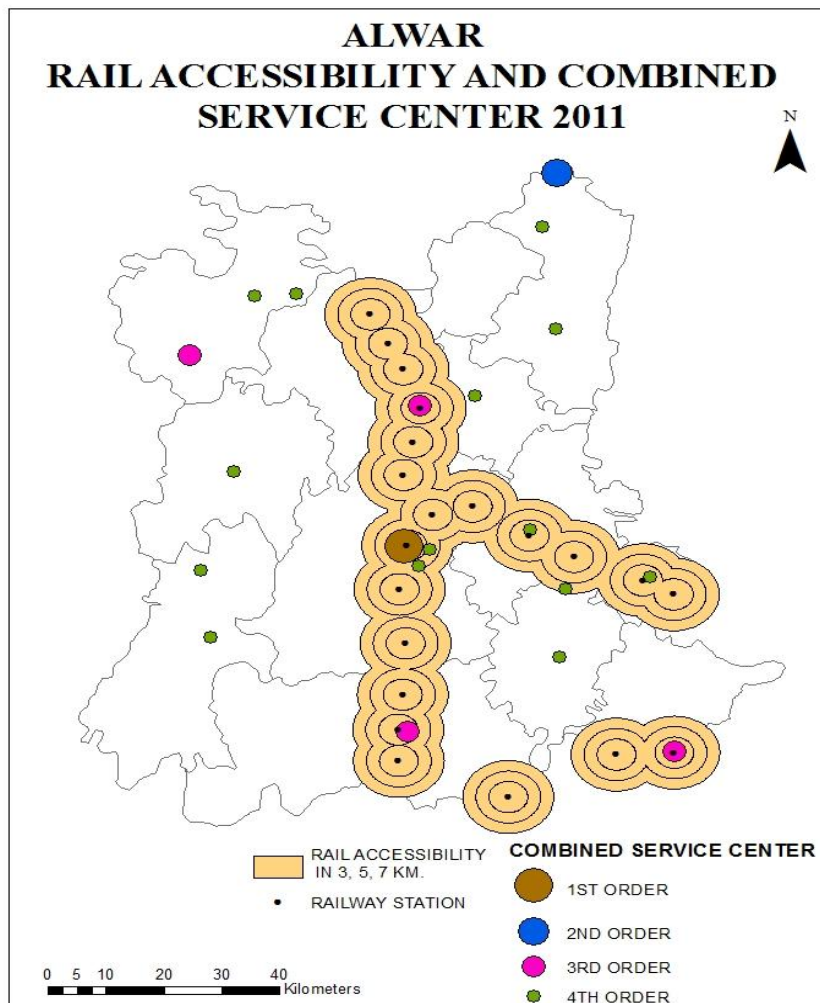


From the map based on study it can be explained that national highways-8 passes through northwestern part of Alwar District from Behror town. Other national highways touch the periphery region of Alwar district in south west and north east and these places do have some services center well connected by roads.

4.12 Rail accessibility and service center

Connectivity depends on roads and railway infrastructure and railways is vital for heavy goods mobility and passengers. Map explains only the rail accessibility in Alwar district to find the association of such connectivity in developing the central places. All the service center does not have rail accessibility, but the 1st order service center Alwar city have rail accessibility. Alwar city is district headquarter. It is central in location.

Map No. 4.8
Alwar district
Rail Accessibility in Combined service center 2011



Second order service center is Bhiwadi without the rail accessibility this shows that although railways are vital but not the only cause for having higher order central place. All third order service center Rajgarh, Khairthal and Kherli have rail accessibility but are of lower order because other centrality function are underdeveloped or missing. Among fourth order service center only Diwakari, Govindgarh, Ramgarh, Barodameo and Itarana(rural) have rail accessibility. But these centers have other rail network accessibility. Govindgarh and Ramgarh have rail accessibility, also tehsil centers so it can be developed as a central place someday. Diwakari and Itarana have medium rail accessibility between 3 to 5 kilometer range mainly used for military transportation. Baroda Meo have low rail accessibility under 5 to 7 km range. Other fourth order service centers don't have rail accessibility. Western and north eastern parts of Alwar district don't have rail accessibility. Western part of Alwar district is covered by low height and dissected hilly region.

4.13 Network Analysis

Network can be defined in many ways like railways, roadways and airways. Network study is important in understanding the connectivity of a region. Graph can be created on the basis of these networks according to the graph theory. A graph will have vertex, edges, sub-graph, and circuits. Vertex is a node or a point where one or more than one roads meet or terminate. Edge is a line or route which connects two vertices. Sub-graph is number of subsidiary graphs in a graph. On the basis of graph theory network analysis can be done. There are some measures for network analysis. These measures are as follows: (a) Cyclometric number (b) Alpha index (c) Beta index (d) Gamma Index.

Table No. 4.22
Alwar district
Network analysis by indices 2011

Type of indices for network	Formula	Value of indices
Alpha	$(E-V+1)/1/2$ (sq. of $V-V)-(V-1)$	0.004113
Beta	E/V	1.362637
Gama	$E/1/2$ (sq. of $V-V$)	0.015057
Cylometric number	$E-V+ p(\rho)$	67

Table has explained study of network analysis for Alwar district. Formulas for different indices are also given in the table. Here,

V = vertex, a node or a point where one or more than one roads meets or terminates.

E = Edge is a line or route which connects two vertices.

$p(\rho)$ = number of subsidiary graphs.

(a)Cyclometric number

This is an index which indicates the number of circuits in a network. Cyclometric number indicates connection and complexity of network. As the cyclometric number increase network tend to become more complete and complex. Cyclometric number has direct relation with development of region. Alwar district has higher Cyclometric number, which indicates more complex and complete network. It has direct relation with level of development. Among all the tehsil Rajgarh tehsil has higher cyclometric number which is followed by Alwar and Behror. Alwar is central in location and is the districts headquarter, so that Alwar is well connected with roads from all directions. Behror is on strategic location and NH-8 passes through it, which connects Delhi to Jaipur. The cyclometric number is low for Kishangarh followed by Thanagazi, Bansur and Lacchmangarh.

(b)Alpha Index

Alpha index is the ratio of actual number of circuits and maximum number of possible circuits. Value of alpha index varies from 0 to 1. If value of alpha index is one it indicates network is completely interconnected. It depends on number of edges. If number of edges decrease value of interconnection also decrease. For Alwar it is near to zero. It indicates network is not interconnected in Alwar district. Among all the tehsils it is near to zero. Network interconnection is weak in most of the tehsils. It is slightly better in Kathumar tehsil, followed by Mundawar. This case suggests that there is still some chance for improving connectivity for better coverage of services functions.

(c) Beta index

Beta index is ratio of edges to vertex. If the value of beta is less than one, it has network in the form of trees with several branches and disconnected graphs but no circuits. If value of beta is equal to one it indicates network with only one circuit. If value of beta is more than one, indicates more complex networks. According to beta index results most of the tehsils have value more than one. It supports to conclude that network in all the tehsil tend to be more complex. For Kishangarh beta value is one, which indicates there is only one circuit. For Alwar district beta value is more than one which indicates more complex network.

(d)Gama Index

Gama index indicates about connection between vertices. Gama index value varies from 0 to 1. If Gama value is 0, it indicates there is no edge. If it is one it indicates maximum number of connection between vertices. All the tehsils are having value of Gama index near to 0, Gama index is lower in Behror, Kotkasim, Tijara, Alwar and Rajgarh. This indicates that there is very less connection between vertices. In rest of the tehsil connection between vertices are slightly better but not so good. For Alwar district Gama value is low and near to zero, which indicates poor connection between vertices.

Table No.4.23
Alwar district

Network analysis by alpha beta gama index and cyclometric meter

Tehsils	Cylometric number	Alpha Index	Beta index	Gama Index
Behror	9	0.005	1.13	0.04
Mundawar	7	0.011	1.16	0.06
Kotkasim	6	0.006	1.11	0.05
Tijara	6	0.006	1.11	0.05
Kishangarh	3	0.003	1.03	0.06
Ramgarh	6	0.010	1.14	0.07
Alwar	10	0.008	1.17	0.05
Bansur	5	0.007	1.10	0.06
Thanagazi	4	0.004	1.05	0.06
Rajgarh	11	0.005	1.15	0.04
Laxmangarh	5	0.010	1.10	0.08
Kathumar	7	0.019	1.21	0.09

Source: District census Handbook of Alwar, Census of India, 2011

All above measures are studied for network analysis gives the picture gives the degree of connectivity. To know the combined effect of all the indices, combined index of network analysis is calculate. It is done by the ranking of each index according to tehsils. Rank for different indices for each tehsil is calculated. Then all the ranks for each tehsil are added. A combined index of rank is presented. Table No- 4.24, is showing the combined index of ranking for network.

Table No. 4.24
Alwar district
Network analysis by composite index of rank

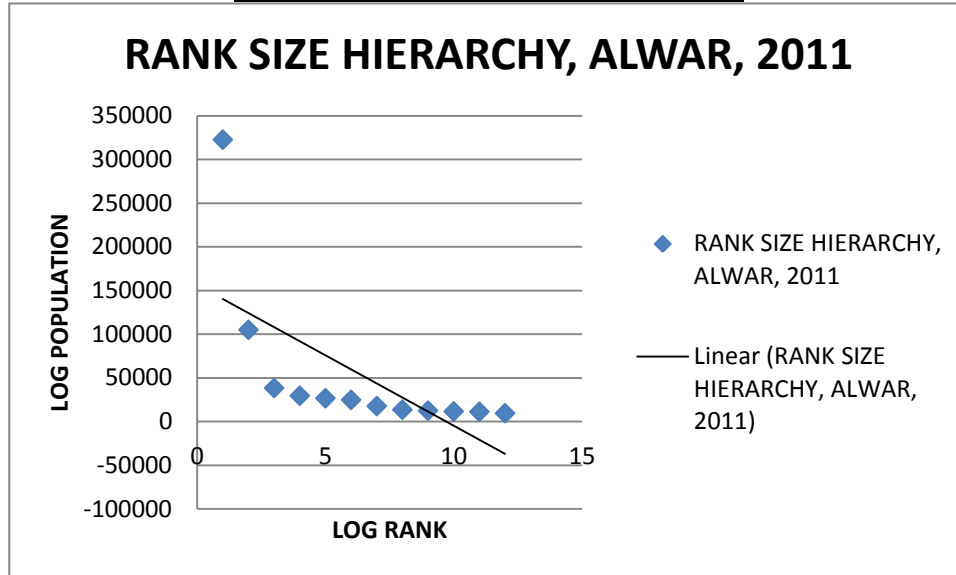
Tehsils	Combined Ranking Index for Network efficiency
Kathumar	8
Mundawar	13
Alwar	19
Ramgarh	19
Laxmangarh	26
Rajgarh	26
Kotkasim	28
Bansur	29
Behror	30
Tijara	32
Thanagazi	40
Kishangarh	42

Source: District census Handbook of Alwar, Census of India, 2011

The combined rank is higher for Kathumar thus has highly efficient network. It is followed by Mundawar, Alwar and Ramgarh also have good connectivity in the region. Lowest rank is given to Kishangarh, which is followed by Thanagazi and Tijara, indicates that network efficiency and connectivity is not good in these tehsils. Connectivity impacts on the development of the region.

4.14 Rank size rule hierarchy

Graph No.4.1
Alwar district
Rank size hierarchy of urban population



Rank size rule²⁰(Zipf, 1949) is given by G.K.zipf in the year 1949. According to Zipf if all urban settlements are arranged in descending order in terms of population, and give them rank, then population of nth town will be $1/n$.

$$P_n = P_1 / n$$

P_n = Population of n^{th} town

P_1 = population of first rank town

This is showing rank size hierarchy. Graph No. 4.1 is showing that city's population is not according to rank size rule. Population of towns and their ranks are not showing correlation according to rank size rule in Alwar district. Alwar city is primate city in Alwar district according to rank size rule.

²⁰Op.cit., No.4

4.15 Population Distribution in Identified service centers

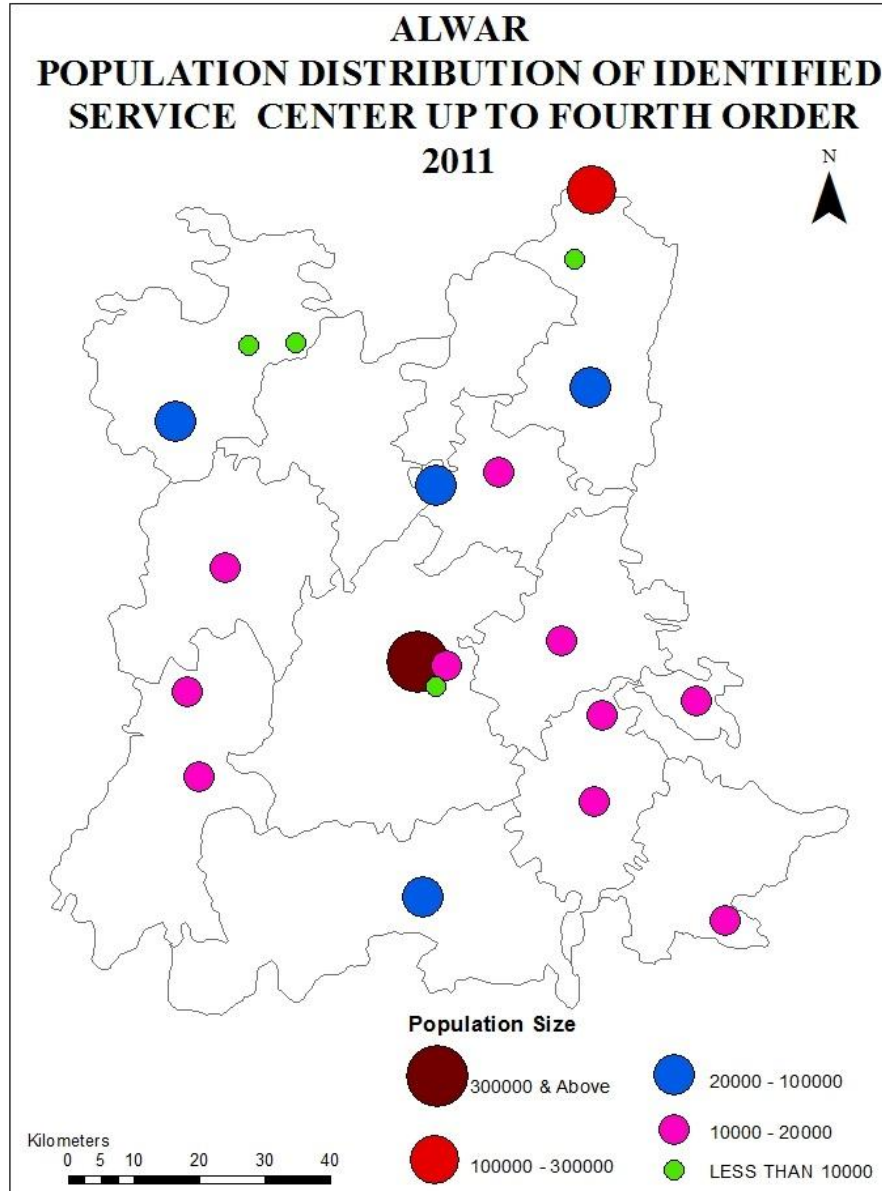
Map No.4.9 is depicting the population distribution in identified central places. First order central place Alwar is having highest population size in Alwar district. 2nd order central place Bhiwadi is having second highest population. Population size of these two central place is supporting the concept of rank size rule (zipf, 1946)²¹. It also supports the concept of threshold in central place theory (Christaller, 1966)²². Among 3rd order central places only Kherli does not have population size of third order.

This map support for correlation between population and evolution of a place as a central place. This can be concluded that population is most important factor for the development of central places. It acts as a threshold for the development of central place in the region. Population creates demand for the services, which is essential factor for triggering development in the region. All the economic activities, functions and services are supported by the demand created by Threshold. Population acted as an important factor in developing central place system in the study area

²¹Ibid.

²² Christaller,W.(1966):Central Places in Southern Germany, translation by W. Baskin, Eaglewood Cliffe, New Jersey, Prentice Hall.

Map No.4.9
Alwar district
Population distribution in Identified central places , 2011



4.16 Conclusion

- 1st order education service center is Alwar. 2nd order education service centers are Rajgarh, Kherli, Bhiwadi, Behror. 3rd order education service centers are Khairthal, Ramgarh, Lacchmangarh, Neemrana, Narayanpur, Tijara and Thanagazi. 4th order education service center is Mandawar, Shahjahanpur, Kasba Bansur, Govindgarh, Kishangarh, Tapookara, Pinan, Baroda Meo, Bardod, Malakhera, Madhosinghpura, Kotkasim and Beejwa.
- 1st order education service center is one. 2nd order education service centers are 4, and 7 third order service centers. Fourth order service centers are 13. Fifth and sixth order service centers are 475 and 1570.
- First order service center thesil wise is in Alwar thesil. Second order service centers are in kathumar, Behror, Rajgarh and Tijara tehsils. Third order education service centers are distributed in Behror, Kishangarh Bas, Lacchamangarh, Ramgarh, Thanagzi and Tijara. Fourth order education service centers are distributed in most of tehsils except, Kathumar, Mandawar, Thanagazi. Fifth and sixth order service centers are distributed in all the tehsils of Alwar district.

Distribution of Health service center

- First order health service center is Alwar. Bhiwadi is second order health service center. 3rd order health service centers are Rajgarh, Behror, Neemrana. Fourth order health service centers are Tijara, Khairthal, Ramgarh and Kherli.
- There are one 1st order health service center and one 2nd order health service center. There is 3 third order and four 4th order health service centers. Fifth order health service centers are 160 and sixth orders are 1901.

- 1st order health service center thesil wise is located in Alwar tehsil. 2nd order service center is in Tijara tehsil. 3rd order service center are distributed in Behror and Rajgarh. 4th order service center are distributed in kathumar,, Kishangarh Bas, Ramgarh and Tijara. 5th and 6th order service centers are distributed in all the tehsils.

Distribution of Banking service center

- 1st order banking service center is Alwar. Bhiwadi is having second order banking service center. Third order banking service centers are Behror, Khairthal, Rajgarh, Kherli. Fourth order banking service centers are Tijara, Kishangarh, Ramgarh, Diwakari, Govindgarh.
- There is one 1st order service center which is Alwar. 2nd order service center is also one which is Bhiwadi. There are four 3rd order service centers. 4th order service center are five. 5th order credit service center and 6th order service center are 210 and 1849 respectively.
- Tehsil wise 1st order banking service center is located in Alwar tehsil which is Alwar city. 2nd order banking service center is located in Tijara tehsil which is Bhiwadi. 3rd order service centers are distributed in Behror, Kathumar, Kishangarh Bas, Rajgarh tehsil. 4th order banking service centers are distributed in Alwar, Kishangarh Bas, Lacchmangarh, Ramgarh and Tijara tehsil. 5th and 6th order banking centers are distributed in all the thesils of Alwar district.

Distribution of recreation service center

- 1st order recreation service center is Alwar city. 2nd order recreation service center is Rajgarh town. 3rd order recreation service centers are Tijara, Bhiwadi, Behror, Khairthal, Kherli. 4th order service centers are Govindgarh, Tapookara, Kishangarh Bas, Neemrana, Ramgarh and Diwakari.

- There is one 1st order recreation service center and one 2nd order recreation service center. 3rd order recreation service center are five, fourth order recreation service centers are six. 5th and 6th order service centers are 103 and 1954 respectively.
- 1st order recreation service center thesil wise is distributed in Alwar tehsil. It is Alwar city. 2nd order recreation service center is located in Rajgarh tehsil. It is Rajgarh town. 3rd order service centers are distributed in Behror, Kthumar, Kishangarh Bas and Tijara. 4th order service center are distributed in Alwar , Bansur , Kishangarh Bas, Lachhmangarh, Ramgarh and Tijara tehsils. 5th and 6th order recreation service centers are distributed in all the tehsils.

Distribution of population service center

- 1st order service center is Alwar city, 2nd order service center is Diwakari, 3rd order population service center is Patti Beena, Kishangarh, Ramgarh, Kherli Ganj, Govindgarh. 4th order service centers Sitapura, Rayli, Gadpur, Guwara Lesava, Behror, Khairtal, Bas Dhikhda, Kootooki, Narwas, Pathredi, Gola ka Bas, and Guwara Dabar.
- There are one 1st order and one 2nd order population service center, and nine 3rd order 14 4th order, 804 5th order population service center and left are 6th order of service center.
- There is one 1st order service center in Alwar tehsil, one 2nd order service center is distributed in Alwar tehsil. 3rd order service centers are distributed in Kathumar Kishangarh Bas, Kotkasim, Lacchmangarh, Rajgarh, Ramgarh and Tijara tehsils. Fourth order service centers are distributed in all the tehsil except Kathumar, Kotkaim, Mandawar and Ramgarh. 5th and 6th order service center are distributed in all the tehsils of Alwar district.

Distribution of Combined service center

- 1st order combined service center is Alwar. 2nd order combined service center is Bhiwadi. 3rd order service centers are Rajgarh, Behror, Kherli, Khairthal. 4th order service centers are Tijara, Ramgarh, Kishangarh, Diwakari, Govindgarh, Tapookra, Neemrana, lacchmangarh, Bansur,itarana (rural), Narayanpur, Thanagazi, Shahjahanpur and Baroda Meo.
- There is one 1st order service center and one 2nd order service center. 3rd order service centers are four in number. Fourth order service center and fifth order service centers are 14 and 71. Rest of centers are 6th order service centers.
- 1st order service center is located in Alwar tehsil which is Alwar city and one 2nd order service center is distributed in Tijara tehsil. 3rd order service centers are distributed in, Behror, Kathumar, Kishangarh Bas and Rajgarh tehsil. 4th order service centers are not distributed in Kathumar, Kotkasim, Mandawar and Rajgarh. 5th order and 6th order service centers are distributed among all the tehsils.

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CHAPTER 5

SPATIAL ARRANGEMENT OF CENTRAL PLACE SYSTEM AND THEIR IMPACT IN THE REGION :FIELD STUDY APPROACH

5.1 Introduction

This chapter is based on field survey in the study area Alwar and for conducting survey, settlements are selected by sampling technique. The analysis on field survey and the study of actual spatial arrangement of central places in Alwar district are obtained. The variation in actual and theoretical spatial arrangement are examined and compared to already identified spatial arrangement studied in chapter 4 based on census OF India,2011. In the process of identification of central place spatial interaction for different centrality function like socio economic, cultural , market, transport and administrative activities, are studied after analysing the field data collected from the samples of settlements from the Alwar region. Spatial interaction based on different type of services are used to demarcate central place region in the Alwar district. This chapter also examines the spread effect and influence of central places on its surrounding region with different range of distance in determining the socio-economic condition of Alwar .

Sixty four settlements are chosen from Alwar district four from each tehsil to examine the spatial interaction pattern. To present the spatial interaction pattern between settlements and central places, flow diagram method is used. This chapter also deals with sampling design and method. Different indicators taken for the sample study is also discussed.

5.2 Sampling design

In the Alwar district 64 settlements are chosen based on stratified random sampling technique. Tehsil wise stratification has been done at different ranges of distance from tehsil headquarter, 64 sample settlements are chosen from 16 tehsils. As per the report of census 2011 there were 12 tehsils in Alwar district and recently four new tehsils are carved out by the Rajasthan administration. At the time of survey (November-December, 2016) total tehsil were 16. From each tehsil 4 sample settlements are selected. Out of four sample settlements 2 settlements are chosen in the range of distance 0- 5 km from the tehsil headquarter. And other

two settlements are selected from range of more than 5 km from the tehsil headquarter. Out of total sample settlements 10 sample settlements are ranked 5th and rest of 54 settlements are of 6th rank. Field study is done for different service like education, health, job opportunities' and credit services, recreation services marketing facilities, transport facilities and administrative activities.

5.3 Sampling technique

Field study is done based on village survey. Questionnaire is set to get information of village particulars. Questions were asked from village headmen and villagers. Then the answers were matched from the response of Patwari of village to minimize the biasness. This field survey was conducted from November 2016 to December 2016. Table no. - 5.1 presenting the variables which were taken for assessing the spatial interaction through field survey.

Table no. 5.1
Different Service indicators taken for the sample survey

Education Indicators	Health Indicators	Economic Indicators	Recreation Indicators	Marketing Indicators	Transport Indicators	Administrative Indicator
Primary school	Hospital	Job /Wage opportunity	Cinema Hall	Agriculture Tool	Bus Service	Administrative place
Middle school	Dispensary	Credit	Stadium	Seeds & fertilizers	Rail service	
Senior secondary school	Veterinary hospital	Banking	Fairs & Festival	Cereal Grinding		
College	Family planning center			Oilseed Grinding		
				Flour and bakery		
				Daily used items		
				Crockery items		

5.4

5.5 Objective of field study

Field study is done for 64 settlements to achieve following objectives.

- (1) To examine the spatial pattern of interaction for different services with the existing central place.
- (2) To examine the present central place system and their interaction.
- (3) To evolve a model of central place in the region based on the field study for overall development.

5.6 Distribution of Educational Facilities in Sample settlements

Table no. 5.2 is indicating average distance for educational services. For higher order sample villages, average distance for primary and middle school, senior and senior secondary school is zero kilometers. This indicates that education services are available as school education service in higher order sample villages. For the lower order sample village only primary education is available in the village. For other education services like middle education, senior secondary school, people need to travel. For higher education people are required to travel out of the village. People of all the sample villages are required to go out for college education. But for college education people of higher order travel more than 12 km, while from lower order sample villages people have to travel less distance around 8 km. All the higher order sample villages have school education. This shows the relation between service order and service availability.

Table no. 5.2
Alwar District

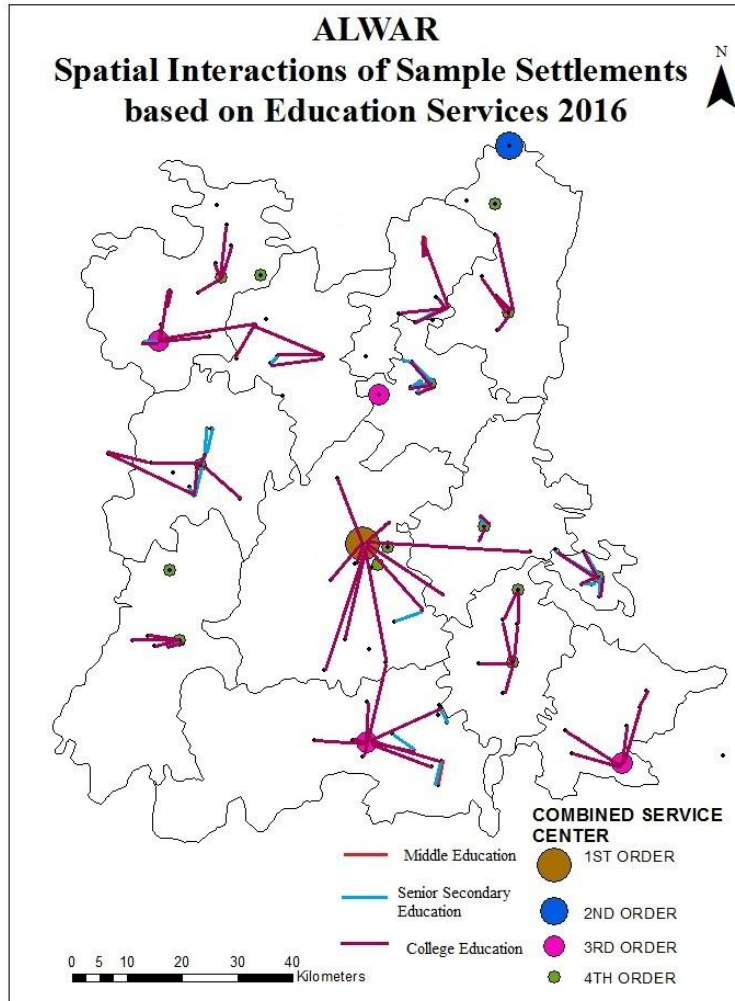
Average distance for Education Service in sample settlements

Order of sample village	number of sample village N	Average distance for education service (in Kilometer.)			
		Primary education	Middle education	Senior and senior secondary education	college education
5th order	10	0	0	0	12.7
6th order	54	0	0.09	1.36	7.76

5.7 Spatial interactions of sample settlements based on education services

Map no. 5.1 is showing the spatial interaction based on Education facilities. In the map sample settlements are taken and their interactions are shown in surrounding region for availing education facilities. In the map it is clearly shown that people have to go for higher services outside of the village. Lower order education service is almost available in each sample village. But for higher education like senior secondary education they cover more distance, some villages have this facility. For higher education like college service they cover more distance, as the order of service becomes higher distance covered for that service increases his can be easily concluded from the results.

Map no. 5.1
Alwar district
Spatial interactions based on education services among sample settlements



In the map no. 5.1, the relation that, order of service becomes higher distance covered for that service increases can be observed. First order service center Alwar provides education service to its region and surrounding tehsil also. Its sphere of influence for education service is wider in comparison to other service center. Second order service center Bhiwadi does not have spatial interaction for the education service because it is an industrial town and

population here are migrant workers. Among third order service center Behror Rajgarh and Kherli have spatial interaction for the education service indicates that these centers provide services to the surrounding lower order settlements. In comparison to first order service center it is found that the area of influence of third order service center is narrower. Khairthal a third order service center and have no spatial interactions. Among 4th order service centers, Bansur, Thanagazi, Barodameo, Lachhmangarh, Ramgarh, Tijara and Neemrana have spatial interaction for the education services. But some 4th order service centers like Sahajahanpur, Tapookara, Narayanpur, Itarana (rural) and Diwakari do not have spatial interaction for the education services. Most of the interaction at these higher order service centers has occurred for higher order education service.

5.8 Distribution of Health Facilities in sample settlements

This table no. 5.3 is indicating that for all the higher order sample villages Dispensary and Family Planning centers are available and for hospital services, people of all the sample villages have to go outside the villages. The distance for hospital is different for higher and lower order sample villages. For lower order sample villages this distance is more than 5 km and for higher order sample village people go more than 3 km distance for the service. Among lower order village people cover around 2 km of distance for dispensary and family planning center. For veterinary hospital an average distance in higher order sample villages is about 1 km, while it is about 4 km for lower order sample villages. It is indicating people of lower order villages cover more distance for all type of Health services.

Table no. 5.3
Alwar District

Average distance for Health Services in sample settlements

Order of sample village	Number of sample village N	Average distance for Health service (in Kilometer.)			
		Hospital	Dispensary	Veterinary	Family planning center
5th order	10	3.5	0	1.1	0
6th order	54	5.24	1.64	4.12	1.64

5.9 Spatial interactions of sample settlements based on health services

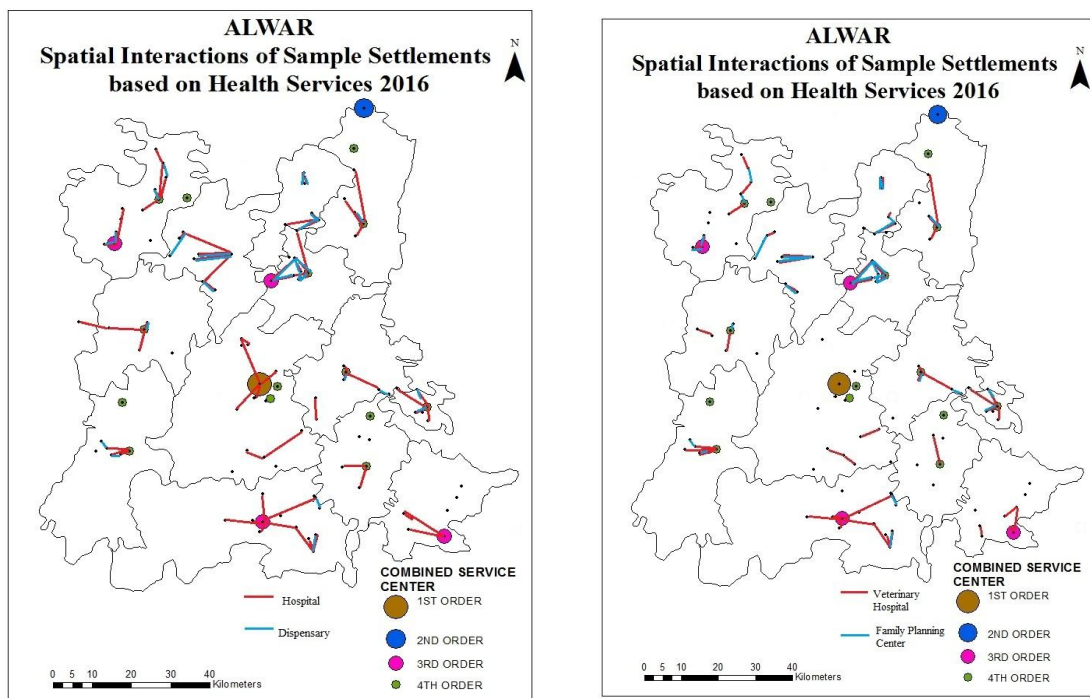
For the health services four indicators are taken for the study. These are hospital, dispensary, family planning center and veterinary hospital. Map no. 5.2 indicates that for lower order health service like dispensary and family planning center either there is no traveling distance or it is short distance. For higher order health service like hospital people travel long distance.

Map no. 5.2 indicates that in Alwar tehsil followed by Malakhera, Lachhmangarh, Kathumar and Rajgarh Tehsils all the sample settlements have Dispensary facilities. In other tehsil people of sample settlements need to travel for some distance.

First order service center Alwar have spatial interaction for higher order health service like hospital. Again second order service center Bhiwadi does not have spatial interaction for health service this show that it does not provide health services to the sample village settlement. All the third order services have spatial interaction based on health services. Some 4th order service centers do not show spatial interaction based on health services and these centers are Narayanpur, Diwakari, Itarana (rural), Tapookra, Shajahanpur and Barodameo. The 4th order centers show some degree of spatial interactions based on health services the

reason may be that settlement have health infrastructure. Other reason might be that these settlements get services from different centers outside of the Alwar district in some case. Center those are near to these sample settlements in Bansur tehsil is Kotputli people go there for health services that is outside Alwar district.

Map no. 5.2
Spatial interactions based on Health services among sample settlements



Mapno. 5.2 explains that in Alwar tehsil all the sample settlements have health services like veterinary hospital and family planning center and in these services Alwar is at first order in health service center does not interact with the surrounding for health services like veterinary hospital and family planning center. Second order service center Bhiwadi does not have spatial interaction for health services like veterinary hospital, family planning center. The entire third

order service centers show spatial interactions for health services like veterinary hospital and family planning center. Some 4th order service centers don't show spatial interaction for health services like veterinary hospital and family planning centers and these 4th order service centers are Narayanpur, Shahjhanpur, Tapookra, Diwakari, Itarana (rural) and Baroda Meo . Other 4th order service centers show spatial interactions based on these health services.

5.10 Distribution of Economic Facilities in sample settlements

This table no. 5.4 is presenting picture of economic services in sample villages daily wage workers in lower order villages travel around 11 km of distance. In higher order villages distance traveled is around 12 km. for credit service people of higher order villages travel for 1 km. of distance whether for lower order sample villages people travel for around 4 km. for banking services people of higher order sample village travel 1.4 km. for lower order this average distance for banking service is around 5 km. among higher order sample villages people travel 1 km more for wages rather than people of lower order villages.

Table no. 5.4

Alwar District

Average distance for Economic Services in sample settlements

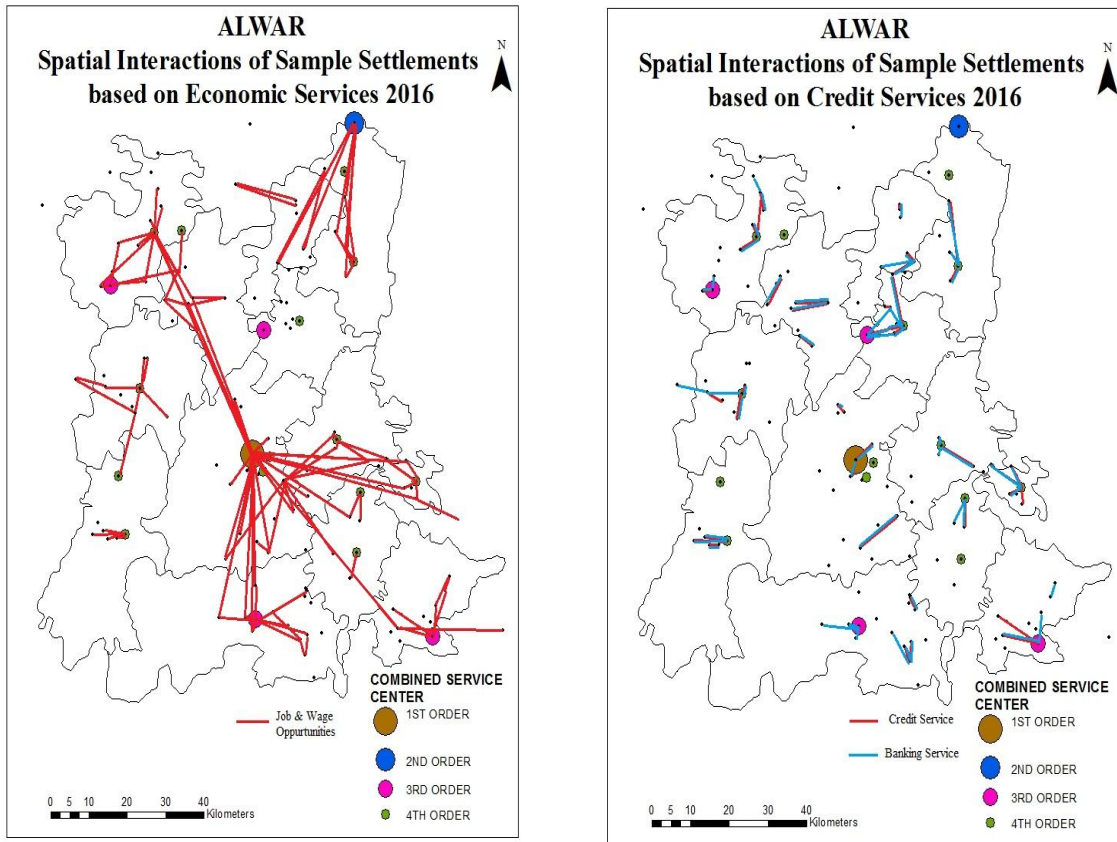
Order of sample village	Number of sample village N	Average distance for Economic services (in Km.)		
		Wage/Employment	Credit service	banking service
5th order	10	11.6	1	1.4
6th order	54	10.45	3.68	4.49

5.11 Spatial interactions of sample settlements based on Economic services

Map no. 5.3 is indicating the spatial interaction based on job opportunities. For job opportunities and wages people cover larger distance than any other

services. First order service center Alwar has spatial interaction for the job opportunities. The spatial interaction with this center is long distance in comparison to other service center. In terms of this service the sphere of influence is wider than other service center. In Alwar Matsya industrial area also attract people for wages and job opportunities from long distance. Second order service center is also providing job opportunities up to long distance. Many industries are located in Bhiwadi, which creates conducive environment for the spatial interaction based on job opportunities and wages. Among third order service center Behror, Rajgarh and Kherli provide the services of the job opportunities to the sample settlements. But one third order center Khairthal does not provide this service to sample settlements. Among 4th order center some center does not provide job opportunities to the sample village settlement which are Kishangarh, Tapookara, Itarana (rural) and Diwakari. Rest of the 4th order service center provides this service to the sample settlement. Some people of sample village settlements also go outside Alwar district. People from Kotkasim settlements travel up to Rewari Gurgaon and Delhi. People from Bansur settlements travel up to Kotputli for job opportunities and wages.

Map no. 5.3
Alwar District
Spatial interactions based on Economic services among sample settlements



Map no. 5.3 indicates spatial distribution of credit service and bank services. Map no. 5.3 depicts that for these service people of sample settlement does not travel to long distance. First order service center Alwar provide these service to the same settlement of Alwar Tehsil. Because of availability of banks and credit service in sample settlement or near to these settlements, people don't cover much distance. In Alwar tehsil there are one first order center and two 4th order centers. But only first order center Alwar provide the credit services to the

surrounding settlement. Second order center does not have spatial interaction based on credit services to sample village settlement. The reason for this is the distance. Bhiwadi is at long distance from sample settlements. The entire third order service centers provide the credit services. In some sample settlements there are availability of credit center. Among 4th order service center Shahjahanpur, Tapookara, Itarana (rural), Diwakari, Lachhmangarh and Narayanpur do not have spatial interaction based on these services. Rest of the 4th order service centers have spatial interaction based on credit services.

5.12 Distribution of Recreational Facilities in sample settlements

This table no. 5.5 represents the recreation scenario of sample villages in Alwar district. For all type of recreation, people tend to go outside of village because such a service needs a large open space. In terms of recreation services people of sample villages have to cover larger distances. For cinema hall people cover near 29 km of distance among higher order villages whereas people of lower order samples cover 37 km of distance for cinema hall facilities. For stadium facility people of higher order villages cover around 34 km whereas people of lower order villages cover 43 km of distance. For fairs & festival people of higher order cover lesser distance of near 2 km. this distance is near 4 km for the residents of lower order villages. In terms of recreation service people of lower order villages have to cover larger distances in comparison to people of higher order villages. Fair and festival is included in the study to observe prospect if any and suggest for developing market related to tourism.

Table no. 5.5
Alwar district

Average distance for Recreation Services in sample settlements

Order of sample village	number of sample village N	Average distance for Recreation service (in Kilometers.)		
		Cinema Hall	Stadium	Fair and Festival
5th order	10	29.2	34.1	1.7
6th order	54	36.93	42.8	3.85

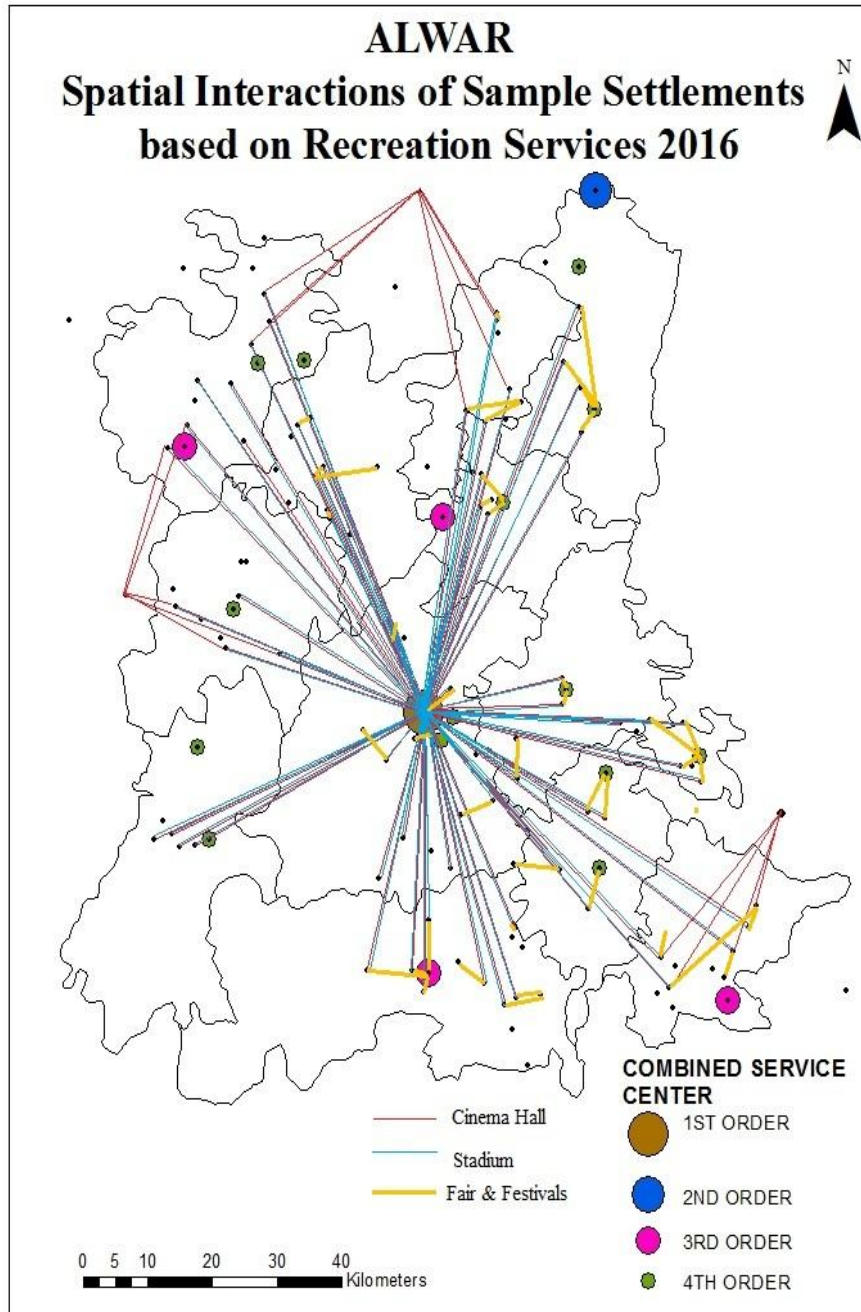
5.13 Spatial interactions of sample settlements based on recreation services

Map no. 5.4 is indicating the spatial interaction based on recreation service. For recreation services three indicators are taken, which are cinema hall accessibility, stadium accessibility and fairs & festivals. For the fairs and festivals spatial interaction between sample village settlements and service centers is happening for less distance. For stadium and cinema hall this spatial interaction is occurring for comparatively greater distance. Cinema hall and stadium availability are in only higher order service centers. That's why people of sample village settlements cover greater distance for these services. In Alwar district only first order service center is having spatial interaction with sample village settlements based on cinema hall and stadium services. Some sample village settlements have spatial interaction for these services out of the Alwar district. Sample village settlements of Bansur and Behror tehsil have spatial interaction to Kotputli for Cinema hall services. Sample settlements of Neemrana Tehsil and Kotkasim Tehsils and Tijara tehsil have spatial interaction to Rewari for cinema hall services. Sample settlements of Kathumar tehsil have spatial interaction to Nagar based on Cinema hall services. For stadium services sample villages settlement have spatial interaction out of district. Some sample settlement of Behror, Neemrana,

Kotkasim and Tijara have spatial interaction with Rewari (Haryana) based on stadium service.

First order service center has spatial interaction for all the recreation services. 2nd order service center Bhiwadi doesn't have spatial interaction based on Cinema hall, stadium service and fairs & festivals. Third order service centers don't have spatial interaction based on cinema hall and stadium service. Among third order center only Rajgarh has spatial interaction based on fairs & festivals. Rest of the third order service center doesn't have spatial interaction based on fairs and festivals. The entire 4th order service centers don't have spatial interaction based on cinema hall and Stadium. Among 4th order center only Narayanpur, Thanagazi, Bansur, Shajahapur, Neemrana, Diwakari and Itarana (rural) doesn't have spatial interaction based on fairs & festivals. Rest of the 4th order service centers have spatial interaction based on fairs & festivals.

Map no. 5.4
Alwar District
Spatial interactions based on Recreation services among sample settlements



5.14 Distribution of Marketing Facilities in sample settlements

This table no. 5.6 is about market facilities in sample villages. Cereal grinding, oilseed grinding and daily used item shops are available in higher order sample settlements. But these facilities are not available in lower order sample settlements. Cereal grinding and daily used item shops for lower order settlements are very near to sample village. For oilseed grinding residents of lower order settlement travel around 5 km of distance. For agricultural tool average distance for higher order settlement is 3 km whereas for lower order sample villages it is around 6 km. For seeds and fertilizer average distance is around 2 km. for higher order sample village. It is around 4.2 for lower order sample villages. For flour and bakery shop average distance is around 1 km in higher order sample villages. It is 4 km for lower order sample villages. For crockery item average distance among higher order sample villages is 3.5 km whereas for lower order sample village average distance is 6 km. maximum distance is covered for agricultural tools and crockery items.

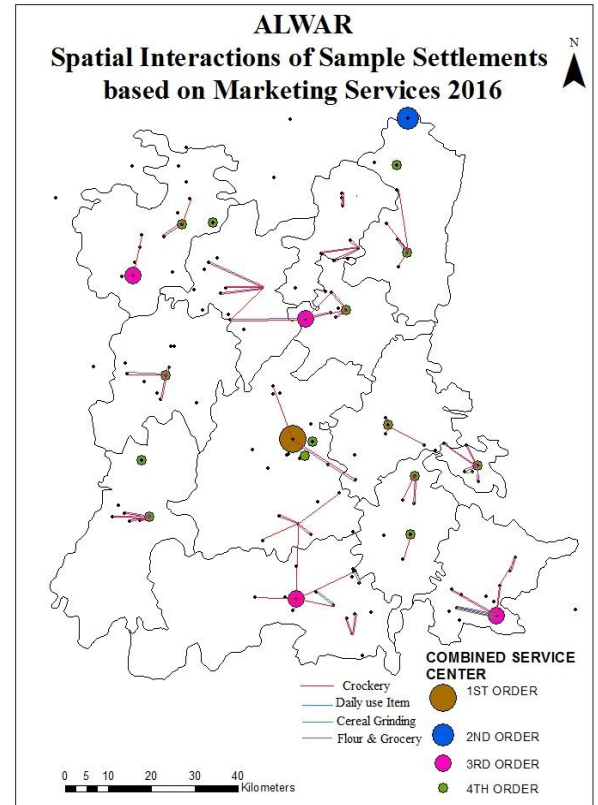
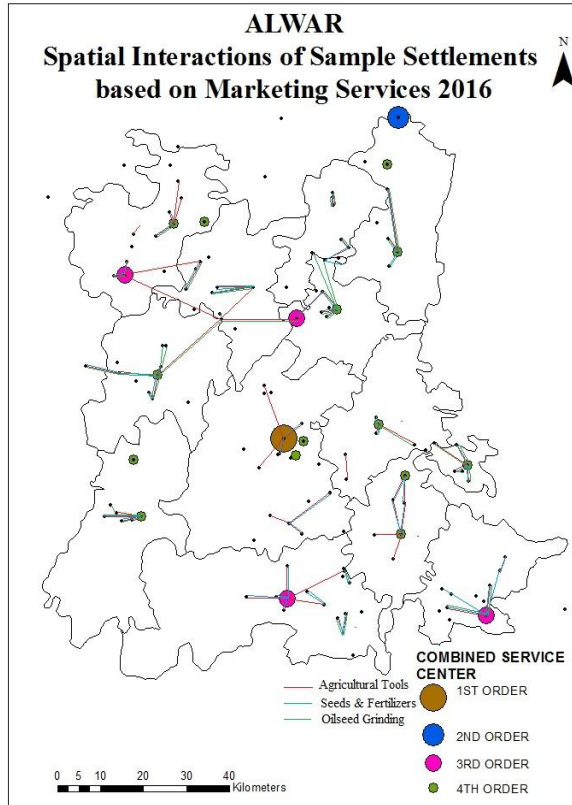
Table no. 5.6
Alwar District
Average distance for Marketing Services in sample settlements

Order of sample village	number of sample village N	Average distance for marketing service (in Kilometers)						
		agricultural Tools	Seeds & Fertilizers	Cereal Grinding	Oilseed Grinding	Flour and bakery	Daily used items	Crockery items
5th order	10	2.9	1.7	0	0	0.78	0	3.5
6th order	54	6.12	4.16	0.2	4.56	4.13	0.39	6

5.15 Spatial interactions of sample settlements based on marketing services

Map no. 5.5 is indicating spatial interaction of sample settlements based on marketing services. First order service center Alwar have spatial interaction with surrounding sample settlements based on agricultural tools and for seeds and fertilizers. Second order service center have no interaction based on marketing services for sample settlements. All the third order centers have spatial interaction with sample settlement based on marketing services. Among the fourth order service centers Shahjahanpur, Tapookara, Narayanpur, Diwakari and Itarana (rural) don't have spatial interaction based on marketing service. All other fourth order service centers have spatial interactions based on these marketing services. Spatial interactions based on daily used items and oilseed grinding is in fewer sample settlements. These facilities are available in almost all the sample settlements.

Map no. 5.5
Alwar District
Spatial interactions based on Marketing services among sample settlements



5.16 Distribution of Transport Facilities in sample settlements

This table no. 5.7 presents the picture of transport facilities in sample villages. For both higher order sample settlements and lower order settlements average distance for bus service is 3 km. Average distance covered by higher order sample villages is 17 km for rail services whereas for lower order sample village average distance is 20 km for rail services. Bus service accessibility is same for higher and lower order sample villages. But it is different in case of railway facility.

Table no. 5.7
Alwar District

Average distance for Transport Services in sample settlements

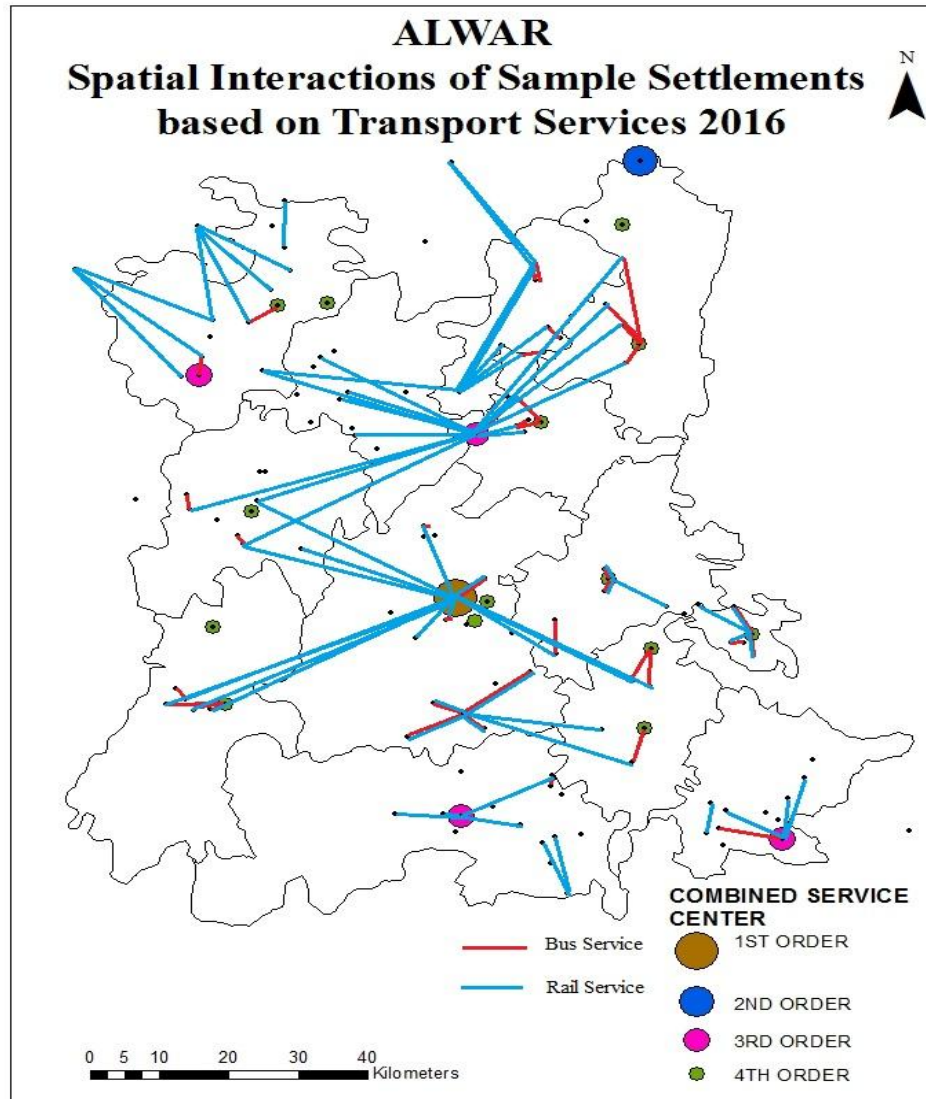
Order of sample village	number of sample village N	Average distance for Transport services (in Kilometers)	
		Bus Service	Rail service
5th order	10	2.9	16.7
6th order	54	2.94	19.73

5.17 Spatial interactions of sample settlements based on transport services

Spatial interactions based on transport facilities are different for bus and rail services. Spatial interaction based on bus services are for lesser distance for sample settlements. Spatial interactions based on railway service are for longer distance.

First order service center Alwar have spatial interaction based on bus and rail service. Map no. 5.6 is depicting the spatial interactions based on rail service of Alwar city with sample settlements in and out of Alwar tehsil because of Alwar junction. Second order center Bhiwadi don't have spatial interactions based on bus and railway services. Among third order service centers only Behror and Kherli have spatial interactions based on bus services. Other centers don't have spatial interactions based on bus service. It might be because of availability of bus service near to sample settlements. Among third order centers Khairthal and Rajgarh have spatial interactions based on rail service. Because these service centers have railway station in the town. Among fourth order service center Neeemrana, Kishangarh, Tijara, Ramgarh, Thanagazi, Govindgarh, Lachhmangarh and Barodameo do have spatial interactions based on bus services with sample settlements. Other fourth order service centers don't have spatial interactions based on bus services. Among fourth order service centers Ramgarh and Govindgarh have spatial interactions based on rail services. Rests of the fourth order service center don't have spatial interactions based on rail service.

Map no. 5.6
Alwar District
Spatial interactions based on Transport services among sample settlements



5.18 Distribution of Administrative services in sample settlements

There is not much difference of administrative service accessibility among higher and lower order sample villages. For higher order sample villages spatial

interaction distance is 7 km. for lower order sample settlements distance of spatial interaction is 8 km.

Table no. 5.8
Alwar District
Average distance for Administrative Service in sample settlements

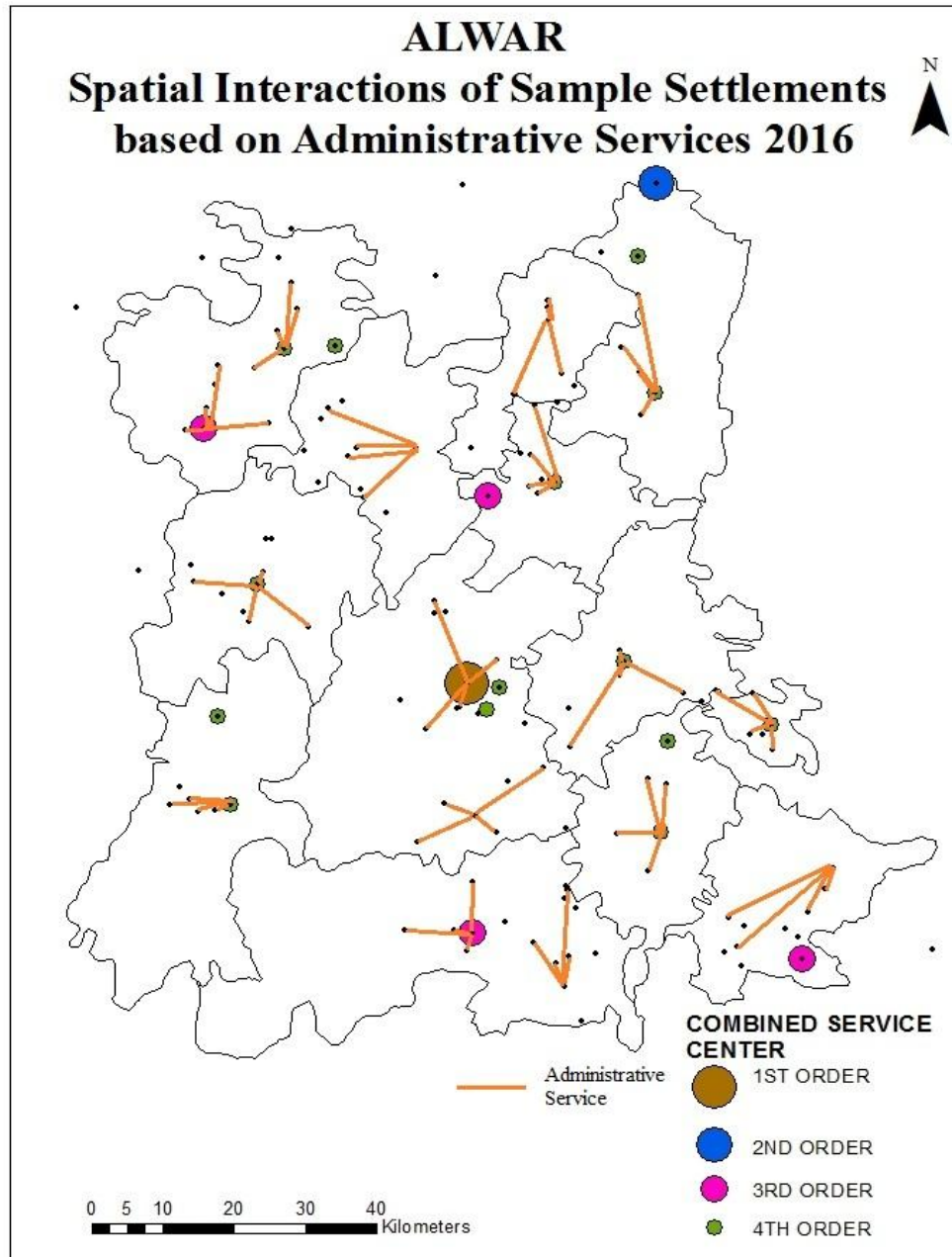
Order of sample village	number of sample village	Average Distance (in KM.)
	N	Administrative services
5th order	10	7.1
6th order	54	7.87

5.19 Spatial interactions of sample settlements based on administrative services

First order service center Alwar have spatial interaction based on administrative services. 2nd order service center Bhiwadi doesn't have spatial interaction based on administrative services. Among 3rd order service center Behror and Rajgarh have spatial interaction based on administrative service. Other 3rd order service centers don't have spatial interaction based on administrative services. Among 4th order service centers Neemrana, Tijara, Lacchmangarh, Ramgarh, Kishangarh, Bansur, Thanagazi and Govindgarh do have spatial interaction based on administrative services. Rest of the fourth order service centers don't have spatial interaction based on administrative services, which are Tapookara, Shahjahanpur, Narayanpur, Diwakari, Itarana (Rural), and Barodameo. It indicates that some service center has developed because of having a tehsil headquarter. But some tehsil headquarters are not having higher order service center which are Kotkasim, Mundawar, Malakhera, Reni and Kathumar of 4th order may be due to absence of factors like population size and some natural limiting factors.

Map no. 5.7

Spatial interactions based on Administrative services among sample settlements



5.20 Proposed central place system

In Alwar district central place distribution is unbalanced, uneven and concentrated at a few locations. It is concentrated mostly in the eastern and central part of Alwar district. For adjusting the distribution of central places by suggesting new central place or by introducing innovative services which have pulling capacity to generate other services in small order towns of Alwar district the following plan is proposed. Refer Table no. 5.9, Table no. 5.11 and Map no. 5.8.

This plan is proposed based on Availability of different type of functions. First order central place is already present in Alwar District. One second order central place is already present, but other proposed central place does not exist in Alwar district. One second order central place is proposed. In second order central place certain education services, transport services and good connectivity is lacking, which needs to be developed to support the development of other service. Refer Table No. 5.10

This plan for central place system in Alwar has been suggested on the basis of existing services, population density, and spatial interaction for different service between existing central places and hinterland region. Proposed central places will provide services to lower order settlements. First order central place Alwar has central location in Alwar district. This central place provides higher order and specialized services to the Alwar region and second order central places.

Map no. 5.8
Alwar District
Proposed central place systems

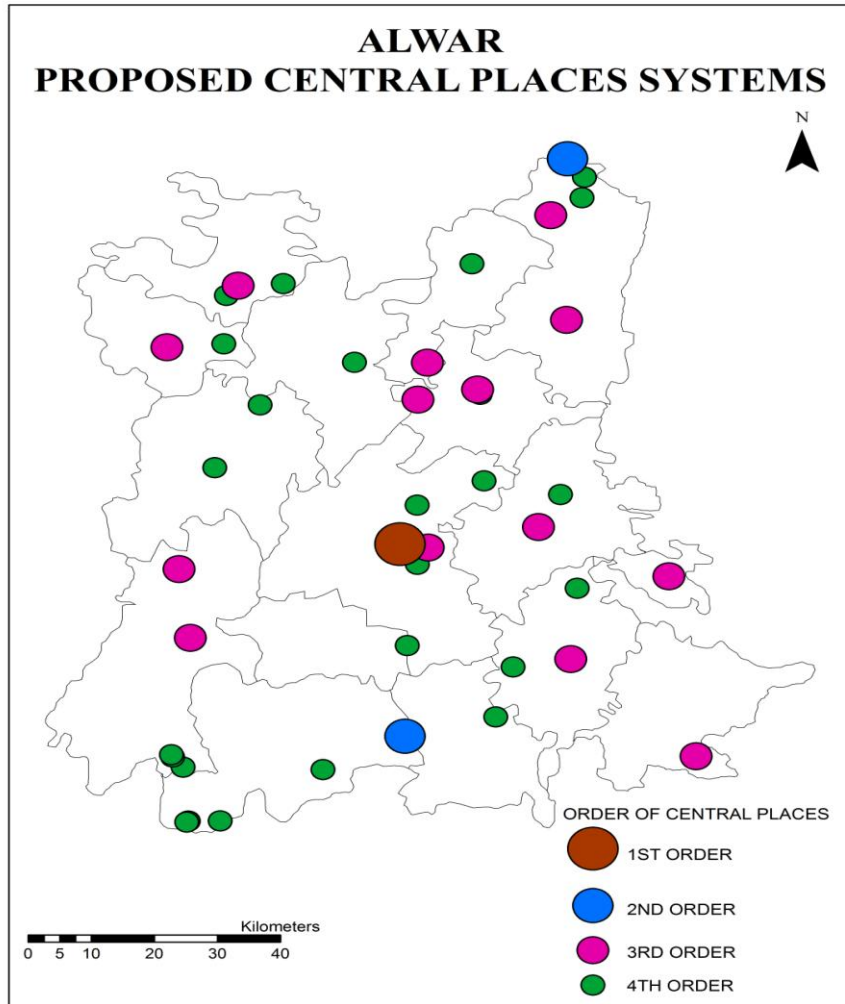


Table no. 5.9
Alwar District

Proposed central place systems tehsilwise in number

Tehsil	Order of central places	Existing central places	Proposed central places
Alwar	First	1	1
	Second	--	--
	Third	--	1
	Fourth	2	3
Bansur	First	--	--
	Second	--	--
	Third	--	--
	Fourth	1	2
Behror	First	--	--
	Second	--	--
	Third	1	2
	Fourth	2	3
Kathumar	First	--	--
	Second	--	--
	Third	1	1
	Fourth	--	--
Kishangarh Bas	First	--	--
	Second	--	--
	Third	1	2
	Fourth	1	1
Kotkasim	First	--	--
	Second	--	--
	Third	--	1
	Fourth	--	1
Lachhmangarh	First	--	--
	Second	--	--
	Third	--	2

	Fourth	3	2
Mandawar	First	--	--
	Second	--	--
	Third	--	--
	Fourth	--	1
Rajgarh	First	--	--
	Second	--	1
	Third	1	--
	Fourth	--	6
Ramgarh	First	--	--
	Second	--	--
	Third	--	1
	Fourth	1	1
Thanagazi	First	--	--
	Second	--	--
	Third	--	2
	Fourth	2	3
Tijara	First	--	--
	Second	1	1
	Third	--	2
	Fourth	2	2

Table no. 5.10**Alwar District****Functions proposed for different order of central places**

Order Of Central Places	Functions Proposed				
	Education	Health	Banking	Recreation	Others
First	Is present	Is present	Is present	Is present	Is present
Second	Medical and engineering colleges, management institute, Polytechnic colleges	Is present	Is present	Cinema theatre, Stadium	Population needed as threshold, Transport services
Third	Govt.- Shorthand and Typewriting, Govt.- Vocational, Govt.- Special School for Disabled, Govt.-Non Formal Education	T.B. Hospital/Clinic, Mobile Health Clinic, Non-Government Charitable-Hospital/Nursing Home,	Nationalised Bank, Private Commercial Bank	Stadium, Cinema Theatre, Auditorium, Community Hall, Public Library, Reading Room	Marketing services, Transport services like railway station, connect with national and state highways
Fourth	Degree Colleges,	Family Welfare Centre, Maternity and Child Welfare Centre, T.B. Hospital/ Clinic, Mobile Health Clinic, Non-Government Charitable-Hospital/Nursing Home	Agricultural Credit Society, Non-Agricultural Credit Society, Co-operative Bank	Auditorium, Community Hall Public Library, Reading Room	Lower order Marketing services, Railway station, connectivity

Table no. 5.11
Alwar District
Name of Proposed central place systems tehsilwise

Tehsil	Systems of proposed central places			
	First order	Second order	Third order	Fourth order
Alwar	Alwar		Diwakari	Itarana(rural), Jaharkhera, Malakhera
Bansur				Kasba Bansur, Rayli
Behror			Behror,Neemrana	Bardod, Madhosinghpura, Shahjahanpur
Kathumar			Kherli	
Kishangarh Bas			Khairthal, Kishangarh	Ganj
Kotkasim			Shahpur	Kotkasim,
Lachhmangarh			Lacchmangarh, Govindgarh	BarodameoBas Dhekda
Mandawar				Mandawar
Rajgarh		Rajgarh		Gola ka bas,Kootooki, Narwas, Patti Beena, Pinan, Sitapura
Ramgarh			Ramgarh	Beejwa
Thanagazi			Narayanpur, Thanagazi	Guwara Dabar, Guwara Lala Bhaiya, Guwara Leswa
Tijara		Bhiwadi	Tijara, Tapookra	Gadpur, Pathredi

5.21 Conclusion

- **Educational Facilities in sample settlements**

For the lower order sample village only primary education is available in the village. For other education services like middle education, senior secondary education, people have to go for some distance. But for higher order all educational facilities are available in the village except higher education like college. For college education people will have to go outside of the village. 2nd order service center Bhiwadi and some 4th order service centers like Shahjahanpur, Tapookara, Narayanpur, Itarana (rural) and Diwakari do not have spatial interaction for the education services. Alwar 1st order service center provide education service outside of Alwar Tehsil

- **Health Facilities in sample settlements**

Only dispensary facility and family planning is available in higher order settlement. It is because family planning is included in dispensary itself. Other services are not available in sample settlements. 2nd order service center Bhiwadi and some 4th order service centers Narayanpur, Diwakari, Itarana (rural), Tapookra, Shajahanpur and Barodameo do not have spatial interaction based on health services. Rest of the service centers have spatial interaction based on health services.

- **Economic Facilities in sample settlements**

People go for greater distance for wage or employment. For banking service lower order sample settlement, people go for larger distance rather than to higher order sample settlement. 2nd order service center and some 4th order service center Shahjahanpur, Tapookara, Itarana (rural), Diwakari, Lachhmangarh and Narayanpur do not have spatial interaction based on Banking and credit services.

For job opportunities one third order center Khairthal does not provide this service to sample settlements. Among 4th order center some center does not provide job opportunities to the sample village settlement which are Kishangarh, Tapookara, Itarana (rural) and Diwakari. Some people go outside of the Alwar district like Rewari, Kotputli, Gurgaon, Delhi, Jaipur and Bharatpur. Alwar and Bhiwadi have very high interaction based on job opportunities.

- **Recreation Facilities in sample settlements**

Recreation services are not available in sample settlements. Higher order recreation services like stadium and cinema service provided by only Alwar which is 1st order service center. Recreation services are not developed in Alwar. Most of the recreation services is provided by fairs and festival in the region.

- **Marketing Facilities in sample settlements**

Cereal grinding, oilseed grinding and daily based item shop are available in higher order sample settlements. But for lower order sample settlements cereal grinding and daily based item shop is within 1 km. spatial interaction has been done with higher order center for higher order services like Agricultural tools, crockery etc. but all the service center does not interact or provide marketing services, for example Bhiwadi.

- **Transport Facilities in sample settlements**

For the transport services people have to cover different distances for different type of services. For bus services people have to cover less than 3 km. but for rail accessibility they have to go cover more than 15 km distance in Alwar district. Alwar and Khairthal provide transport services for railways to a wide region. Other centers which which provide rail

service to surrounding region are Ramgarh, Rajgarh, Malakhera, Kherli, Govindgarh. But 2nd order service center Bhiwadi does not have interaction based on transport services.

- **Administrative Facilities in sample settlements**

Sample settlements have more or less equal spatial interaction based on Administrative service. All the sample settlements have to cover below 8 km distance for administrative services. Among the service centers Tapookara, Shahjahanpur, Narayanpur, Diwakari, Itarana (Rural), and Barodameo, Bhiwadi and Khairthal do not have spatial interaction for administrative services.

- **Proposed central places**

Only first order central place has all the functions. Second order central places are lacking in recreation services. All the Lower order services needs to be develop in the region in fourth order central places.

Chapter 6
CONCLUSION

The study of “central places and socio economic development: A case study of Alwar District (Rajasthan) brings out very important findings about the status of regional development of Alwar, and variation in the socioeconomic condition of different central places and in nearby settlements the central place provide services. The services provided by the central places to those settlements falling within its range. Based on the centrality functions like education, health, banking and recreations are obtained to access the relation between the order of the services and the socioeconomic condition. Above all the study has gone deep in to finding the relation between the centrality and order of services at the higher to lower order of the settlements and the relation between service and the distance to which it successfully carter the need of people in far of settlements are analyzed.

The study has been concluded to drawn in support for creating new innovative central places and improving the sub- functions of the services along with improving the connectivity. This centrality based spatial arrangement design in the process of regional development of Alwar would support to make it developed without putting more emphasis on the economic growth. In the process of designing spatial arrangement and placing new centrality function in existing administrative towns in such a way, to let the market force capture the response to provide the service to different settlements and hence for that cause there need to be a proper spatial linkages plan to develop road network connecting every settlements.

In the study the following discrepancies are observed from the study of same problem with different angles.

a) Population distribution as a function has been observed and it is found that there are settlements with very less population that means weak threshold may hinders the working of market mechanism for generations of services like health and education, but these services are among the vital services to be provided irrespective of the ground condition to improve socioeconomic indicators like sex

ratios, literacy, social and cultural status of women and dalits. The findings on the socioeconomic indicators suggest that sex ratio is skewed against women in many of the settlements and even in towns. SC population are concentrated in the settlements around the higher order towns like Alwar and in its continuum like Diwakari because of being servicing class of but these settlements with highest population density for SC, fall behind all others settlements even in primary to middle category of education services. ST populations are mainly concentrated in remote settlements in the region and they are also at the risk as the distributions of services required to improve on the development indicators are skewed against the low order population settlements.

b) All the socioeconomic functions like education (primary, middle, secondary, senior secondary and college), health (different institutions), banking and recreations are also following the market principle and are distributed according to the hierarchy of the population size and urbanization. Most urban settlements have almost every service in its higher order but small towns and low order settlements population size wise, have lower order of services with some exception as industrialized lower order towns having most of the services in god shape attributing to the population density and connectivity favoring market based provisioning of the vital services.

c) Banking and credit service and job opportunity are also in good condition in every cities of higher order population wise and in industrial towns and the area has agriculture as a dominant economic activity in rural settlements are lacking in credit related services may not be a good sign for healthy agricultural growth. Market in the nearby agricultural space and connectivity from National capital and State capital has favored the farmers in getting good remuneration. But having improved banking services in these regions will add to financial inclusion target and contribute in national savings.

d) Recreational infrastructure services are following the pattern of demand by urbanization and availability of open space outside the main town so it is found in

the study that most of such services are in Alwar and in nearby town Rajgarh. During this contemporary period witnessing the cultural revival (Yoga and Exercise) even small towns and rural settlements have the potential demand for recreational services. This logic goes against the literature related to centrality due to growth point.

The deviation observed in the spatial distribution of services based on centrality shows a strong correlation of the population size, urbanization, connectivity and industrialization to order of services give the details which are further explained to support the need based regional planning for socioeconomic development.

The study explained in detail about the region Alwar, marked as NCR by the Government of India, the terrain of the region has put some limitation on the nature of the development which is as expected is in conformity to many other studies. The study area is significantly dominated by the agricultural activities with some pockets of industrial places like Bhiawdi, Tapookra and Neemrana. Alwar being a first order central place has huge burden in providing services of many types to the adjoining settlements like Diwakari and Bhoogar. Other than Alwar a few more central service points are Bhiwadi, Rajgarh, Kherli, Behror has been marked in the study.

The reason for such outcomes about socio economic condition of Alwar may be because any settlement pattern is not emerging from the spatial organization in the region. The resulted pattern of settlement based on the census as well as primary survey can be attributed to many factors including geographical, which are fixing the distribution of centrality function important for the socio economic development of the population in and around the settlements mostly based on the market mechanism.

Physiography has also fixed the distribution of services in the region with two divisions one is Aravali hills and other is plain region. The geographical factor has decided the settlement pattern of Alwar district, scattered hills of Aravali

range are spread in north to south, and also present in some central and south west region, some segmented hills are also scattered in eastern and western part of Alwar where as the eastern region of Alwar is mostly plain. Important findings of this study can be correlated with pattern and distribution of settlements. Urban center are located mainly in plain region thus physiography has decided the Alwar's settlement pattern.

Connectivity has also proved to be an important deciding factor of the settlement pattern of Alwar and their evolution as urban centers. All the urban centers are situated on national highway or state highways or on radial axis. So the pattern of urban centers and central places are also decided by connectivity and accessibility. NH-8 passes through Behror tehsil. Behror, Shahjahanpur and Neemrana are developing urban center in proximity to National highwys and near to national capital on radial axis of highways.

Among all urban centers in Alwar district , Alwar is of first order and has primate city population. Alwar is primate city in Alwar district because of various regions. It is district headquarter of Alwar district. Centrality of Alwar city supports it in evolving as primate city. Matasya industrial area in Alwar provides secondary and tertiary activity in the region. This region provides job opportunities for population in surrounding region. In hilly region, settlements are of small population size and in plain region settlements are comparatively of larger population size. Settlement concentration is also high in plain region.

In Alwar industries are situated mainly in north eastern part, central part and some pockets of north western part of Alwar district. This industrialization has accelerated the process of urbanization in this region which has led to rapid emergence of small towns in Alwar district. Bhiwadi has been found as rapidly growing among all towns in last decade (2001-2011). Other town which has emerged due to industrialization is like Tapookara, Neemrana, Diwakari and Bhoogar. The towns with no industry have lower decadal population growth this shows that population growth derived by the force of industrialization. Population

density is high in Tijara, Alwar and Behror tehsils due to industrialization. Thanagazi and Bansur tehsils have no industry and thus have lowest population density without any urban centers.

Region with higher concentration of SC & ST population are having very less to no urbanization. Mundawar, Kishangarh and Kotkasim have higher concentration of SC population and regions are not having any sign of being urbanized. The region which has higher concentration of ST population is Rajgarh and Thanagazi. Thanagazi is not yet urbanized and Rajgarh tehsil has town with very low population growth rate. This low population rate hinders the growth of services. Literacy rate is also low in Thanagazi tehsil with ST population and not any senior secondary school in Diwakari with 40% SC population. Behror and Alwar tehsils has higher literacy rate. This has shown the variation in urbanization and development based on social indicators in the Alwar district.

The situation of work force participation rate is higher in Behror tehsil having three main towns like Behror, Neemrana and Shahjahanpur. Bhiwadi has industrial complexes and has highest work force participation rate among all the towns, this give a picture that urbanization and industrialization has impact on work force participation rate.

Settlement pattern have impact on distribution of functions and services. Very small size rural settlement either does not have any function or having negligible services like education, health, recreation, credit and banking. Population size has the relation with the availability of functions and population is threshold for the establishment of any function. Higher population size rural settlement has fairly better services like education, health, recreation, credit and banking. But higher order services like college education, hospitals, bank and stadium are very less even in higher order population size settlement demand for a planned development strategy.

Mandawar and Behror are well covered under all type of education function because it depends on for services from Delhi, being closed and connected through road. Tijara is also closed to Delhi but have least coverage of education facilities may be because of cultural factor as the region has Mewati population here cultural is determining the demand for the services like education. Health services are better in Alwar and Behror.

The region is good at availing some services but in this era of market based economic growth one cannot wait for the region to develop at the fate of it given all the findings in this study support that the limitation if market can be bridge by locating centrality function in a planned way so that its coverage in many settlements improve.

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Appendix 1

Thesil	Village name	Order	Distance range	Administrative distance (in Kilometer)
Alwar	Bhugore	5	I	5
Alwar	Tuleda	5	I	5
Alwar	Shahpur	6	II	14
Alwar	Umren	6	II	10
Bansur	Rampur	5	II	16
Bansur	Alampur	6	II	10
Bansur	Holawas	6	I	5
Bansur	Ramnagar	6	I	3.5
Behror	Baldod	5	II	10
Behror	Gandala	5	II	9
Behror	Machal	6	I	2
Behror	Mundiakheda	6	I	2
Govindgarh	Bhaisdawat	6	I	4.5
Govindgarh	Kharsanki	6	I	3
Govindgarh	Kherli basur	6	II	7
Govindgarh	Naswari	6	II	10
Kathumar	Aruwa	6	I	3
Kathumar	Bhanokar	6	II	12
Kathumar	Daroda	6	I	5
Kathumar	Salwadi	6	II	22
Kishangarh	Jhirdia	6	I	4.5
Kishangarh	Kultajpur	6	I	5
Kishangarh	Rundh jhamuwas	6	II	15
Kishangarh	Tohari	6	II	9
Kotkasim	Aanaka	6	I	4
Kotkasim	Bhojrajka	6	II	12
Kotkasim	Kanahdka	6	I	2
Kotkasim	Patan ahir	6	II	15
Lachmangarh	Harshana	5	I	5
Lachmangarh	Deenar	6	II	9
Lachmangarh	Gandoora	6	II	9
Lachmangarh	Maujpur	6	I	5
Malakhera	Baleta	5	II	10
Malakhera	Barkheda	5	I	3
Malakhera	Beejwad naruka	5	I	4
Malakhera	Naithla	6	II	13
Mandawar	Chiruni	6	I	5

Mandawar	Dahlawas	6	II	13
Mandawar	Padmadakala	6	II	15
Mandawar	Peepli	6	I	4
Neemrana	Bichpuri	6	I	5
Neemrana	Dhabarbas	6	II	10
Neemrana	Gheelot	6	II	8
Neemrana	Salalpur	6	I	2
Rajgarh	Thanarajaji	5	I	4
Rajgarh	Dhigawada	6	II	10
Rajgarh	Kundroli	6	II	10
Rajgarh	Surer	6	I	5
Ramgarh	Bamoli	6	II	18
Ramgarh	Chidwai	6	II	10
Ramgarh	Dohali	6	I	5
Ramgarh	Doli ka bas	6	I	5
Reni	Babeli	6	II	7
Reni	Nangal ka bas	6	I	3
Reni	Tahakda	6	I	4
Reni	Toda gyansingh	6	II	20
Thanagazi	Ghar bassi	6	II	9
Thanagazi	Harner	6	I	3
Thanagazi	Rupukabas	6	I	4.5
Thanagazi	Saleta	6	II	7
Tijara	Hasanpur	6	II	15
Tijara	Isroda	6	II	7
Tijara	Kahalilpuri	6	I	2
Tijara	Luhadera	6	I	3

Distance (in kilometer)	Distance range
Up to 5 km	I
More than 5 km.	II

Appendix 2

HOUSEHOLD SURVEY IN VILLAGE SAMPLE

I Social activities

Educational Amenities

s. no.	Name of education institution	Total no.	Within the village or outside	If outside name of the place	Distance in kms.
1	Primary school				
2	Middle school				
3	Senior secondary				
4	College				
5	University				

Health facilities

s. no.	Name of health institution	Total no.	Within the village or outside	If outside name of the place	Distance in kms.
1	Hospital				
2	Dispensary				
3	Veterinary				
4	Family planning center				

II Economic activities

s. no.	Economic activity	Total no.	Within the village or	If outside name of the	Distance in kms.
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			outside	place	
1	Job/ employment/wage				
2	Credit facility				
3	Banking				
4					

III Cultural activities

s. no.	Recreation	Total no.	Within the village or outside	If outside name of the place	Distance in kms.
1	Cinema hall				
2	Stadium				
3	Fairs and festivals				
4					

IV Marketing activities

s. no.	Marketing	Total no.	Within the village or outside	If outside name of the place	Distance in kms.
1	Agricultural tools				
2	Seeds & fertilizer				
3	Cereals grinding				
4	Oilseed				

	grinding				
5	Flour				
6	Daily used food items				
7	Grocery				
8	Others				

V Transport and Administrative Services

s. no.	Transport	Total no.	Within the village or outside	If outside name of the place	Distance in kms.
1	Bus stand				
2	Railway station				
3	Administrative office				
4					

Survey of anaj and sabji mandi each tehsil level

Sr no.	Goods to sell	Goods to buy	People come from (distance) in km.
1	Cereals		
2	Vegetables		
3	Others		
4			