



IJIRSET

International Journal of Innovative Research in
SCIENCE | ENGINEERING | TECHNOLOGY

e-ISSN: 2319-8753 | p-ISSN: 2320-6710



INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN SCIENCE | ENGINEERING | TECHNOLOGY

Volume 10, Issue 7, July 2021

ISSN INTERNATIONAL
STANDARD
SERIAL
NUMBER
INDIA

Impact Factor: 7.569



9940 572 462



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Delimitation of Urban Influence Area: A Case Study of District Bundi, Rajasthan, India

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ABSTRACT: The study of urban areas is one of the core concepts of urban geography. Each city is connected with its surrounding area. A big city, in the hierarchical pattern, serves the surrounding area. It provides various important or core services and also gets served by the surrounding cities of lower hierarchy. Central services are provided by the big or nodal cities; on the other hand they also depend on the surrounding area for various services and raw materials. The limit of this interaction depends on the distance and population of these two cities. The study area, Bundi district is situated in the south-east part of Rajasthan. Bundi city is the headquarters of Bundi district. It provides various important services to the lower cities i.e. tehsil headquarters and also gets served by them with various types of raw materials and food items. Study and analysis show that this interaction of Bundi city headquarter is limited with the distance between two cities and population as well.

KEYWORDS: Urban Areas, Hierarchy, Central Services, Influence Area.

I. INTRODUCTION

“The nodal region has the unity and form of spatial organization, not the spread of specific features that differentiate it from other regions.” - Ray M Northam

“Cities do not grow by themselves but the countryside sets them up to do tasks that must be performed in central places.” – Mark Jaferson

In an urban hierarchy a big/nodal city performs and conducts the important works like administration, financial assistance and high level medical, educational and commercial services. The surrounding cities of lower hierarchy provide food, milk, vegetables, fruits, grains and other raw materials. These materials are essential for the functioning of that big/nodal city. The distance and quantity of this interaction between two cities in a hierarchical pattern depend on two factors-

1. Distance between those two cities.
2. Population of those two cities.

In Bundi district, Bundi city is a big/nodal city in a hierarchical pattern. While Talera, Keshoraipatan, Nainwa, Hindoli and Indergarh are tehsil headquarters and are the cities of second level in hierarchical pattern. The interaction between Bundi city headquarter and these tehsil headquarters depends upon the distance and population.



Table - 1
Administrative Set up

S.N.	Tehsils	Tehsil Head Quarter	Population of Tehsil Head Quarter (2011)	Linear Distance form District Head Quarter
1.	Bundi	Bundi	103286	-----
2.	Keshoraipatan	Keshoraipatan	24627	45
3.	Indergarh	Indergarh	7444	80
4.	Nainwa	Nainwa	19485	70
5.	Hindoli	Hindoli	9601	25
6.	Talera	Talera	7203	20

Source: District Statistical Abstract, 2018 and Google Map

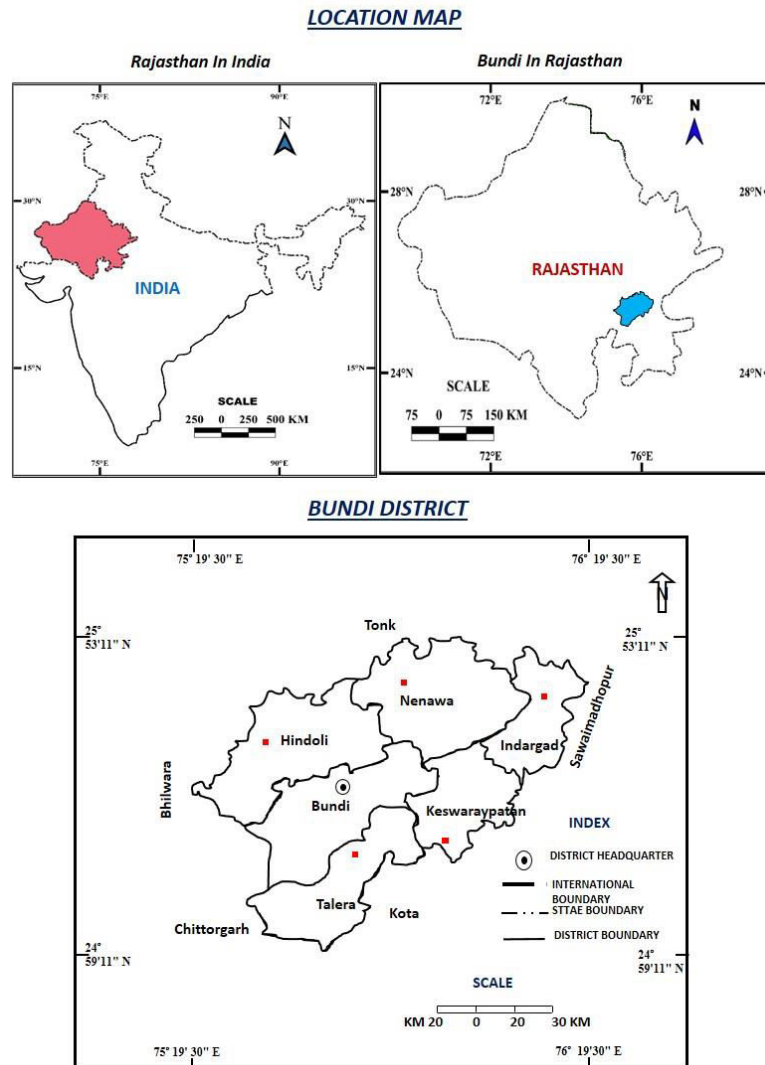


Fig. – 1

Location Map of District Bundi

II. RELATED WORK

A lot of research and work have been undertaken in the field of delimitation of interaction between cities. In 1858-59 H C Carey¹ introduced the Gravity or Interaction model to justify the relation between two city centers. In 1930 R E Dickinson² studied the “Regional Functions and Zones of Influence of Leeds and Bradford” in his book “Geography” vol. 15. In 1931 famous economist Reilly³ introduced the law of “Retail Gravitation” to study the density of interaction between two cities. In 1949 P D Converse⁴ modified Reilly’s principle into “Breaking Point” theory for the delimitation of the influence area of a city. In India R L Singh (1955), R L Dewedi (1964), S L Aalam (1965), P D Mahadev and Jaishankar (1969) introduced various methods to demark the influence area of a nodal city. These are all methods based on the supply of milk, fruit, vegetables, bus service area, medical, education service area, administrative service area etc.

In the recent scenario Md. Julfikar and Deepika Varshney (2012)⁵ studied in detail about “Spatial Modeling of Urban Growth and Urban Influence Approach of Regional Development in Developing Economy”. (Journal of Urban and Regional Analysis, Vol. IV 2, 2012, p, 129-148).



R B Bhagat (2004)⁶ studied the “Dynamics of Urban Population Growth by Size Class of Towns and Cities of India”. (Demography India- January, 2004, 33(1):47-60).

Kaushik Mandal, Soumendu Chatterjee and Nilanjana Das Chatterjee⁷ studied the “Delineating Sphere of Urban Influence: The Case Study of Three Early Urban Centers of Eastern India”. (Project- Sphere and Radius of Urban Influence- November 2015).

III. METHODOLOGY

Primary and secondary data are collected for analytical study and finding conclusions. Intense survey and field visit are undertaken to bring out the empirical results for study. Secondary data are collected from various published and unpublished administrative publications. For the accuracy of analysis and delimitation of urban influence areas, the Gravity or Interaction method of H C Carey is used. The formula used for it is-

$$I = P_1 P_2 / d$$

I – Gravity of Interaction between P_1 and P_2

P_1 - Population of big/nodal city

P_2 - Population of small city

d- Linear distance between P_1 and P_2 cities

IV. EXPERIMENTAL RESULTS

According to the formula of H C Carey the calculation was undertaken to analyze the gravity or interaction pattern between various tehsil headquarters in Bundi district. Here the population of tehsil headquarters is used in thousands. The results of this calculation are used for the analysis of gravity or interaction patterns in Bundi district.

Table- 2
Calculation According Formula of H C Carey

S.N.	City headquarter/ Tehsil headquarters	$I = P_1 P_2 / d$	Gravity or Interaction
1.	Bundi	-----	----
2.	Keshoraipatan	(103) (24) / 45	54.93
3.	Indergarh	(103) (7) / 80	9.01
4.	Nainwa	(103) (19) / 70	27.95
5.	Hindoli	(103) (9) / 25	37.08
6.	Talera	(103) (7) / 20	36.05

Source: Calculation according formula (Population is used in thousands)

According to the calculation and results it is clear that distance and population affect the gravity or interaction pattern between two cities in district Bundi. Tehsil Keshoraipatan has the maximum quantity of interaction with district



headquarter. Tehsil headquarter of Keshoraipatan occupies the highest population and medium linear distance from district headquarter. The lowest quantity of interaction is of Indergarh tehsil headquarter because linear distance between district headquarter and Indergarh tehsil headquarter is too much. Hindoli and Talera tehsil headquarters are on second and third rank according to the quantity of interaction. These two tehsils have minimum linear distance from district headquarter in the comparison of other tehsil headquarters of district Bundi. Tehsil Nainwa has medium quantity of interaction because of its medium linear distance and population. This analysis shows that linear distance and population are affecting the gravity/interaction or influence pattern in Bundi district. The interaction or influence of a nodal/big city affects various aspects related to the socio-economic and cultural environment of Bundi district.

V. CONCLUSION

The pattern of gravity or interaction is affecting the various socio-economic and cultural aspects in district Bundi. The analysis and study results show that the tehsil headquarters of Indergarh and Nainwa tehsils have lower quantity of gravity or interaction i.e. 9.01 and 27.95 only. Distance is the major responsible aspect for it. Tehsil headquarter of Indergarh is 80 kms while the tehsil headquarter of Nainwa is 70 kms from district headquarter Bundi. These two tehsil headquarters have low interaction with district headquarter. This fact also affects the socio-economic development of these two tehsils. These two tehsils are underdeveloped according to the development in the field of agriculture and industries. For the development of these tehsils, the establishment of central services of high level like administration, medical, finance and education should be developed and encouraged. On other hand the tehsil headquarters of Hindoli and Talera usually have more interaction with district headquarter Bundi, because of their lower linear distance and high accessibility with district headquarter. These two tehsils have a lot of potential for development in the field of industries and agriculture. Keshoraipatan tehsil headquarter is highly interacted with the district headquarter because of its large population and good accessibility. Tehsil Keshoraipatan is also well connected by roads and rail routes, not only with the district headquarter but also other parts of district Bundi. Talera, Hindoli and Keshoraipatan tehsils are more developed in the comparison of Nainwa and Indergarh tehsils. So a suitable strategy should be developed and undertaken for the development of the entire district. The influence or gravity pattern of nodal city should be kept in the center of this strategy so that the positive and negative effects of gravity or interaction pattern could be managed for equal development of the entire Bundi district.

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