Urban Hierarchical Analysis of Jaunpur District

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Abstract

In the initial stage of the hierarchy study, the hierarchy was determined based on the population of urban centers based on the number, quality, and grouping of tasks performed by them, but later on, the development of a multi-professional dimension rather than one commercial extent of urban centers. The imagination started gaining strength, and along with the population of urban centers, the people of regional importance were also considered necessary. As a result, the importance of urban centers is determined by their regional importance functions, and the size, structure, and parts of urban centers were considered the basis for determining the hierarchy. Scholars have emphasized the tasks based on determining the hierarchy because all the centers do not perform the central functions equally. However, there is a difference in the amount of their work. Primary functions refer to those found in only a few cities due to their nature and nature. Therefore, the primary basis of hierarchy is the number and characteristics of functions found in cities, which we call 'centrality.' based on this relative importance of urban centers" centrality,' their hierarchy is determined.

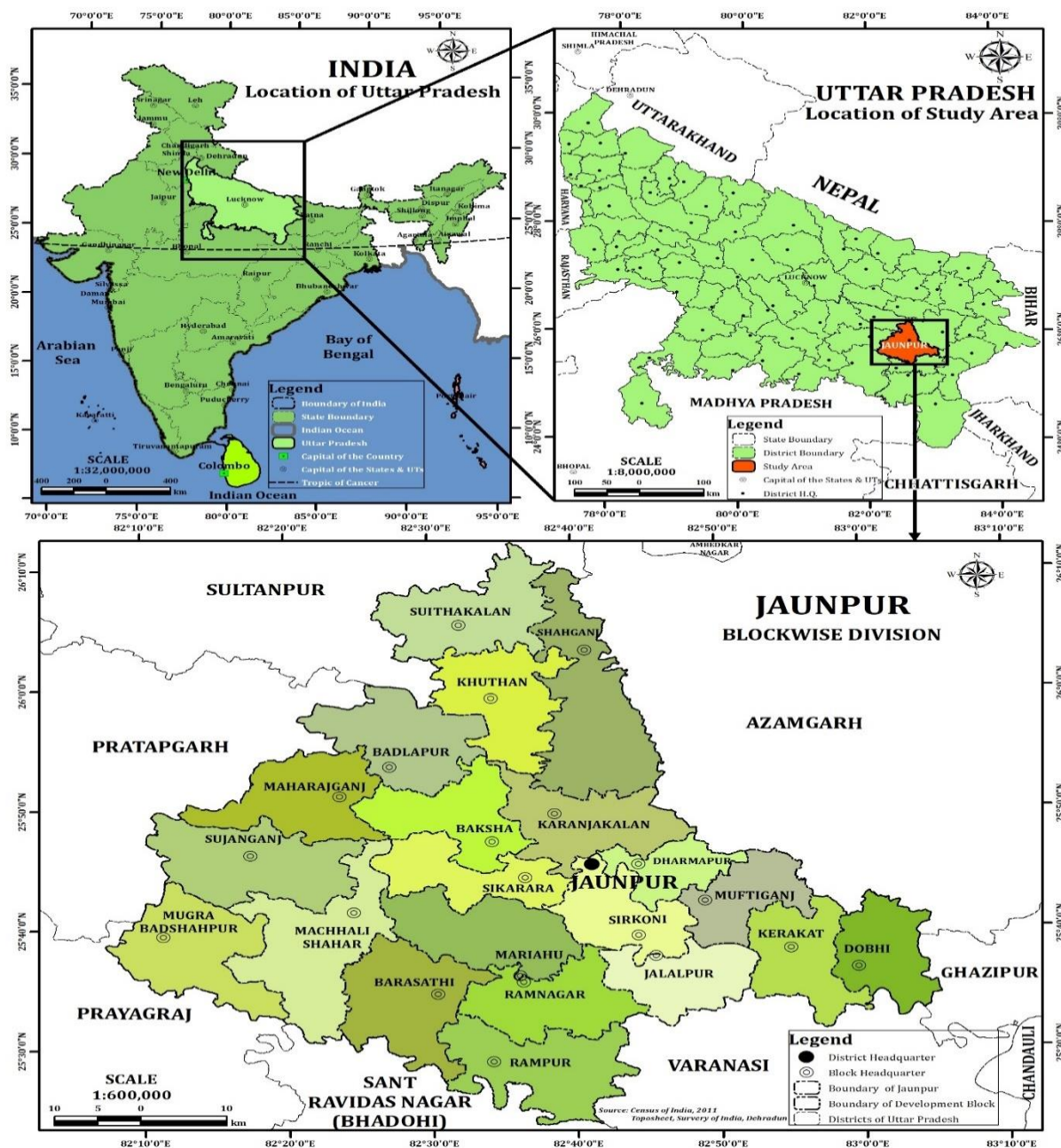**Key Word-**Hierarchy, Urban Center, Centrality Index

Introduction

Keeping in view the imperative of regional development in a developing country like India, there is a need to have such a hierarchical classification of cities that can become a medium for the success of the regional development process. So that the planners can immediately know which city can be developed as an urban center of which level in a short time, the cities of different hierarchical categories must be named in an understandable and meaningful way. As soon as such a city belongs hierarchical class, the public image of the functional level of that city and the expected service facilities emerge in front of the planners in the same way as any district headquarters or tehsil headquarters emerges. The most serious difficulty in this direction lies in determining the centrality of the urban centers. Knowing the importance of centrality is necessary because there is a massive difference in the matter of different tasks. As a result, the nature of urban services is also not uniform. Therefore, giving equal importance to every job would be far from fiction and reality. The following three methods have been used in the present study.

Study area

The district of Jaunpur forms the north-western portion of the old province and the present division of Varanasi, lying between the parallels of 25° 24' and 26°12' north latitude and between 82°7' and 83°5' east longitude. It is bound on the west by districts of Pratapgarh and Prayagraj, south Santkabirnagar, the east by Ghazipur and Azamgarh, and the southeast by Varanasi, and on

the north by the Sultanpur district. Most of the boundary is artificial, although, in some places, it is marked by rivers lying well outside the edges of the district, surrounded by the lands of Partabgarh and Sultanpur. The district has a significant length of 85 km from north to south and an extreme breadth from east to west of 90km. The total area of the Jaunpur district is 4038 square km. The study area has been divided into six tahsils (subdivisions) and 21development blocks, which carried 13 urban centers.

Map No.1

Hypothesis

In the context of the use of hierarchy in the study area, the following significant hypothesis has been formulated and tested -

1. Whether the hierarchy of the study area exists.
2. Whether population size and domicile index are interdependent.
3. Whether domicile index and the number of works are interdependent.

3. Methodology

The following methods have been used for the class-wise hierarchy of urban centers in the study area-

3.1Hierarchy based on occupational composition.

3.2Hierarchy based on population.

3.3Hierarchy based on service capacity.

3.1Hierarchy based on occupational composition-

Kashinath Singh has used this method. The following formula has been used to measure the centrality of urban settlement in terms of persons engaged in trade and commerce in each city of the study area.

Formula,

$$C= \frac{N \times 100}{P}$$

Here

C = centrality

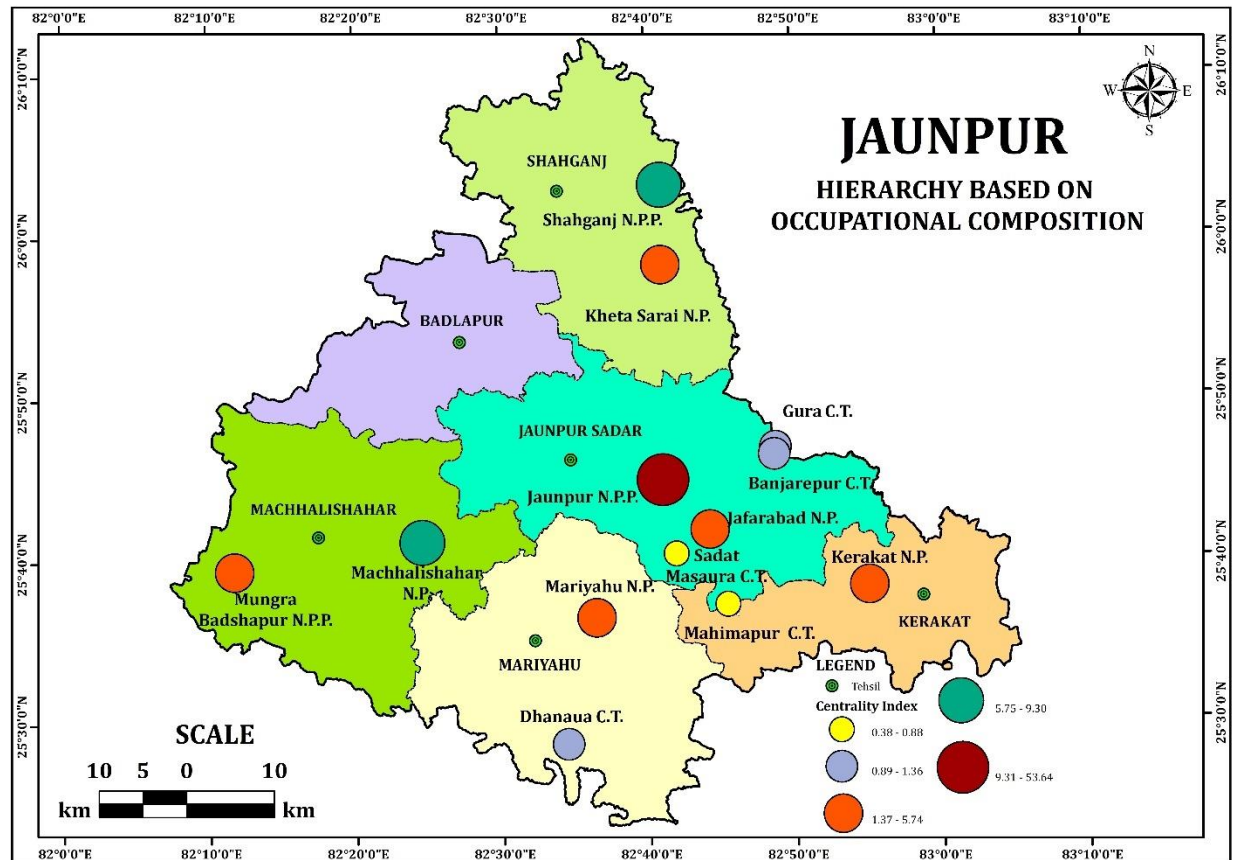**N =** Number of workers engaged in trade and commerce in the city

P = total number of workers involved in trade and commerce work in the entire study area

Table No.1

S.N.	Urban Center	Total Population	Tot Working People	Tri pop.	Centrality Index
**Hierarchy Based on Occupational composition in Jaunpur District**
1	Jaunpur	180362	38,453	32087	53.63
2	Shahganj	26556	6,221	5566	9.30
3	Machhalishahar	26107	5,981	5059	8.45
4	Mariahu	22778	4,945	3440	5.74
5	Mungra Badshahpur	20004	4,462	3336	5.59
6	Kerakat	13525	3,127	2488	4.57
7	Khetasarai	19438	4,009	2488	4.16
8	Jafrabad	10792	2,549	1957	3.27
9	Banjarepur	5108	1,289	816	1.36
10	Dhanaoaa	6212	1,665	786	1.32
11	Gura	5618	1,165	810	1.31
12	Sadtamasoura	4800	1,212	526	0.88
13	Mahimapur	5280	1,215	225	0.38
14	Total Population	346580	76293	59831	100.00

Based on the city's centrality value obtained, the urban centers are classified as the centrality and total population of the town. Tertiary Population and Centrality Index and all workers and the Centrality Index on the simple method diagram, but in these drawings, there is no relation between all workers and centrality of cities and tertiary population and centrality. Even if there is a relationship, it is not very healthy. In such a situation, dividing the cities into hierarchical categories is neither possible nor appropriate. Therefore, the basis of the type and centrality of urban functions has been outlined. This diagram shows the relationship between the kind and centrality of the cities' works compared to other charts. Therefore, keeping in mind the relationship between the type and centrality of urban functions, these cities have been divided into four hierarchical categories by drawing lines.

Map No.2

On this basis, one urban settlement is found in the first hierarchical category of the district, two in the second hierarchical category and nine cities in the third hierarchical order, and one town in the fourth hierarchical category. By looking at these relations, it becomes clear that the hierarchical arrangement of the cities of the Jaunpur district does not match with the hierarchical arrangement R = 3 of Kristaller.

3.1.1 Towns of the first hierarchical order

Only one town in this category comes in the district, Jaunpur. This city is the headquarters of the district. Jaunpur city is connected by road and rail to the rest of the study area and the state. Since Jaunpur city is the district headquarters; as a result, the service facilities here are much more than in other categories of town, such as district headquarters, two big hospitals, animal hospitals, homeopathic and Unani hospitals, four-degree colleges, six intermediate colleges, I.T.I.s, polytechnics, railways. Junction, Bus Depot, Bus Station, Engineering College, Many Bus Stops, Telephone Exchange, Many Cinema Halls, Many Types of Banks, Head Post Office, Many Sub Post Offices, Police Stations and Many Police Outposts, Tehsil and Block Headquarters, Artificial Insemination Centre, Family, and Maternal Child Welfare Center, Hotel, Guest House, Employment. A total of 48 types of service facilities, et., Are centered on Jaunpur city, due to which this city occupies a prominent place among the cities of the district.

3.1.2 Cities of the second hierarchical grade:

In this category, five urban centers of the study area are Shahganj, Mariahu, Machhlishahr, Kerakat, and Mungara badshahpur. Shahganj is the largest urban center of this category; a total of 34 central services of various types are accessible here, Tehsil and block headquarters, bus depo and bus station, railway junction, post office, bank, educational institution, medical, public safety, animal safety, agriculture market, etc.

Mariahu, Machhlishahr, and Kerakat are tehsil and development block headquarters. In addition to administrative facilities, 31, 27, and 27 central services are available here for education, medical, public safety, animal safety, banking, transport, and communication, respectively. Another city of this category, Mungra badshahpur, is the headquarters of the development block and has 27 types of central services, including a railway station, bus depot and bus station, educational institution,

medical, public security, veterinary hospital, banking, and communication. These urban centers are inter-connected with the district headquarters and the state.

3.1.3 Towns of the third hierarchical grade:

Khetasarai and Jafarabad come under this category. Of these cities, 22 central services are accessible in Jafarabad, including railway junctions, bus stops, public safety, veterinary hospital, health, banking, education, entertainment, and communication. At the same time, 21 central services are available in Khetasarai, including the railway station, public security, animal service center, post office, medical service center, banking, education, and communication. Both the cities of this category are connected to all the towns of the hetownsict.

3.1.4 Fourth Hierarchical Class Cities:

In this category, five urban centers of the district, Gaura, Dhanau Mahimapur, Sadmatsaura, and Banjarepur, come. Gaura is the largest city in this category. There are 19 services of various types: education, medicine, veterinary, transport and communication, public security, banking, etc. Among other towns of one category, 16 types of central services are available in Dhanauaa, and 16 are also available in Mahimapur. In contrast, 12 central semimajor are available in Sadmatsaura, and 11 central servicmajoravailable in Banjarepur. These centers are directly or indirectly connected by road and rail apart from the study area.

3.2 Hierarchy based on population

The Absolute Centrality Index (A.C.I.) and Size Index (S.I.) of the urban centers in the study area were determined by using the Adholi formulas.

Formula,

two $A.C.L = \dfrac{Pb}{26660}$

in which,

A.C.I. = Absolute Centrality Index

Pb = Total Basic Population of the Urban Centre (Nonagricultural Population)

26660 = Average population of the total urban population of the study area

Formula

$$S.I. = \dfrac{Pti}{EPt} \times 100$$

which,

S.I. = Size Index

Pti = total population of cities

EPt = total population of all the cities in the study area

After that, for determining the hierarchy of urban centers, the urban centers are divided into A.C.I. and S.I. (Table No.2) is underlined (Map No.3). Considering the relation between A.C.I. and S.I., these cities have been divided into five hierarchical categories. On this basis, one of the first hierarchical categories, one of the second hierarchical category,
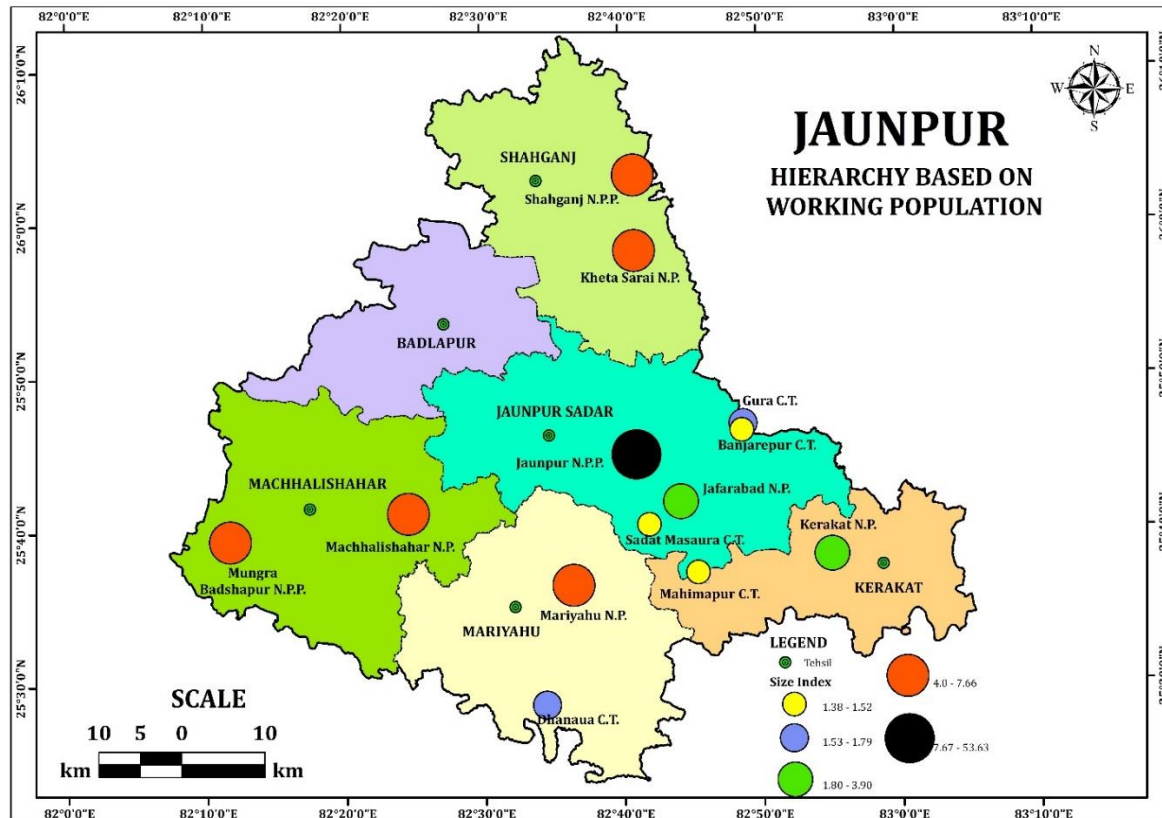
Table No.2

S.N.	Urban Center	Total Population	Tot Working People	Tri pop.	A.C.I	S.I.
				Hierarchy based on Population in Jaunpur District		
1	Jaunpur	180362	38,453	32087	6.76	53.63
2	Shahganj	26556	6,221	5566	0.97	7.66
3	Machhalishahar	26107	5,981	5059	0.97	7.53
4	Mariahu	22778	4,945	3440	0.81	6.57
5	Mungra Badshahpur	20004	4,462	3336	0.75	5.77
6	Kerakat	13525	3,127	2488	0.67	3.90
7	Khetasarai	19438	4,009	2488	0.67	5.61
8	Jafrabad	10792	2,549	1957	0.48	3.11
9	Gura	5618	1,165	810	0.21	1.62
10	Dhanaoaa	6212	1,665	786	0.21	1.79
11	Banjarepur	5108	1,289	816	0.19	1.47

12	Sadtamasoura	4800	1,212	526	0.18	1.38
13	Mahimapur	5280	1,215	225	0.16	1.52
14	Total Population	346580	76293	59831	12.38	100

And five towns of the third hierarchical category (Table No. 5-2 and Figure No. 5-2) are found in the district. We see that the hierarchical arrangement of the towns of the district Jaunpur does not match with the hierarchical arrangement K 3 of Cristaller.

Map No.3

3.2.1 Towns of the first hierarchical order:

Only Jaunpur urban center comes under this hierarchical category. It is A.C.I. (6.53) and S.I. (52.4) Compared to other towns is too much. It is the primary city of the study area where a total of 46 public services are accessible, as mentioned in the above study.

3.2.2 Cities of the second hierarchical grade:

Seven urban centers of the study area come under this category: Shahganj, Mariahu, Machlishahar, Kerakat, Mungara badshahpur, Khetasarai, and Jafarabad are included. The A.C.I. and S.I.of these cities are 0.97 and 7.66, 0.80 and 6.57 respectively. 0.95 and 7.53, 0.49 and 3.90, 0.71 and 5.77 and 0.67 and 5.61 and 0.38 and 3.11 (Table No. 5.1). Here 21 to 34 central services are available, including Junior High School, Inter College, Degree College, Health Services Bank, Trade and Commerce, Public Safety Development Block Headquarters, etc. Shahganj, Madiyahu, Machhlishahr, and Kerakat are these cities' tehsil and development block headquarters, while Mungarabadshahpur is the development block headquarters. Khetasarai and Jafarabad are the major urban center.

3.2.3 Cities of the third hierarchical grade

This category has five towns: district Gaura, Dhanoa, Mahimapur, Sadamvasaura, and Bajrepur. Whose A.C.L. and S.I. 0.20 and 1.62, 0.20 and 1.790, 16 and 1.52 are 0.15 and 1.38 and 0.17 and 1:47 respectively (Table No. 5.1). Primary services include education, health, animal service, public security, banking, transport and communication, trade and commerce, agricultural service, etc. Of these, 19 central public services are accessible in Gaura, 16 in Ghana, 16 in Mahimapur, 12 in Sadmatsaura, and 11 in Bajrepur. All these centers are connected to the district headquarters by road and rail.

3.3 Hierarchy based on service capacity

The above formula calculates the value of urban activities and services to bring reality and fairness to the centrality index to determine the hierarchical rank of cities in the study area.

Formula,

$$W = \frac{N}{FN}$$

Here

W = Weight

N = Total No. of Domiciles

FN = Number of Service Special

For selected urban activities and services, the highest value is for district headquarters and the lowest price is for cheap galley shops (1.78). After that, the centrality index of all the cities was calculated by the following formula.

Formula

$$C = (f\,4 \times Wh1) + (f4 \times Wh2) + \ldots\ldots(f4x \times Whn)$$

Where,

C = centrality index

F4 = number of units of work

Wh = value of functions

Table No.3

S.N.	Name of Services	Weightage	S.N.	Name of Services	Weightage
Weightage of Services in Urban Center of Jaunpur District				
1	Junior High School	3.98	25	Tehsil Headquarters	550
2	Inter College / Boys	9.14	26	Block Headquarters	157.14
3	Inter College / Girls	43.42	27	Station	122.22
4	College	23.24	28	Police station	52.38
5	University	3300	29	Nationalized bank	18.86
6	Technical college	64.71	30	Other banks	1100
7	Polytechnic	3300	31	Gramin Bank	8.23
8	Engineering	1650	32	Cooperative bank	113.79
9	Primary health center	41.77	33	Co-operative Agriculture and Rural Development Bank	660
10	Community health center	194.12	34	Primary Agricultural Credit Co-operative Societies	14.54
11	Tuberculosis Center	1650	35	Post office	7.69
12	Leprosy center	3300	36	Post office savings bank	9.65
13	Infectious disease center	3300	37	Bus Station / Bus Stop	22.45
14	Allopathic hospital	366.67	38	Bus depot	1100
15	Ayurvedic Hospital	91.67	39	Railway station (including halt)	89.19
16	Homeopathic Hospital	82.5	40	Cold storage	150
17	Unani Hospital	366.67	41	Seed warehouse	9.43
18	Family and Maternal Child Welfare Center / Sub Center	6.56	42	Purchase Selling Co-operative Societies	126.92
19	District hospital	1650	43	Fertilizer sales center	6.59
20	Animal Hospital	89.19	44	Pesticide sales center	29.46
21	D-Class Veterinary Hospital	1100	45	Co-operative Milk Collection Center	64.71
22	Animal service center	70.21	46	Cheap nugget shop	1.78
23	Artificial insemination center	38.82	47	Agricultural service center	3300
24	District headquarters	3300	48	Entertainment center	194.11

After that, for the determination of the hierarchy of cities, the actual population and centrality index of the towns (Figure No. 5:3A), the number of all workers and the centrality index and the tertiary population and centrality index (Figure No. 5:3A), the cities were classified according to a straightforward method. 5:3C) has been outlined. However, in these diagrams, there is no relation between the actual population and the centrality index of the cities, the number and centrality index of all the workers, and the tertiary population and the centrality index. Even if there is a relationship between them, it is not healthy. In such a situation, dividing these cities into hierarchical categories is neither possible nor appropriate. Therefore these cities are again classified on the general law diagram as to the type and centrality of urban functions.

The index (Table No. 5.1) is based on the underlined (Figure No. 5-3D). In this diagram, more relation is visible between the number of services of cities and the centrality index than in other charts. Therefore, keeping in mind the relationship between the types of services and the centrality index, these cities have been divided into five hierarchical categories by drawing lines in Fig. 5-3D. One (7.69%) of the first hierarchical category in the Jaunpur district is on this basis. Two (7.69%) of the second hierarchical category and four (30.77%) of the third hierarchical rank, five (38.46%) of the fourth hierarchical and two (15.38%) cities of the fifth hierarchical rank (Table No. 5.1 and Fig. 5.3D) are found. In which there is a relation of 1: 1: 4:52. The hierarchical arrangement of the towns of the district does not match Cristaller's hierarchical arrangement K = 3.

3.3.1 Towns of the first hierarchical order

Jaunpur is the only city of this category in the district, which is the city with the highest concentration index in the entire district. Jaunpur Nagar is the district headquarters. Whose centrality index 40814.64 is highest because of district headquarters, service facilities are found the most in comparison to other cities like district and tehsil headquarters, district-level hospital, homeopathic, Unani, allopathic, leprosy, infectious diseases, ayurvedic, Family and Maternal Child Welfare Center / Sub-centre, Veterinary Hospital, Artificial Insemination Center, Kotwali Police Station, Police Posts, Many Junior High Schools, Inter Colleges, Degree Colleges, Technical Colleges, Polytechnics, Engineering Colleges, Various types of Banks, Bus Depots and Stations, Railway Junction, Trade & Commerce Center, Recreation Kendras Many post offices, Krishi Seva Kendras, etc. A total of 48 central services are available. A hotel facility is also available for an overnight stay in Jaunpur city; apart from this, there are restaurant lodges and dharamshalas. Jaunpur city is now moving towards the industry as well. Here, in many small industrial units, batteries, furniture, P.V.C. Pipe, tractor trolley manufacturing, thresher manufacturing, candle, incense sticks, electric board, polythene bag, pen manufacturing, etc.

3.3.2 Cities of the second hierarchical grade:

A town in this hierarchical category, Shahganj Nagar has a railway junction, bus depot, and bus station, community health center, police station, junior high school, inter-college, degree college, family and maternal child welfare center / sub-center, veterinary hospital, animal Service centers, artificial insemination centers, various types of banks, post offices, cold warehouses, seed warehouses, cooperatives, fertilizer centers, pesticide centers, entertainment centers, etc. sub-central services are accessible. Shahganj is directly and indirectly connected with the district and various cities of the state.

3.3.3 Towns of the third hierarchical grade:

The district has four cities in this hierarchical category: Madiahu, Machhlishahr, Kerakat, and Shahganj tahsil headquarters, while Mungarabadshahpur is the only development block headquarter and municipal council. These cities are railway stations, bus stations, junior high schools, inter colleges, degree colleges, community health centers, allopathic hospitals, homeopathic Unani hospitals, and family and maternal children. Welfare Center / Sub-centre, veterinary hospital, police station post, various banks.

Post Office, Cold Warehouse, Seed Warehouse, Purchase-sale Co-operative Societies, Cheap Galle Shop, Agricultural Service Center, Recreation Center, etc. 31, 27. 27 and 27, respectively.

A variety of central services are accessible. All the cities of this category are directly and indirectly connected with all the district and state cities by road and rail.
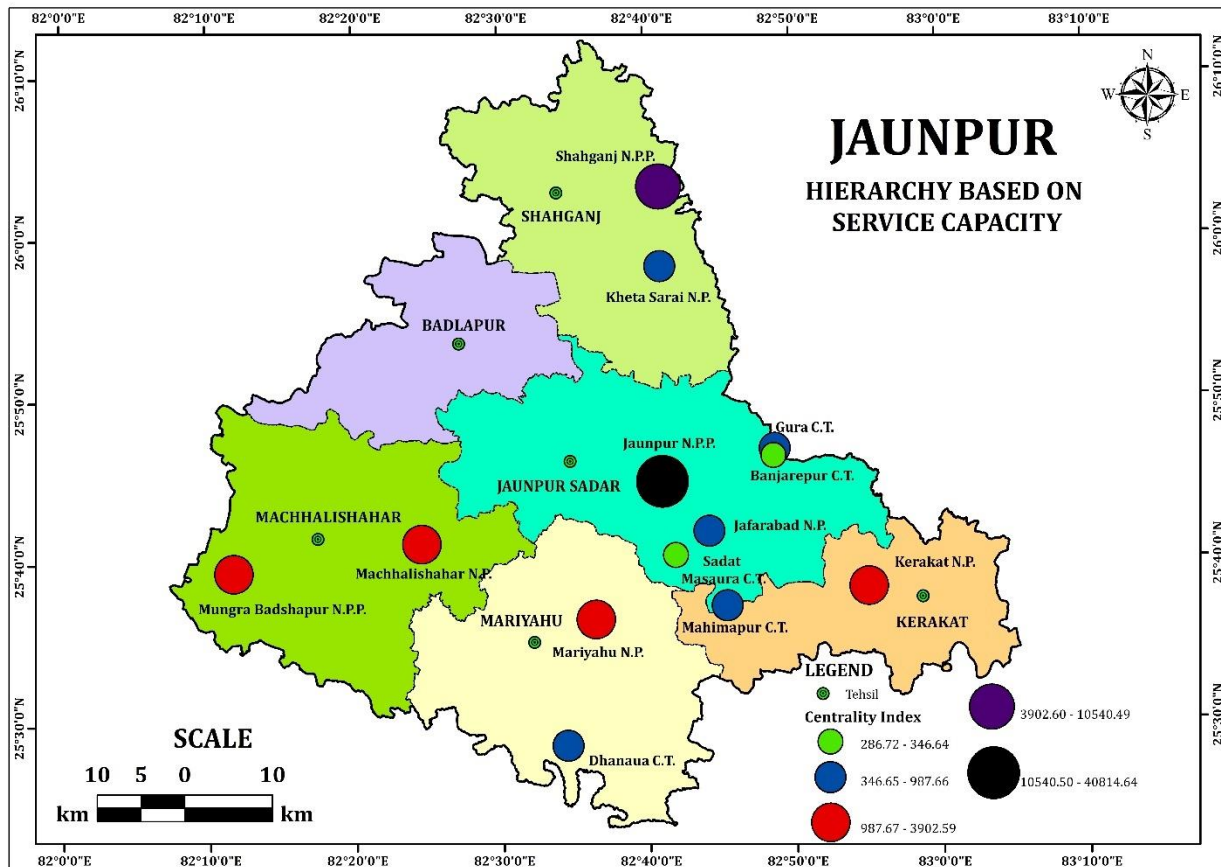
3.3.4 Fourth Hierarchical Class Cities:

There are five cities in this hierarchical category, in which Khetasarai, Jafrabad, Gaura, Dhanaua, and Mahimapur come. These cities have 21, 22, 19, 16, and 16 central services. Of these

Table No.4

\u00A0	Hierarchy based on Service Capacity of Jaunpur District		
S.N.	**Urban Center**	**No. Service**	**Centrality Index**
1	Jaunpur	48	40814.64
2	Shahganj	34	10540.49
3	Mariahu	31	3902.59
4	Machhlishahar	27	3410.64
5	Kerakat	27	3304.47
6	Mugrabadshahpur	27	3193.38
7	Khetasarai	21	987.67
8	Jafarabad	22	905.83
9	Gura	19	691.89
10	Dhanaoaa	16	673.3
11	Mahimapur	16	647.56
12	Sadatmasaura	12	346.64
13	Banjarepur	11	286.72

Map No.4

In cities, there is a railway station at Khetasarai and a railway junction at Jafarabad. Police stations, banks, inter-college, post offices, and health in all the cities of this category service facilities are accessible to centers, veterinary hospitals, co-operative societies, cheap nugget shops, seed warehouses, fertilizer centers, agricultural service centers, ayurvedic and homeopathic hospitals, family and maternal child welfare centers / sub-centers, artificial insemination centers, etc. All the cities of this category are connected by road to the district headquarters, while Jafarabad and Khetasarai are connected to most of the state's cities.

3.3.5 Fifth Hierarchical Category Cities:

There are two towns in this category of the district, Sadatmasaura and Bajrepur. Both these centers are connected to the district headquarters by road. Here 12 and 11 central services are available, including junior high school, inter-college, primary health center, family and maternal child welfare center / sub-center, animal service center, artificial insemination center, ayurvedic and homeopathic hospital, police post, bank, post office respectively. Both these centers are developing at a rapid pace, as both these cities are located near the district headquarters. Among these centers are Sadmatsaura Census Town and Bajrepur Nagar Panchayat.

4. Testing Hypotheses:

At the beginning of the present chapter, three significant hypotheses were formulated. Here the data findings related to the functions of urban centers and functional units and population size have been tested to formulate the theory.

4.1 Relationship between population and functions of urban centers:

Some scholars have worked on the relationship between people and functions. Bamas 40 discovered the relationship between population and types of Ashoka city. Some other scholars like King and Support-42 examined this problem. It is evident with the help of the correlation coefficient

It happens that with the increase in population, the number of functions also increases. The positive correlation between population and functions makes it clear that population and number of functions are interrelated, confirming this hypothesis.

4.2 Size of the population of urban centers and relation to functional units:

To test this, the relationship between population size and functional units was examined by ordering the urban centers of the study area based on two variable variables, population and the number of functional units. This is explained in Fig. 6.1 m. The value of the correlation coefficient of both the indexes + this positive relationship indicates a high-level relationship. Hence it is clear that population and functional units are interrelated.

Relationship between the functions of urban centers and functional units

Like the above two hypotheses, this hypothesis has been tested based on the number of functions of urban centers and the number of functional units. Functions and functional units are interrelated, and as the number of functional units increases, the number of functions also increases. The functional units of the urban centers of the district have been displayed. The correlation coefficient of these two variable variables is 0.87, and this relationship is of a very high level. So it is clear that population and functions, population and functional units.

There is a relationship between functional and functional units, and the increase in one of these also affects the other variables. Thus, by discussing the functional and hierarchical functions of urban centers in the region, it is clear that the large cities have also grown in functional units. The distribution of functions in an area does not have any special significance on the extent of the medium population.

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