Rural growth centres for regional development in Bundelkhand region of Madhya Pradesh, India

Pawan Kumar Sharma, Sagar, Madhya Pradesh

Abstract

The goal of micro-regional development requires adequate attention to various economic, social and political factors that influence the rural society through an intricate web of interrelationship; where growth centres can be eligible potential feature. This paper is an attempt to identify the existing hierarchy of rural settlements in Bundelkhand region of Madhya Pradesh. For this the Social Amenity Index method has been applied by using the weightage values of 43 amenities to each of the 7077 villages. A total of 94 villages have been identified as rural growth centres; but they are unable to serve the entire region. After determining the radius of service area under each existing RGCs, 50 more such centres have been proposed to serve or fulfil the un-served areas. The study reveals that balanced regional development of the region can be ensured through the spatial arrangement of these existing and proposed RGCs.

Keywords: Rural growth centres, hierarchy of rural settlements, social amenity index, regional development, Bundelkhand.

Introduction

In recent years, greater emphasis has come to be laid on grass-root planning approach and a number of rural development programmes were launched to meet this end. Under the New India vision, PURA (Provision of Urban Amenities in Rural Area) mission is launched by the government of India for transformation of rural India by providing livelihood opportunities and urban amenities in selected rural growth centres to improve the quality of life in rural areas. This approach of rural growth centres is based on selectivity on the one hand and decentralization of social amenities on the other. It suggests what facilities should be located at different levels of the hierarchy. Therefore an overall development of all villages within a region can be ensured in an integrated way at minimum cost. Rural growth centres are the units to provide spatial connectivity to services for the nearby rural areas along with its own population. These growth centres, specifically the rural growth centres also work as a decentralizing unit for the bigger urban centres and help in diffusing the concentration of the population in the urban centres by providing services in the rural areas.

The impact of central place in regional development has attracted considerable attention in the literature as a crucial factor in the context of achieving balanced regional growth. The growth centre approach has become an integral part of the formulation and implementation of regional policies in developed and developing countries of the

world (Moseley, 1972). It is an imperative operational strategy in the process of achieving sustainable development; where the regional and local development plans work in an administrative hierarchical manner (Misra, 1987). Indian planning has accepted the growth centre concept as the strategy for local planning for identifying spatial and functional units of planning (Bhatt, 1972). A pilot research study for growth centres was launched in the Fourth Five-Year Plan (1969-74), setting up 20 cells for research and survey to classify growth centres in different states of India (Shah, 1974). Mishra (1978) gives a new concept of 'Growth Foci' on the pattern of the central place theory in Indian context and suggested

a five-tier hierarchy of growth foci, viz; Growth Pole, Growth Centre, Growth Point, Service Centre and Central Village. Punekar (1974) in his study observed that Growth Centres based planning is more effective in India which is predominantly residing in villages. A growth centre is a powerful tool in micro-regional development and rural development. Rao (1963) explained the concept of central place as the crystallization of mass around a nucleus, which acts as a focal point for its surrounding area. The essential attribute of these centres is to serve their surrounding territory in terms of economic, cultural, commercial, administrative and other requirements (Khan, 1995). Mishra and Sharma (2003) have identified growth
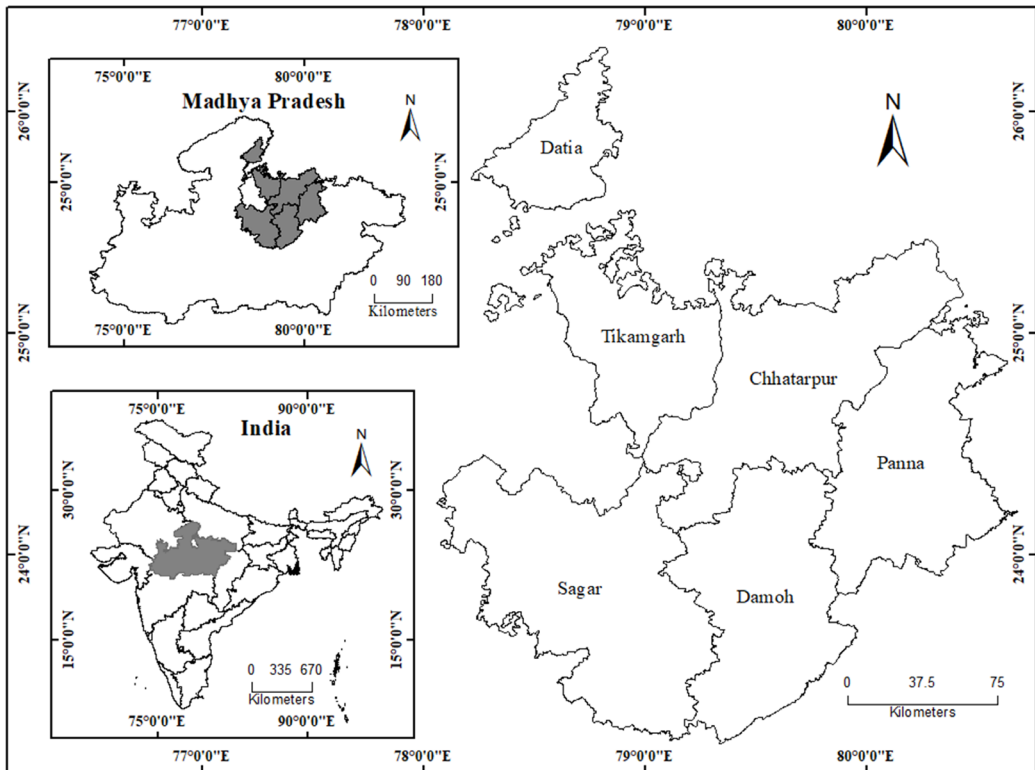

Fig. 1: Location of Bundelkhand Region in Madhya Pradesh

centres and their hierarchy by measuring the centrality score. Seddeek (2018) pointed out the importance of growth centres in resolving the problem of sharp fragmentation of the regional functions of certain centres and, thus, growth centres aim to redistribute investment and regional functions to achieve balance and to deal with regional imbalances. Growth centres are the tools for the elimination of regional disparities and promote overall development in a micro-regional context (Sharma, 2019). Sridhar (2006) mentioned that the Growth Centres in India were built to shift industrial growth away from the centres of urbanity. Such development centres should be situated to prevent the detrimental impact of large cities. Despite number of studies on growth centre, there still remains a research gap of an effective mechanism for regional policies. For the proper implementation of the rural settlement hierarchy-based planning this study comprehensively analyses the theoretical as well as application aspects of the growth centres in the study region.

The study area

The Bundelkhand region is spread across 13 districts in India, out of which seven districts are in Uttar Pradesh and six in Madhya Pradesh-Sagar, Panna, Damoh, Datia, Chhatarpur and Tikamgarh which is included in the present study. The region in Madhya Pradesh extending between latitudes of 23° 10' to 26° 20' north and longitudes of 78° 26' to 81° 40' east is located in the northern part of the state. The region covers an area of 41330 km² comprising 13.40 per cent of the total area of the state. It has 86,53,492 persons in 2011 accounting for 11.91 per cent of the total population of the state. About 77.68 percent of total population is residing in 7157 villages of the region. The landscape is shaped by Deccan lava structure consisting of low rocky outcrops, rugged topography, narrow valleys and plains. The region has a high percentage of barren and uncultivable land.

Objectives

The specific objectives of the study are to

a) identify Rural Growth Centre (RGC) and Mapping of their served hinterland areas.

b) propose new Rural Growth Centres for the un-served areas.

c) plan a spatial arrangement of existing and proposed Rural Growth Centres for the integrated regional development

Data and methods

The present study is based on secondary sources of data collected from District Census Handbooks, Directorate of Economics and Statistics, Socio-Economic Caste Census, Revenue Board of Madhya Pradesh and official websites of the government of Madhya Pradesh for the year 2011.The study is divided into two parts. In the first part; all the settlements of the study area have been categorized into four-tier hierarchy for the identification of rural growth centres which is based on the Social Amenity Index score. The second part includes planning by determining zones of influence of service centres and then proposing the RGCs for the un-served areas.

Identification of existing Rural Growth Centres

Number of criteria's has been evolved by the geographers of ranking and analyzing the settlements in different parts of the world. It is based on central facilities found in the settlement like education, medical, marketing, postal etc. In the present study,

Social amenity index (SAI) method has been applied to classify all the settlements into four-tier hierarchical classes and also to identify the rural growth centres. The SAI has been calculated on the basis of central function performed by each settlement. As many as 43 functional institution found in a total of 7077 villages have been taken into consideration. For finding SAI, different weightage for each facility have been assigned. To find out weightage following formula has been used:

W = N/F

Where;

W = Weightage of each facility,

N = Total number of settlements in the study area,

F = Number of settlements having that particular facility

After the calculation, all the facilities are arranged in order to their weightage score (Table1). Facility which is available in more number of settlements would have lower weightage while facility found less in number in settlement would have a higher weightage. The Social amenity index (SAI) has been calculated with the help of the following formula:

SAI = EA/mA

Where

SAI = Social amenity index

EA = Aggregate facility score value of settlement

MA = Mean facility score value of all the settlement

Facility score value of a settlement is calculated by multiplying the weightage of a particular facility with the number of that facility available in that settlement. For example if there are 5 primary schools in the settlement and weightage for primary school is 1.5, we multiply 5×1.5 = 7.5. Similarly facility score value of other facility is worked out and finally by adding the facility score value of all the facilities available in the settlement the EA is calculated. For finding out mA, we add the EA of each settlement and divided them with total member of settlements included in the study region.

Table 1 shows the list of functions and their assigned weightage scores based on Social Amenity Index (Parkers, 1969). As per the categories suggested by Mishra (1978) in his growth foci concept in Indian context; the identification and categorization of the hierarchical order of all the villages of the study region is shown in table 2.

Among the 7077 villages of the study region, 6534 villages are inhabited and 543 villages are uninhabited. Therefore, the sums of weightage values for each of the 6534 villages have been exactly computed. Table 2 shows the four-tier hierarchical arrangement of inhabited villages in. Rural Growth Centres (RGC), Rural Growth Points (RGP), Rural Service Centres (RSC) and Central Village (CV).There is a total of 94 villages have been identified as Rural Growth Centres (RGCs) in the region out of 6534 inhabited villages. These villages have a score of SAI above 7.25.

Table 3 shows the district wise data of the number of villages under different hierarchical order in the study region. The highest numbers of RGC's have been recorded from Damoh district having 25 RGCs; which is followed by Sagar with 19 RGC's. The least number of RGC's have been recorded from Datia district, where only

Table 1: Facilities with their weightage score in Bundelkhand region, Madhya Pradesh

Facilities	Weightage score
Primary school	1.20
Middle school	2.31
Secondary School	12.22
Senior Secondary school	23.43
Primary health centre (PHC)	67.40
Primary health sub centre (PHS)	9.99
Maternity and child welfare centre (MCW)	57.07
Hospital-alternative medicine (HO)	168.50
Dispensary (D)	64.93
Veterinary hospital (VH)	32.02
Family welfare centre (FWC)	69.38
Tap water (Treated/Untreated)	7.94
Well Water (Covered / Uncovered well)	1.14
Hand pump	1.11
Tube wells / Bore well	4.06
River / Canal	3.28
Tank / Pond / Lake	3.56
Post office (PO)	13.99
Sub post office (SPO)	12.16
Post & Telegraph office (P&TO)	23.67
Telephones (Land lines)	7.43
Mobile phone coverage	1.42
Internet cafes/ Common service centre (CSC)	104.07
Bus service (Public & Private)	3.31
Railway stations	80.42
Sea /River ferry service	27.64
Connected to national highway (NH)	26.71
Connected to state highway (SH)	11.14
Connected to major district road (MDR)	5.27
Pucca roads	2.26
Commercial & Co-operative Banks	25.19
Agricultural Credit Societies	11.06
Self-Help Group (SHG)	1.71
Public distribution system (PDS) shop	3.21
Mandis / Regular market	20.57
Weekly Hat	10.20
Agricultural marketing society	20.22
Integrated Child Development Scheme (Nutritional Centres)	4.91
Anganwadi Centre (Nutritional Centres)	1.35
Power Supply for Domestic Use (ED)	1.14
Power Supply for Agricultural Use (EAG)	1.20
Power Supply for Commercial Use (EC)	1.64
Power Supply for All Uses (EA)	1.64

Source: Computed by author

Table 2: Hierarchical order of rural centres in Bundelkhand region, Madhya Pradesh

Hierarchical Order	Social Amenity Index	Villages
Rural Growth Centres	Above 7.25	94
Rural Growth Points	4.25-7.25	143
Rural Service Centres	1.25-4.25	1208
Central Villages	Below 1.25	5089
Total		6534

Source: Computed by author

4 settlements have been recognised as RGC, which is only 0.68% of its inhabited villages. Table 3 shows the list of hierarchical order of rural settlements including RGCs in the 40 blocks of the six districts of the region.

Rural Growth Centres: Rural Growth Centres are the first order of the central village. The villages having a social amenity index of over 7.25 have been identified as RGCs. There are 94 such villages serving as the highest order service centres covering the largest areas among the other hierarchical orders. All these places are served by metalled roads and provision of secondary schools, post and telegraph offices with telephone, banks, police station and electricity supply for domestic as well as irrigation purpose. There is a visible imbalance in the distribution of these centres across the region (Table 3 and 4). The highest number of 7 RGCs has been identified in Jabera block of Damoh district, followed by Barigarh with 6 RGCs helping Damoh to have the highest number of RGCs (25) among the six districts. On the other hand, Banda, Shahgarh and Rehli blocks of Sagar district have no RGCs creating a major setback for these blocks.

Rural Growth Points: Rural Growth Points (RGPs) are the second order central villages which offer lower order facilities. The villages having a SAI score between 4.25 and 7.25 have been identified as RGPs.

There are 143 villages identified as RGPs in the Bundelkhand region of Madhya Pradesh which have important facilities like regular market, secondary schools, dispensaries, post offices, electric supply and pucca road with direct bus service to district head quarter etc. Niwari block of Tikamgarh and Rajnagar block of Chhatarpur have the highest number (9) of RGPs, whereas Banda and Kesli blocks of Sagar do not have any village classified as RGP. In contrast to district level distributions of these centers, Chhatarpur district stands first with 40 RGP's followed by Tikamgarh with 37 RGPs, while Damoh has the least number (12) of RGP among the six districts.

Rural Service Centre: There are 1208 Rural Service Centres (RSCs) in the region having a SAI score between 1.25 and 4.25. These third order centres mostly consist of the services of the lower order like middle school, primary health centre, post office, bus stand, rural market, village panchayats etc. Though most of the services rendered by these settlements are for local and neighbouring clusters, such facilities are not present in all the centres. Datia block has 66 RSCs, highest among the 40 blocks of the region whereas Sagar district with 305 RSCs in its 11 blocks tops among the six districts. On the other hand, Hatta block of Damoh has the least number (15) of RSCs.

Table 3: Hierarchical distribution of rural centres in Bundelkhand region, Madhya Pradesh

District	C.D Block	RGCs	RGPs	RSCs	CVs	Uninhabited
Datia	Seondha	1	3	45	149	24
	Datia	2	7	66	172	7
	Bhander	1	5	31	104	14
Tikamgarh	Niwari	3	9	40	69	18
	Prithvipur	4	7	24	96	11
	Jatara	3	4	45	120	24
	Palera	3	6	32	95	14
	Baldeogarh	2	3	33	113	11
	Tikamgarh	1	8	24	128	13
Chhatarpur	Gaurihar	1	3	27	100	20
	Laundi	1	5	30	111	9
	Nowgong	3	7	46	61	9
	Chhatarpur	2	6	45	87	12
	Rajnagar	3	9	45	75	8
	Bada Malhera	2	4	38	108	11
	Bijawar	3	4	17	121	23
	Buxwaha	1	2	18	92	18
Sagar	Bina	1	3	22	127	24
	Khurai	1	4	22	146	14
	Malthon	4	1	19	149	20
	Banda	0	0	30	134	15
	Shahgarh	0	5	16	89	18
	Rahatgarh	4	1	40	152	14
	Jaisinagar	2	1	24	118	4
	Sagar	2	2	43	102	13
	Rehli	0	2	33	186	24
	Kesli	3	0	20	149	17
	Deori	2	2	36	193	22
Damoh	Hatta	3	2	15	134	4
	Patera	3	1	17	135	3
	Barigarh	6	1	25	110	8
	Patharia	2	4	26	99	0
	Damoh	2	1	25	203	7
	Jabera	7	1	21	150	11
	Tendukheda	2	2	17	157	6
Panna	Ajaigarh	2	3	33	80	2
	Panna	2	6	28	149	40
	Gunnor	3	5	39	174	6
	Pawai	3	2	31	164	9
	Shahnagar	4	2	20	188	16
	Total	94	143	1208	5089	543

Source: Computed by author

Central Villages: At the lowest order are central villages with an average population less than 500 persons having lower order services like primary school, bus services, petty shops etc. The villages having SAI score below 1.25 have been identified of the lowest tier in the hierarchy as Central Villages (CV). Out of the total 6534 inhabited villages, 5089 villages are CVs, which makes for 77.88 percent of the total inhabited villages of the region. These centres are only viable for the local services of the community and need to rely on other higher order centres for almost all the services. The maximum numbers of villages comes under this category, which do not having even the basic facilities, concurrently depends on the higher order settlement and creates a pressure for the goods and services.

Result and discussion

Rural Growth Centres act as a stimulus for the development of the region. These centres are hierarchically arranged with superior functionality to its surrounding lower order settlements. In the regional context each and every RGC has its own sphere of influence. In the rural areas of the study region, due to the scattered distribution of small sized cluster settlements, it is impossible to locate all the functions in every settlement. These centres act as nucleus for providing some basic packages of services to their hinterland according to their respective hierarchical orders. This idea of spatial arrangement of rural growth centers is based on selectivity (All functions of different orders need to be located in the most appropriate places) on the one hand and decentralizations on other hand. It helps to define the hierarchy of settlements and suggests what facilities or services should be located at different level of the hierarchy.
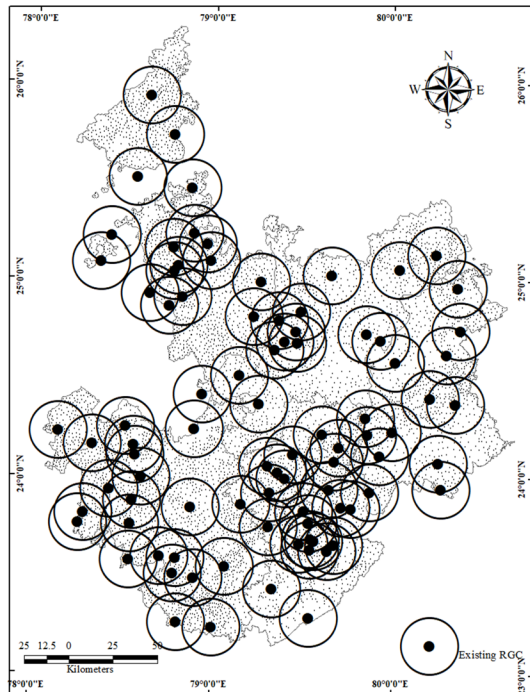

Fig. 2: Existing Rural Growth Centres with their Zone of Influence in Bundelkhand Region (M.P.)

Thus, the accessibility of services to all the people within a region can be ensured in an integrated way at minimum cost in terms of money, time and efforts.

Estimation of the average zone of influence of RGC

The determination of zone of influence of a particular RGC involves the identification of the area and population dependent on the particular RGC for the supply of goods and services offered by it. An average radius of RGC has been considered in the present scenario for the purpose. As many as ten random cases have been taken to determine the influence radius of the RGC by superimposing the service areas of these

Table 4: Proposed Rural Growth Centres (RGC) in Bundelkhand Region, Madhya Pradesh

| District	Block	No. of Proposed RGC	Name of Proposed RGC	Total Area (Hectare)	Total Population	No. of HH	SAI	Hierarchical Order	
								Existing	Proposed
Datia	Seondha	2	Magrol	442.3	2279	412	2.29	RSC	RGC
			Juujharpur	1095.8	3461	608	5.51	RGP	RGC
	Datia	2	Kamrari	920.9	2300	504	1.77	RSC	RGC
			Jonhar	218.9	981	194	1.48	RSC	RGC
	Bhander	1	Saletara	973	2261	571	1.97	RSC	RGC
Tikamgarh	Prithvipur	2	Tapariya Hadaran	173.7	186	46	3.92	RSC	RGC
			Sunauniya West	322.4	2771	575	3.21	RSC	RGC
	Palera	1	Barana (Thar)	896.3	2357	451	6.34	RGP	RGC
	Baldeogarh	2	Sharkanpur Khas	604.5	4156	877	6.50	RGP	RGC
			Gukhrai Khas	860.4	2544	660	1.72	RSC	RGC
	Tikamgarh	1	Patha Khas	739.5	3916	738	5.55	RGP	RGC
Chhatarpur Gaurihar (Barigarh)	Gaurihar (Barigarh)	2	Prakash Bumhauri	2288	3080	678	2.21	RSC	RGC
			Pahara	2142.3	5075	1128	4.82	RGP	RGC
	Laundi	2	Patha	1368.1	3943	715	4.94	RGP	RGC
			Banjri	1186.2	3094	758	1.76	RSC	RGC
	Nowgong	3	Singrawan Khurd	452.5	1433	260	5.95	RGP	RGC
			Churwai	1860.6	4292	761	4.03	RSC	RGC
			Tatam	2156.6	5494	1010	6.98	RGP	RGC
	Chhatarpur	1	Brajpura	628.8	1667	296	5.30	RGP	RGC
	Rajnagar	1	Vikrampur	1630.2	3111	569	4.42	RGP	RGC
	Bada Malhera	1	Ranital	619.2	2229	565	3.40	RSC	RGC
	Bijawar	3	Lakhanguwan	2213.6	4420	1020	5.10	RGP	RGC
			Kishangarh	1177.4	2571	539	4.79	RGP	RGC
			Dewra	2251.3	1331	284	3.74	RSC	RGC
	Buxwaha	1	Darguwa	1757.9	2837	563	7.19	RGP	RGC
Sagar	Bina	1	Piprasar	825.1	1445	293	3.46	RSC	RGC
	Khurai	1	Sarkhedi	557.3	930	223	1.46	RSC	RGC
	Banda	2	Niwari	132.4	328	71	0.35	RC	RGC
			Binaika	875.4	2549	561	3.08	RSC	RGC
	Shahgarh	2	Khatora Kalan	903.4	2944	758	4.45	RGP	RGC
			Amarmaoh	1515.5	5550	1246	5.32	RGP	RGC
	Rahatgarh	1	Parasari Kalan	558.8	793	170	5.19	RGP	RGC
	Sagar	1	Pathariya Jat	845.3	4555	982	3.93	RGP	RGC
	Rehli	2	Hardi	858.1	2528	537	1.38	RSC	RGC
			Gangapur	184.2	161	38	2.50	RSC	RGC
	Kesli	1	Naharmau	924.1	2097	490	3.84	RSC	RGC
	Deori	2	Singpur	951.2	2077	548	2.01	RSC	RGC
			Jhamara	501.9	932	233	1.38	RSC	RGC
Damoh	Damoh	1	Bahera	118.1	411	120	0.28	RC	RGC
	Jabera	2	Singhpur	530.9	2897	684	3.90	RSC	RGC
			Harat	175.6	337	69	0.23	RC	RGC
	Tendukheda	1	Taradehi Mal	298.4	2136	463	6.19	RGP	RGC
Panna	Ajaigarh	2	Mohari	161.9	511	110	1.19	RC	RGC
			Banhari Kalan	613.4	3415	723	6.97	RGP	RGC
	Panna	1	Pahadi Khera	550.5	2913	675	5.85	RGP	RGC
	Gunnor	1	Jaswant Pura	1768.8	5186	1209	4.53	RGP	RGC
	Pawai	2	Kalda	650.1	1744	400	4.99	RGP	RGC
			Krishngarh	1315.4	4139	970	6.06	RGP	RGC
	Shahnagar	2	Banjari	186.8	365	93	0.19	RC	RGC
			Bori	737.7	2361	512	5.48	RGP	RGC

Source: Computed by author
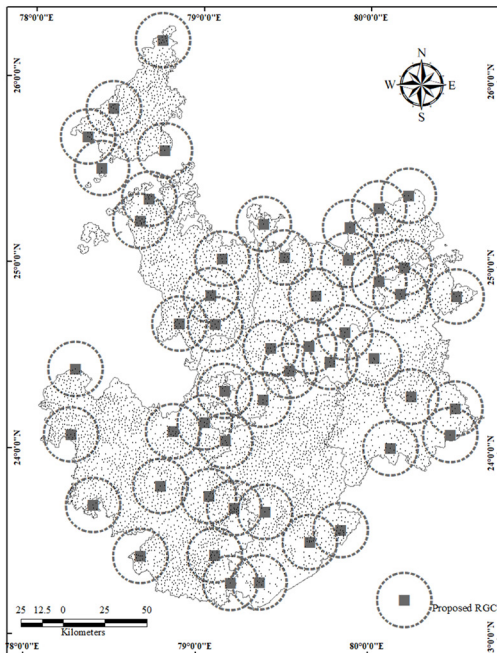
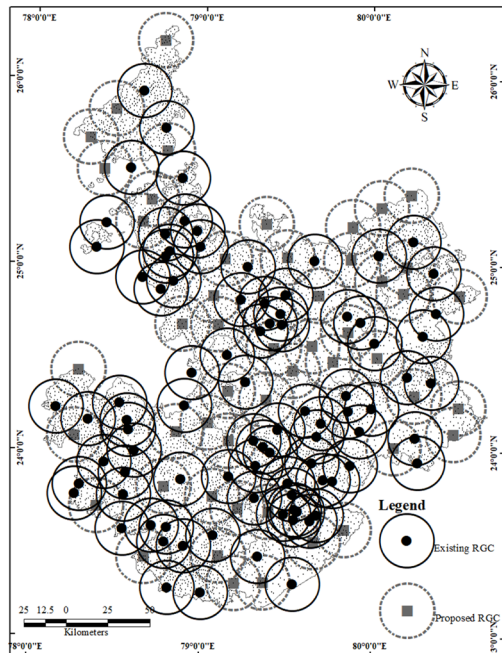Fig. 3: Proposed Rural Growth Centres with their Zone of Influence in Bundelkhand (M.P.)

Fig. 4: Existing and Proposed Rural Growth Centres in Bundelkhand (M.P.)

randomly selected growth centres with reference to the market, medical, education, postal, and transport facilities regarded as the 'Breaking point method' by Reilly (1929). The purpose of this law of retail gravitation is to find a point of indifference between two locations so that the trading area of each can be determined. This point is assumed to be a function of the distance between two locations pondered by their respective population size. Through this analysis, the average radius has been estimated at 20 kms though there is a slight difference in the circumference of a served area for each of the center.

The proposed scheme of RGCs has been figured out using GIS techniques. Each RGC is serving an area in 20 km radius. Figure 2 shows the position and coverage of all the 94

existing RGCs in the region and the spaces un-served by the influence circles are left as un-served area meaning thereby the gaps generally is out of reach by any of the RGCs. The settlements of these remaining areas have been taken into consideration for the proposal of 50 new RGCs in these un-served gaps. In order to propose the new RGCs, the analysis of the central places put in a matrix that the lower order rural settlement of an un-served area (existing gaps) has been upgraded with recommendations of some higher order facilities to carry out the whole region under the served area. Additionally, on the basis of assessment of existing gaps, accessibility and connectivity the optimal located settlement has been proposed as RGCs, so that maximum people can avail facilities within minimum distance.

The specific location arrangements of proposed 50 RGCs have been identified to fill the un-served areas between existing RGCs. This GIS based spatial planning is the tool for achieving balanced regional development and is a measure against the concentration of socio-economic activities in urban centres.

Table 4 shows the list of 50 newly identified and proposed Rural Growth Centres in the study region. The position of the proposed RGCs is shown in figure 3 whereas figure 4 shows the combined picture of existing and proposed RGCs. Thus, appropriate location of higher order functions which presently have higher weightage value should be developed in the identified centres which will ensure better regional integration for more balanced development.

Conclusions

It is clear that the spatial arrangement of rural growth centres is an important tool through which the quality of life in human settlement can fairly be improved because such a system provides various facilities within easy reach of the people, in a lesser time and at least distance. The Bundelkhand region, as a whole is known as one of the most backward areas of the country due to its very poor socio-economic infrastructure and non availability of basic amenities especially in remote villages. The preceding analysis reveals that the level of development differs widely among the villages in the region. A positive association of the physical resource base and social infrastructure development of the villages was evidently clear. Interestingly, villages falling in the close proximity of district headquarters recorded the higher level of social infrastructure development due to the trickling down effect of urban centre. As indicated by social amenity index 77.88

percent of villages are at the lowest level of developmental hierarchy whereas only 1.43 percent are marked as growth centres having the capacity to serve their own population as well as the population of surrounding lower odder settlements. Hence, the present study offers a new perspective for regional rural development through the identification of 94 rural growth centres and proposing 50 new rural growth centres in un-served areas to increase easy access of services to the local people. It advocates a new approach of spatial regional planning through selective growth centres. The study reveals that through the spatial arrangements of these existing and proposed RGC's the balanced regional development of the region can be ensured.

Acknowledgement

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Pawan Kumar Sharma

Assistant Professor
Department of General &
Applied Geography
Dr. H. S. Gour Central University.
Sagar (M.P.) India

E-mail: pawansharmageo@gmail.com