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RESEARCH ARTICLE

A STUDY ON SPATIO -TEMPORAL DISTRIBUTION OF RURAL PERIODIC MARKET CENTRES IN JALPAIGURI DISTRICT, WEST BENGAL, INDIA

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ABSTRACT

Rural periodic market centres are the authorized public gathering of rural as well as urban populace of the nearby area treated as a service centre and cater the services to its surroundings. These markets held on periodic basis it is the periodicity of the market centre which bears some considerable impact in marketing transaction on that area. In addition the spatial distribution pattern also leaves the significance effect on the degree of convergence of participants on that area. The pattern of distribution of rural periodic markets in space, time and function as well as commodities offered for sale and the spheres of influence of markets in the area. The frequency of visit of that participant largely depends on the pattern of distribution of rural periodic markets in the district. Data used for this research were obtained from field observation covering 54 rural periodic market centres in the study area. Data collected were presented in tables, appropriate thematic maps, and suitable cartographic techniques. Nearest Neighbour Analysis was applied to find out the pattern of spatial distribution of the market centres. The focus of the study is to highlight the pattern of spatio-temporal distribution of rural periodic markets and necessity of well integrated marketing system in order to keep maintenance of threshold level and development of the region.

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INTRODUCTION

The periodic market is a type of market characterized by its temporal nature. The periodic market is a location where farmers, vendors, and consumers gather to exchange their goods within a shortly predetermined period. Rural periodic market centres are commonly known as 'Hat' in West Bengal, 'Painth' in western Uttar Pradesh, 'Bazar' in eastern Uttar Pradesh, 'Mandi' etc. in various parts of India. The term hat or periodic rural market is derived from the vocabulary hatta, hattica etc. (Roy, 1949). A periodic market is "an authorized public gathering of buyers and sellers of commodities, meeting in the appointed place at a regular interval" (Hodder, 1965). According to Khan (2009), the periodic market is a significant event in the lives of farming communities in developing countries, where individuals from various socio-economic backgrounds come to the market based on their needs. The distributional aspect of rural periodic markets involves the locational pattern of market centres in term of space and time. As rural periodic markets are central places or growth poles in rural area. It is, therefore, very important to study their distribution that reflects the market relation with different aspects of the landscape like average served area, average population served, net sown area, and inhabited villages.

The integration of location of rural markets especially periodic markets in time and space also deserve to be mentioned as well. The present study of distribution of rural periodic markets can be described into two ways, i.e. spatial distribution, and temporal distribution. Physical space being of prime concern to geographers, various aspects of location and distribution of market centres have been studied since 1931 (Dixit, 1988). Several geographers have studied the distribution of market centres of various regions. The distribution of market centres in the Saryupur Plains in U.P. studied by V. K. Srivastava and H.O. Srivastava in 1979. Dixit has studied the distribution of market centres from various aspects in U.P. Kumbhar, Deshmukh (1984) have studied the distribution of periodic market centres of Sangli District. The term 'spatial' indicate that an occurrence occupies the portion of earth's surface. An occurrence is an identified, phenomenon, of specified magnitude, whereas 'distribution' is spatial arrangement/organisation of occurrence of the same type. Understanding the distribution patterns of rural periodic markets has long been a key focus for regional development planners aiming to enhance the rural economy. This study is primarily concerned with identifying and detailing the spatial hierarchy in which various elements are organized (Haggett, Cliff & Frey, 1977 and Ebong & Animashaun, 2009).

The spatial and temporal organization of periodic markets maximizes returns by balancing the demand and supply of goods and services. According to Geist (1990), periodic markets, as central places, can be evaluated based on the structural and functional characteristics of their goods and catchment areas. This temporal arrangement meets local needs, allowing sufficient intervals between market days for preparation, both financially and in terms of merchandise (Okafor, 1982; Omole, 2002). The district has a glimpse of weekly, bi-weekly and tri-weekly rural periodic market centres. Apart from the periodicity spatial pattern of distribution in between market centres have a significant role for the threshold gathering in the said market centres. The evenly distribution of market centres signify the considerable impact on the spatio-temporal synchronization of market centres.

Objectives

The present work has been carried on the following objectives:

- To analyze the spatial distribution of rural periodic market centres in Jalpaiguri District.
- To determine the temporal patterns of market periodicity in the study area.

METHODOLOGY

The study on spatio -temporal distribution of rural periodic market centres in Jalpaiguri District involved primary and secondary data collection. Primary data were obtained through extensive field surveys and consultations with local administrative bodies such as the Jalpaiguri Zilla Parishad and Panchayat Samities. Secondary data were sourced from official reports, including those from the West Bengal State Marketing Board (2012–13) and Census of India documents (1961–2011). The spatial distribution of market centres was analyzed using Nearest Neighbour Analysis (NNA), a statistical tool initially developed for ecological studies (Clark and Evans), which was later adapted by Geographers to understand patterns such as settlements and market locations. This technique assessed whether the spatial arrangement of market centres was clustered, random, or dispersed, with z-scores and p-values determining the statistical significance of these patterns. Geographic Information System (GIS) techniques played a pivotal role in data analysis, enabling the creation of thematic maps to represent the spatial distribution of market centres visually. To examine temporal patterns, the frequency of market operations was analyzed, and the Chi-Square test was employed to evaluate whether specific days of the week had a statistically significant impact on market activity. The integration of statistical methods with cartographic techniques ensured a comprehensive understanding of both spatial and temporal dynamics, providing insights into the role of these market centres in the regional economy.

The Study Area: The terminology 'Jalpaiguri' originated from the words 'Jalpai', meaning 'olive', and the suffix 'Guri', meaning 'Place'. At the beginning of the 1990s, olive trees no longer grew in this adjacent area. It lies between 26º15′47″ & 26º59′34″ N Latitude and 88º23′2″ & 89º7′30″ E Longitude.

The total geographical area is 3380.38 km². Jalpaiguri District is in the northern part of West Bengal and at the foothills of the Eastern Himalayas and two international borders, namely Bhutan in the north and Bangladesh in the south; also includes four districts namely Darjeeling in the west and north-west, Kalimpong in the north-west, Koch Bihar in the south and Alipurduar in the east.

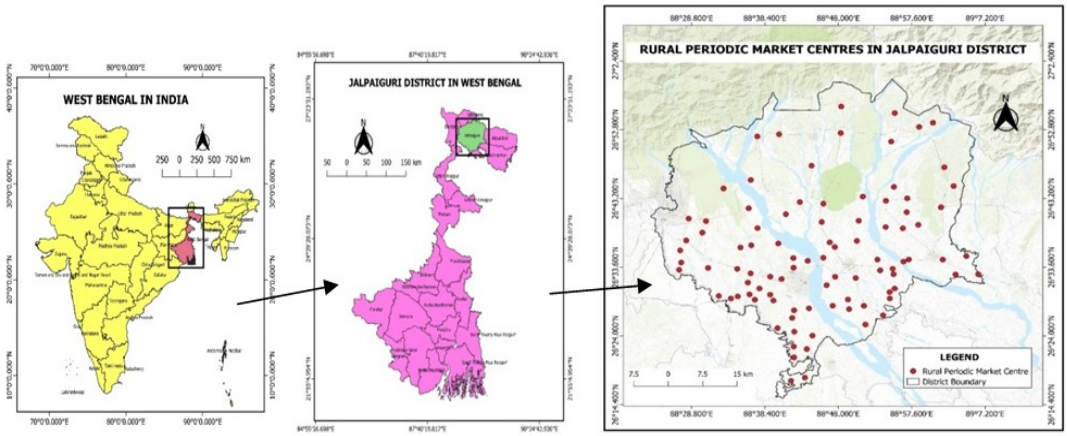
The district is part of the Western Dooars region. After being bifurcated into Jalpaiguri and Alipurduar Districts in 2014, the district currently consists of 9 Community Development Blocks (Rajganj, Jalpaiguri Sadar, Maynaguri, Dhupguri, Banarhat, Mal, Kranti, Matiali and Nagrakata). According to Census of India 2011, the total population of the district is 19,85,600 ; sharing with total rural population is 16,28,791(82.03%) and urban population is 3,56,809 (17.97%). Total Inhabited Villages is 391.

RESULTS AND DISCUSSION

Nearest Neighbour Analysis Method: Nearest Neighbour Analysis method was first developed by plant ecologist Clark and Evans (1954) who were concerned chiefly with explaining distributed pattern of various species of plants and trees on the surface of earth. The geographers applied this technique to people, factories, settlements and other items to explain the location pattern. Recently it has been employed by Geographers to study the spatial distribution pattern of settlements. The fig (3) illustrates the significance of spatial patterns in Nearest Neighbour Analysis (NNA) based on the z-score and p-value:

The diagram shows a normal distribution curve indicating three spatial patterns: Clustered (left tail): Represented by z-scores less than -2.58 (blue region), indicating highly clustered patterns. Random (center): Represented by z-scores between -1.65 and +1.65 (yellow region), indicating random spatial patterns. Dispersed (right tail): Represented by z-scores greater than +2.58 (red region), showing highly regular or dispersed patterns. The p-values associated with different z-score ranges indicate the statistical significance of the spatial pattern: Blue and red regions indicate significant deviations from randomness (clustered or dispersed). The yellow region corresponds to patterns that fall within randomness. Below the curve, visual examples depict: Clustered patterns: Points are closely grouped, resulting in low mean nearest neighbour distances. Random patterns: Points are scattered without a discernible order, showing intermediate mean distances. Dispersed patterns: Points are evenly spaced, leading to high mean nearest neighbour distances. If the computed z-score falls in the blue or red regions, the observed pattern is statistically significant, suggesting non-random spatial distribution (clustered or dispersed). If it falls in the yellow region, the pattern is random, with no significant spatial structure. NNA allows planners to understand whether spatial arrangements of features (rural periodic markets) are clustered, random, or dispersed, aiding in decision-making for resource allocation and planning. Based on the highlighted red region in the figure, the pattern depicted in the image corresponds to a dispersed (regular) pattern. Because: The z-score is located in the right tail of the curve (greater than +2.58), indicating a statistically significant dispersed pattern.

Location Map of the Study Area



Source: Based on Various Reports from Census of India and West Bengal State Marketing Board, 2012-13

Fig.1 Location Map of the Study Area

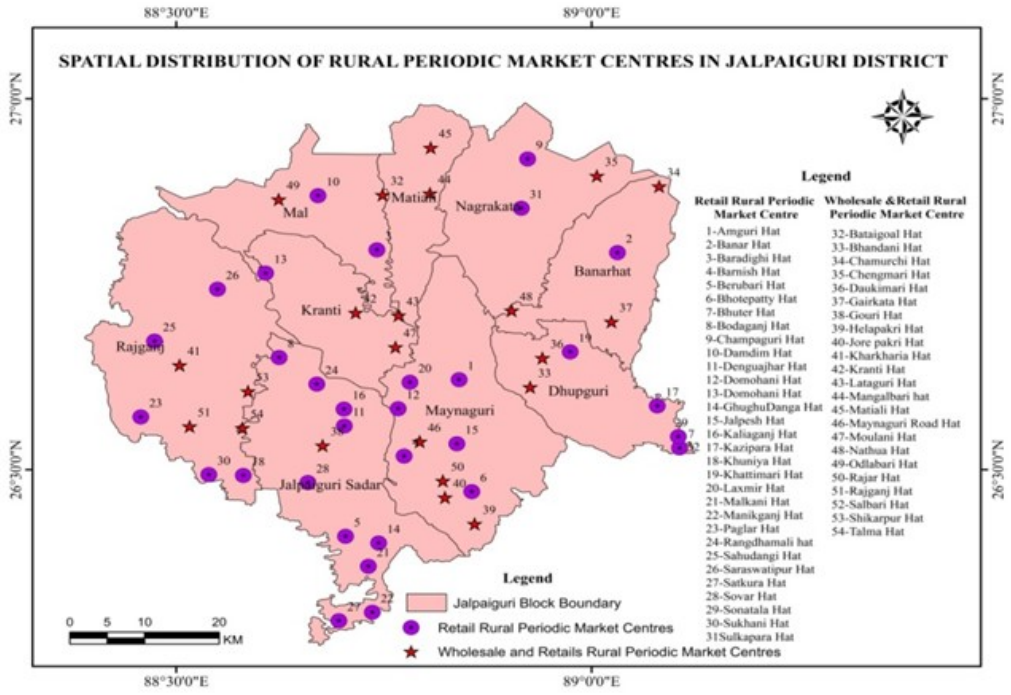


Fig.2. Spatial Distribution of Rural Periodic Market Centres in Jalpaiguri District

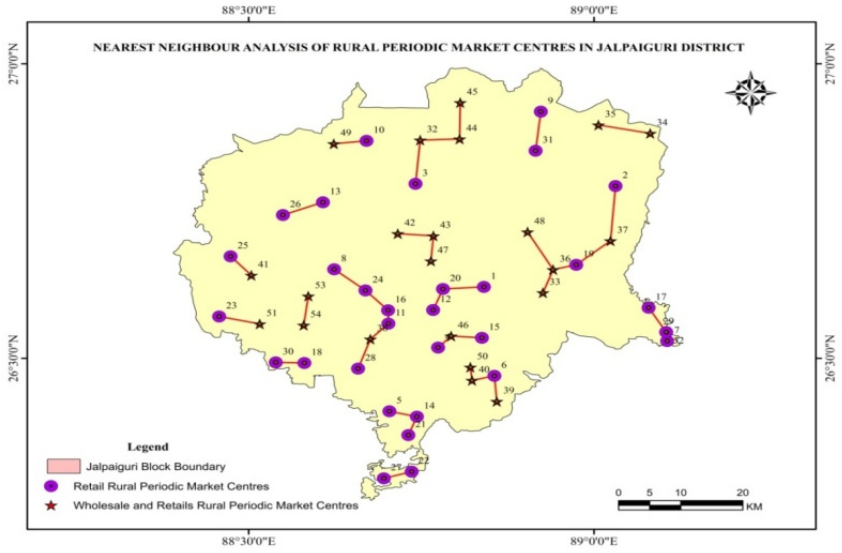


Fig. 3. Distribution of Rural Periodic Market Centres based on Nearest Neighbour Analysis in Jalpaiguri District

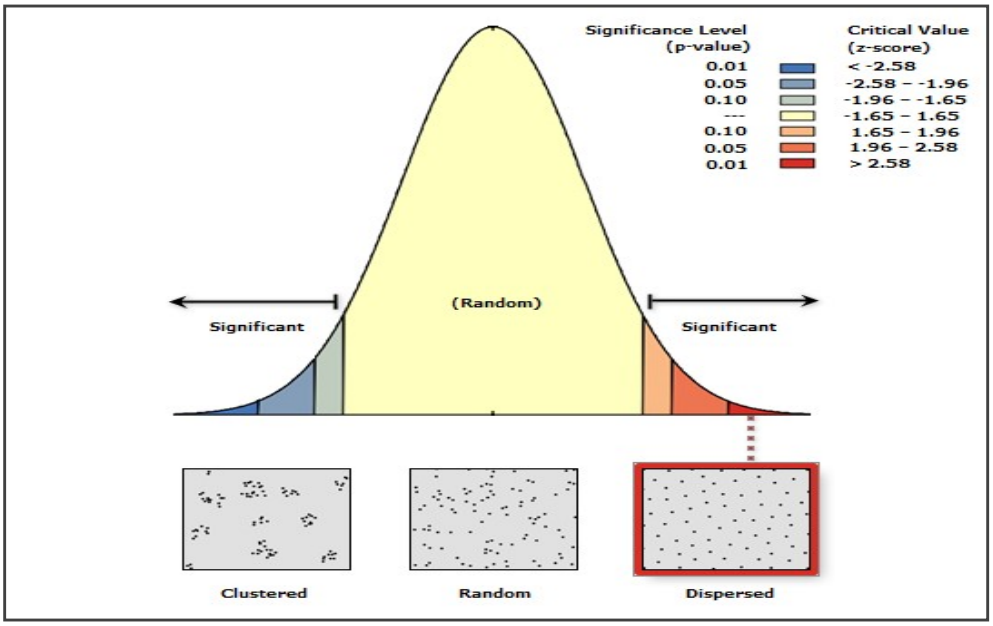


Fig.4. Significance of spatial patterns in Nearest Neighbour Analysis (NNA) based on the z-score and p-value

Table.1 Average Area Served by per Rural Periodic Market Centres of Jalpaiguri District

Sl. No.	Name of the Blocks	Total Area (km^2)	Total Number of RPMC	Average area served by per RPMC
1.	**Rajganj**	614.83	26	23.65
2.	**Jalpaiguri Sadar**	513.62	52	9.88
3.	**Maynaguri**	530.60	41	12.94
4.	**Dhupguri**	315.40	27	11.68
5.	**Banarhat**	250.14	15	16.68
6.	**Mal**	310.24	22	14.10
7.	**Kranti**	243.16	17	14.30
8.	**Matiali**	204.91	8	25.61
9.	**Nagrakata**	397.48	7	56.78
Total		**3380.38**	**215**	**15.72**

Source: Various reports from Census of India and West Bengal State Marketing Board, 2012-13

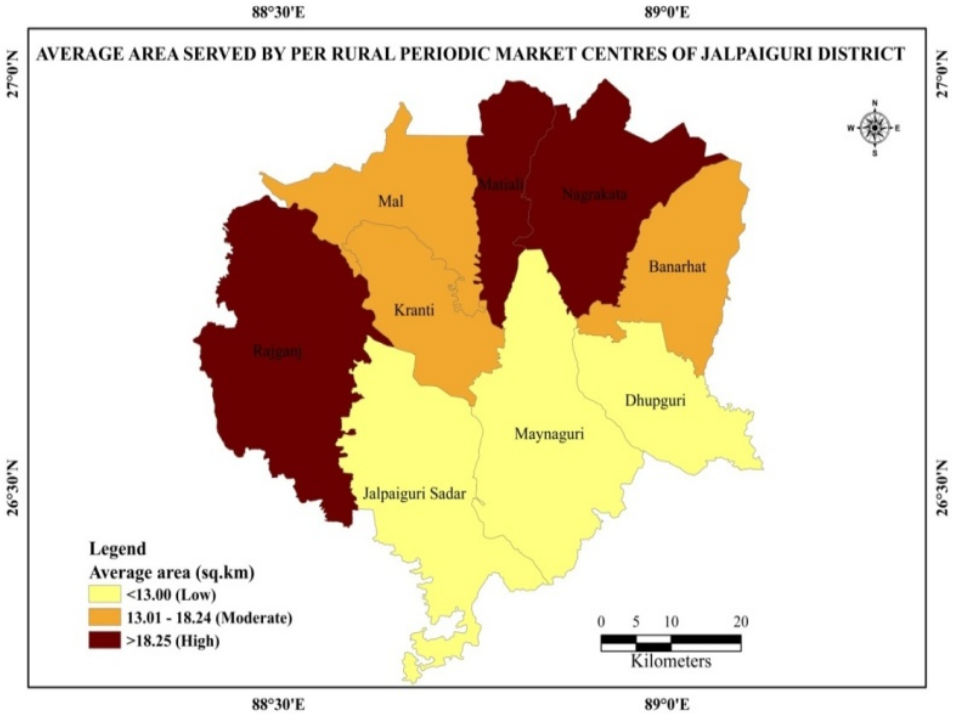


Fig.5. Average Area Served by per Rural Periodic Market Centres in Jalpaiguri District

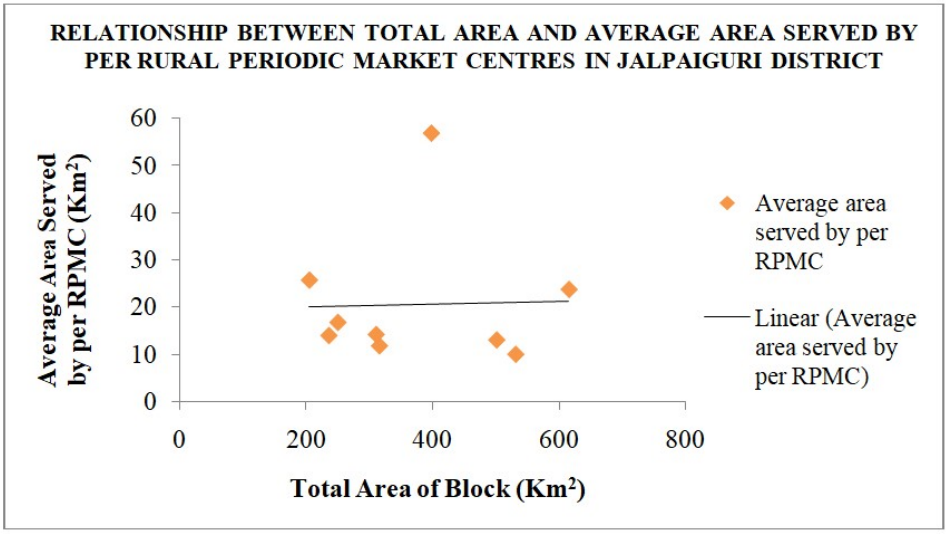


Fig.6 Relationship between Total Area and Average Area Served by per Rural Periodic Market Centres in Jalpaiguri District

Table 2. Average Net Sown Area Served by per Rural Periodic Market Centres of Jalpaiguri District

Sl. No.	Name of the Blocks	Total Net sown Area (km^2)	Total Number of RPMC	Average Net Sown Area Served by per RPMC
1.	Rajganj	261.68	26	10.06
2.	Jalpaiguri Sadar	277.00	52	5.33
3.	Maynaguri	329.20	41	8.03
4.	Dhupguri	180.26	27	6.68
5.	Banarhat	189.78	15	12.65
6.	Mal	128.60	22	5.85
7.	Kranti	90.30	17	5.31
8.	Matiali	82.01	8	10.25
9.	Nagrakata	120.90	7	17.27
Total		1659.73	215	7.72

Source: Various reports from Census of India and West Bengal State Marketing Board, 2012-13

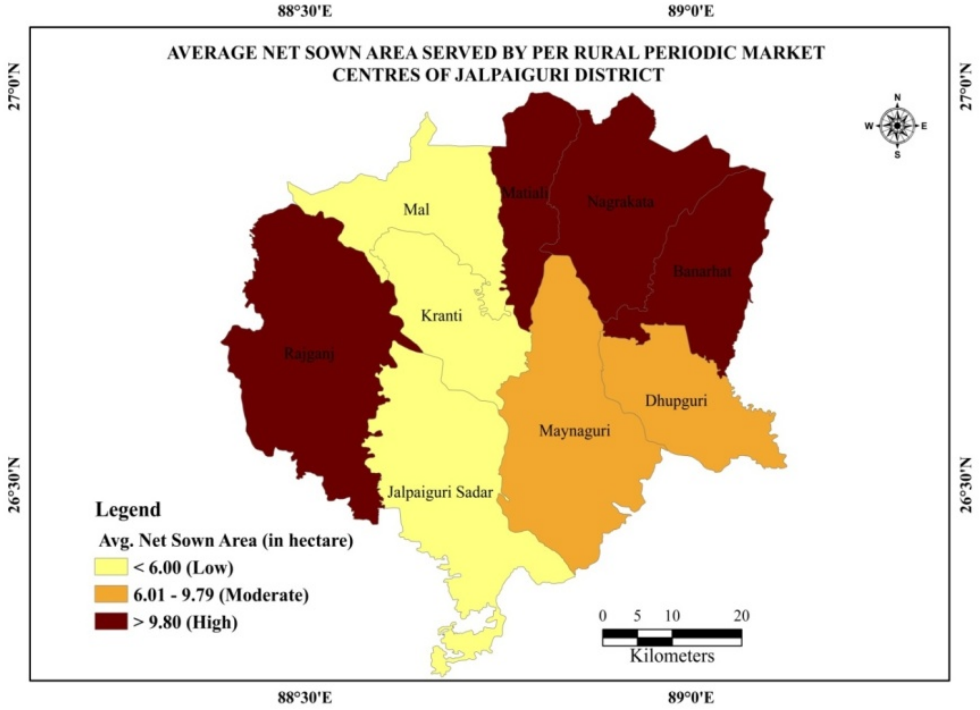


Fig.7. Average Net Sown Area Served by per Rural Periodic Market Centres in Jalpaiguri District

Table.3 Average Population Served by per Rural Periodic Market Centres of Jalpaiguri District

Sl. No.	Name of the Blocks	Total Population	Total Number of RPMC	Average Population Served by per RPMC
1.	Rajganj	373776	26	14376
2.	Jalpaiguri Sadar	323445	52	6220
3.	Maynaguri	329032	41	8025
4.	Dhupguri	256419	27	9497
5.	Banarhat	158435	15	10562
6.	Mal	176051	22	8002
7.	Kranti	123505	17	7265
8.	Matiali	117540	8	14693
9.	Nagrakata	127397	7	18200
Total		1985600	215	9235

Source: Various reports from Census of India and West Bengal State Marketing Board, 2012-13

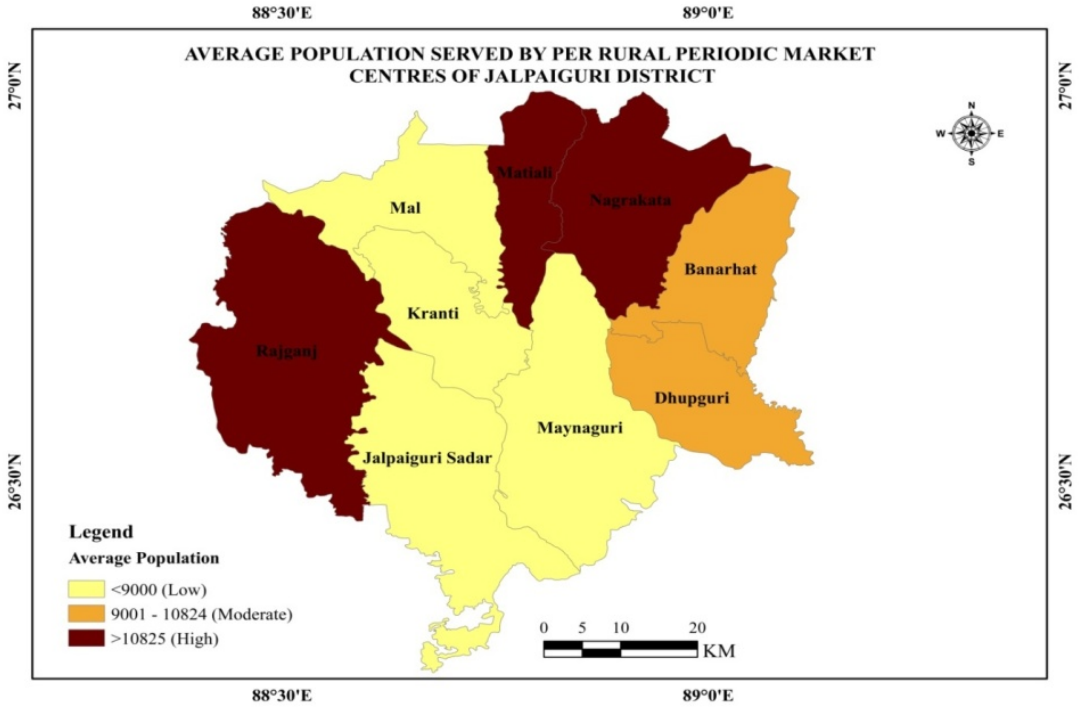


Fig. 8. Average Population Served by per Rural Periodic Market Centres in Jalpaiguri District

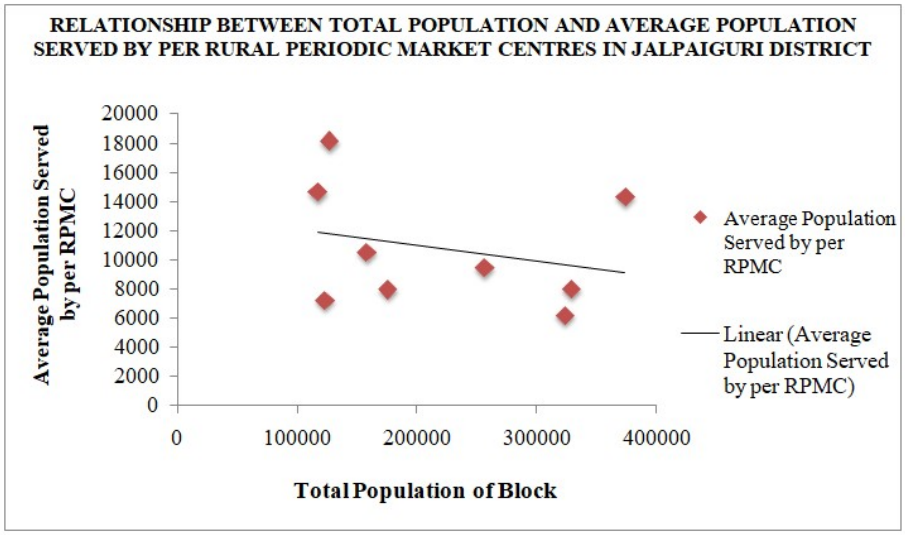


Fig.9 Relationship between Total Population and Average Population Served by per Rural Periodic Market Centres in Jalpaiguri District

The visual example in the red box shows evenly spaced points, consistent with a regular or dispersed distribution. Thus, the observed pattern is dispersed, reflecting maximum spacing between points.

Average Area Served by per Rural Periodic Market Centres: The area of Jalpaiguri District is 3380.38 km^2, according to Table 1; each rural periodic market centre serves an average of 15.72 km^2. According to the Block-level study, the average area served by each rural periodic market centre varies significantly by region. Nagrakata Block (56.78 km^2), Matiali Block (25.61 km^2), and Rajganj Block (23.65 km^2) are the rural periodic market centres that serve the high average area. The number of rural periodic market centres and the served area are inversely correlated; there are seven, eight, and twenty six rural periodic market centres in the aforementioned Blocks, respectively. Banarhat Block (16.68 km^2), Kranti Block (13.86 km^2), and Mal Block (14.10 km^2) are among the rural periodic market centres that serve a moderately sized average area. Jalpaiguri Sadar Block (9.88 km^2), Dhupguri Block (11.68 km^2), and Maynaguri Block (12.94 km^2) are among the lower areas served per rural periodic market centre, with fifty two, twenty seven, and forty one rural periodic market centres, respectively.

Average Net Sown Area per Rural Periodic Market Centres: According to Table 3, each rural periodic market centre in the study area has an average net sown area of 7.72 km^2. The average net sown area for each of the nine Blocks in the Jalpaiguri District's rural periodic market centres varies significantly, according to the study. However, there is five Blocks out of nine Blocks with average net sown area larger than the district average include Nagrakata Blocks (17.27 km^2), Banarhat Blocks (12.65 km^2), Matiali Blocks (10.25 km^2), Rajganj Blocks (10.06 km^2), and Maynaguri Blocks (8.03 km^2). The average net sown area of the remaining four blocks is lower than the district average. Jalpaiguri Sadar Block (5.33 km^2), Mal Block (5.85 km^2), Dhupguri Block (6.68 km^2), and Kranti Block (5.31 km^2). The Nagrakata Block (17.27 km^2), Banarhat Block (12.65 km^2), Matiali Block (10.25 km^2), and Rajganj Block (10.06 km^2) had the highest average net sown area served by per rural periodic market centres. The Maynaguri Block (8.03 km^2) and Dhupguri Block (6.68 km^2) are included in the moderate average net sown area served by each rural periodic market centre. Given the number of rural periodic market centres, Kranti Block (5.31 km^2), Jalpaiguri Sadar Block (5.33 km^2), and Mal Block (5.85 km^2) have the lowest average net sown area served by each rural periodic market centre.

Average Population Served by per Rural Periodic Market Centres: One of the key markers of a region's market concentration index is the fact that each rural periodic market centre in the current study area serves a specific percentage of the population. The average number of people served by each rural periodic market centre in the Jalpaiguri District is 9235, as shown in Table 3 Based on physiographic, social, economic, and demographic factors, the average population per rural periodic market centre varies from Block to Block. Five Blocks of the district i.e., Nagrakata Block (18200 persons), Matiali Block (14693 persons), Rajganj Block (14376 persons), Banarhat Block (10562 persons) and Dhupguri Block (9497 persons) serves more people than the district average (9443 persons) due to the less number of rural periodic markets. Remaining four Blocks i.e., Jalpaiguri Sadar Block (6220 persons), Kranti Block (7265 persons), Mal Block (8002 persons), and Maynaguri Block (8025 persons) tends to serve less average population than the district average due to more number of rural periodic markets. Jalpaiguri Sadar Block (6220 persons), Kranti Block (7265 persons), Mal Block (8002 persons), and Maynaguri Block (8025 persons) show low concentration of rural periodic market centres with reference to the population served by them. Moderate concentration of rural periodic market centre included only in Dhupguri Block (9497 persons). Whereas, remaining four Blocks i.e., Nagrakata Block (18200 persons), Matiali Block (14693 persons), Rajganj Block (14376 persons), and Banarhat Block (13544 persons) show high concentration of rural periodic market centres (Fig.8).

Average Number of the Inhabited Villages Served by per Rural Periodic Market Centres: In the present study area, there are on an average 1.82 inhabited villages served by per rural periodic market, which varies Block to Block from 0.54 inhabited villages in Jalpaiguri Sadar Block to 4.57 inhabited villages in Nagrakata Block. Table 4 show the high category of inhabited villages served by per rural periodic market are Nagrakata Block (4.57 villages), and Matiali Block (3.25 villages). Whereas four Blocks, i.e., Dhupguri Block (2.22 villages), Banarhat Block (2.53 villages), Mal Block (2.55 villages), and Kranti Block (2.71 villages) are in medium category. Remaining Jalpaiguri Sadar Block (0.54 villages), Rajganj Block (1.00 villages), and Maynaguri Block (1.93 villages) are included in the low category (Fig.10).

Distribution of Periodicity of Rural Periodic Market Centres: A crucial component of market setup is periodicity. It is not equally important to hold market meetings on every day of the week. Market meetings are held at different frequencies throughout the week because some days are preferred over others. The pattern that appears when a market within a group of markets holds meetings with varying frequencies on days is referred to as its frequency. The phenomenon known as "market periodicity" occurs when a group of markets are only held on, prearranged days. Regional, cultural, economic, and religious diversity are some of the factors that shape this periodicity, which varies by region (Khan, 2009).

Based on their frequency within a given time frame, periodic markets are referred to by a variety of names, including weekly, bi-weekly, and tri-weekly. Table 5 outlines the weekly, bi-weekly, and tri-weekly rural periodic markets' Block-by-Block distribution in the Jalpaiguri District. There are 215 rural periodic markets in the study area. Of these, 61 take places weekly, 152 bi-weekly and only 2 take places tri-weekly.

The Block level research reflects that the largest number of weekly rural periodic markets is in all nine blocks; a high concentration of weekly rural periodic markets is observed in Mal Block (19), followed by Jalpaiguri Sadar Block (7), Banarhat Block (7), Kranti Block (7) and Nagrakata Block (7). Whereas a low concentration of weekly rural periodic market was observed in Maynaguri Block (1) followed by Dhupguri Block (3) and Rajganj Block (4). There are the most biweekly rural periodic markets in Jalpaiguri Sadar Block. e. 44, while the lowest number is i for Matiali Block. e. just two.

Table.4 Average Number of the Inhabited Villages Served by per Rural Periodic Market Centres of Jalpaiguri District

Sl. No.	Name of the Blocks	Number of Inhabited Villages	Total Number of RPMC	Average Number of Inhabited Villages Served by per RPMC
1.	**Rajganj**	26	26	1.00
2.	**Jalpaiguri Sadar**	28	52	0.54
3.	**Maynaguri**	79	41	1.93
4.	**Dhupguri**	60	27	2.22
5.	**Banarhat**	38	15	2.53
6.	**Mal**	56	22	2.55
7.	**Kranti**	46	17	2.71
8.	**Matiali**	26	8	3.25
9.	**Nagrakata**	32	7	4.57
Total		**391**	**215**	1.82

Source: Various reports from Census of India and West Bengal State Marketing Board, 2012-13

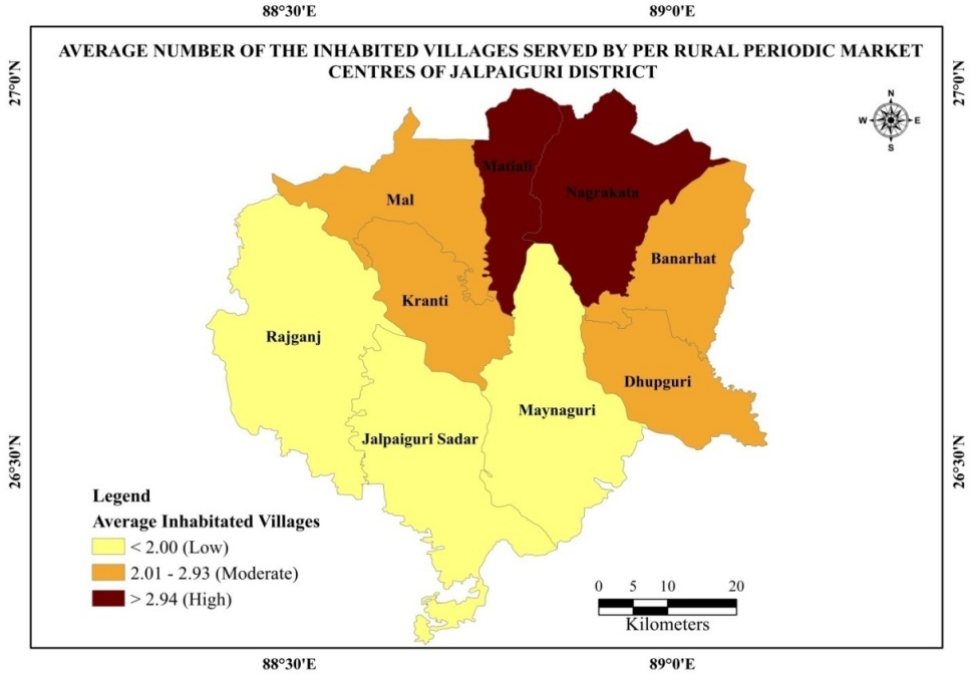


Fig.10 Average Number of the Inhabited Villages Served by per Rural Periodic Market Centres in Jalpaiguri District

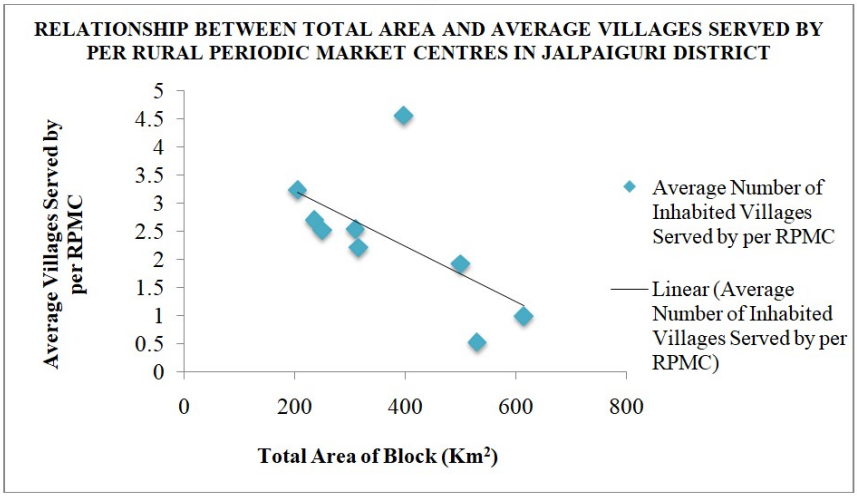


Fig.11 Relationship between Total Area and Average Villages Served by per Rural Periodic Market Centres in Jalpaiguri District

Table 5. Periodic Distribution of Rural Periodic Market Centres of the Jalpaiguri District

Sl. No.	Name of the Blocks	Weekly	Bi-weekly	Tri-weekly	Total
1.	Rajganj	4	22	0	26
2.	Jalpaiguri Sadar	7	44	1	52
3.	Maynaguri	1	40	0	41
4.	Dhupguri	3	23	1	27
5.	Banarhat	7	8	0	15
6.	Mal	19	3	0	22
7.	Kranti	7	10	0	17
8.	Matiali	6	2	0	8
9.	Nagrakata	7	0	0	7
Total		61	152	2	215

Source: Various Reports from Census of India and West Bengal State Marketing Board, 2012-13

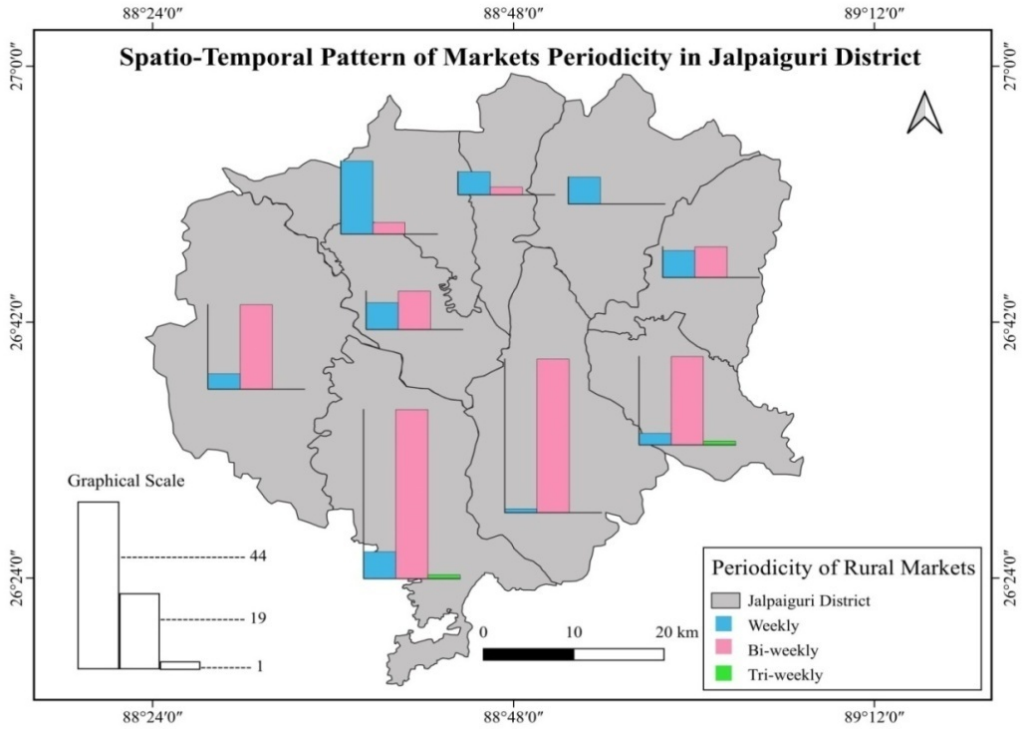


Fig.12 Spatio-temporal pattern of markets periodicity in Jalpaiguri District

Table 6. Day-wise Distributions of Rural Periodic Market Centres of Jalpaiguri District

Sl. No.	Name of the Blocks	Days of the week							Total (Meeting Days)
		Mon	Tue	Wed	Thu	Fri	Sat	Sun	
1.	Rajganj	5	11	4	6	7	7	8	48
2.	Jalpaiguri Sadar	15	9	17	13	15	12	17	98
3.	Maynaguri	14	6	12	16	10	11	12	81
4.	Dhupguri	9	6	7	7	9	5	9	52
5.	Banarhat	3	3	3	2	5	3	4	23
6.	Mal	0	1	3	3	6	7	5	25
7.	Kranti	4	3	5	2	5	5	3	27
8.	Matiali	1	2	1	0	1	3	2	10
9.	Nagrakata	0	0	2	1	2	0	2	7
Total		51	41	54	50	60	53	62	371
In %		13.75	11.05	14.56	13.48	16.17	14.29	16.71	100

Source: Various reports from Census of India and West Bengal State Marketing Board, 2012-13

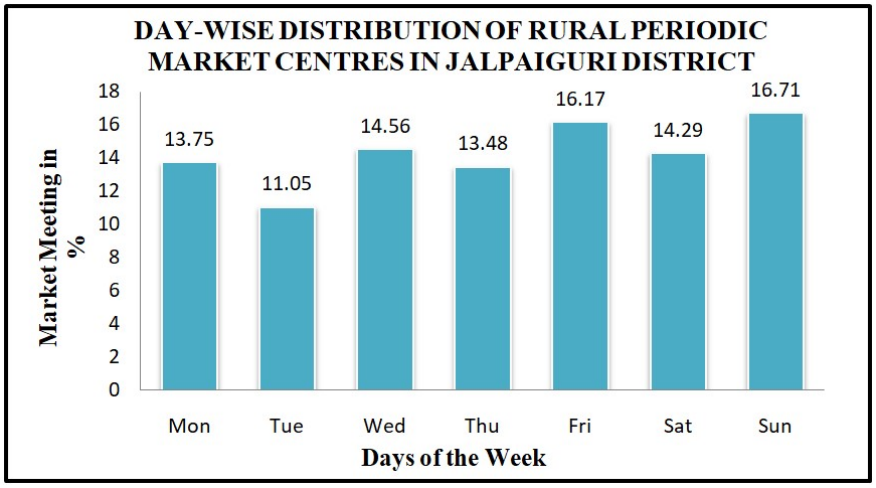


Fig. 13. Day-Wise Distribution of Rural Periodic Market Centres in Jalpaiguri District

The perishable nature of products like vegetables and other agricultural commodities, as well as rising local demand, are the main drivers of this distribution and call for more frequent market events.

Furthermore, Jalpaiguri Sadar Block (1) and Dhupguri Block (1) are the only places where triweekly rural periodic markets have appeared. The remaining seven blocks in the study area do not have this kind of rural periodic market.

Table.7 Chi-Squared test of periodicity of rural periodic market centres in Jalpaiguri District

Days of the week	Observed Frequency (o)	Expected Frequency (e)	Residuals (o-e)	(o-e) ²	(o-e) ²/e Or X²
Monday	51	53	-2	4	0.075472
Tuesday	41		-12	144	2.716981
Wednesday	54		1	1	0.018868
Thursday	50		-3	9	0.169811
Friday	60		7	49	0.924528
Saturday	53		0	0	0
Sunday	62		9	81	1.528302
Total	**371**				**5.433962**

Source: Computed from various reports from Census of India and West Bengal State Marketing Board, 2012-13

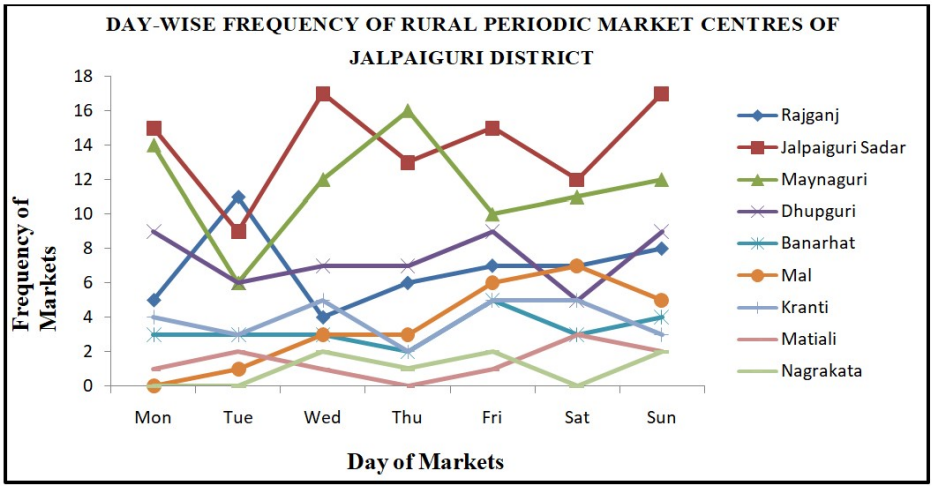


Fig.14. Day-wise frequency of Rural Periodic Market Centres in Jalpaiguri District

Frequency or Day-wise Distribution of Rural Periodic Market Centres: Market meetings are held at different frequencies throughout the week because some days are preferred over others. The pattern that appears when a market within a group of markets holds meetings with varying frequencies on days is referred to as its frequency. from the table. The most popular days to visit the rural markets in the Jalpaiguri District are Sundays (62) and Fridays (60) and Wednesdays (54) respectively. On Tuesday, however, there were the fewest rural markets (41). On Monday (51), Thursday (50), and Saturday (53), there were additional rural markets. According to a block-wise distribution analysis, Jalpaiguri Sadar Block has a higher frequency of rural periodic markets on Wednesdays (17), Sundays (17), Mondays, and Fridays (15). Rural periodic markets are held on Thursday (16), Monday (14), Wednesday (12), and Sunday (12) in Maynaguri Block. The rural periodic markets were held in Nagrakata Block on Wednesday, Friday, and Sunday, as well as on Thursday and Friday. There are no rural periodic markets in the Nagrakata Block on Mondays, Tuesdays, or Saturdays. Rajganj Block frequently hosts rural periodic markets on Tuesdays (11), Sundays (8), Fridays (7), and Saturdays (7). In Dhupguri Block, rural periodic markets are more prevalent on Mondays (9), Fridays (9), and Sundays (9). The Banarhat Block's Friday (5) rural markets are the most frequented. In Mal Block, rural periodic markets are more prevalent on Saturdays (7) and Fridays (6). There are no rural periodic markets in this block on Monday. Wednesday, Friday, and Saturday are the three most frequent rural periodic markets in the Kranti Block. In Matiali Block, rural periodic markets are more prevalent on Saturdays (3), Tuesdays (2), and Sundays (2). There isn't a rural periodic market in Matiali Blocks on Thursday. Table, 6 shows that there were a total of 371 market meeting days, which is spread over all the seven days of the market meeting, or the frequency of the market varies from block to block and also from day to day in the study area. A high concentration of market meeting days was observed in Jalpaiguri Sadar Block (98), followed by Maynaguri Block (81) and Dhupguri Block (52). In contrast, a low concentration was observed in Nagrakata Block (7), followed by Matiali Block (10) and Banarhat Block (23). The Chi-square test (X^2) indicates that there is no significant relation between the days of the week and the distribution of markets. Therefore, we clearly say that a particular day does not play any significant role in the distribution of marketing days. The results confirm that market activity in the district takes place every day of the week, with only slight fluctuations in the frequency of market meetings. This indicates a consistent pattern of market engagement throughout the week.

Major Findings: The study revealed several significant findings regarding the spatio-temporal distribution of rural periodic market centres in Jalpaiguri District. Spatially, the distribution of these market centres was found to follow a dispersed pattern, as evidenced by the Nearest Neighbour Analysis, with a z-score greater than +2.58. This pattern ensures an even spatial distribution, maximizing accessibility across the district. Each market centre serves an average area of 15.63 km², though this varies across blocks, with some blocks, like Nagrakata, covering much larger areas. Similarly, the average population served per market centre is approximately 9,443 people, but blocks with fewer market centres, such as Nagrakata and Matiali, serve significantly higher populations.

Temporally, the periodicity of markets includes weekly, bi-weekly, and tri-weekly cycles, with bi-weekly markets being the most common. The Chi-Square test confirmed no significant bias in market days, indicating an equitable distribution of market activities throughout the week. This ensures residents' regular access to market facilities, irrespective of the day. Further, the study identified variations in the average number of inhabited villages served per market centre, with blocks like Nagrakata and Matiali serving a higher number of villages due to their dispersed nature. The analysis also highlighted the role of socio-economic and cultural factors in shaping the temporal and functional dynamics of these markets. These findings underscore the importance of rural periodic markets as socio-economic hubs, catering to the diverse needs of the population while fostering regional economic stability. They also emphasize the need for a well-integrated rural marketing system to enhance accessibility and support regional development.

CONCLUSION

The study on the spatio-temporal distribution of rural periodic market centres in Jalpaiguri District highlights significant insights into their spatial patterns, periodicity, and functionality. The findings reveal that the distribution of market centres is influenced by spatial, demographic, and socio-economic factors, with variations in the average area, population, and inhabited villages served across blocks. The study underscores the importance of rural periodic markets as essential nodes in the socio-economic structure of the study area. The spatially dispersed pattern ensures widespread accessibility, while temporal consistency supports economic stability. The findings emphasize the need for an integrated rural marketing system to sustain threshold levels and foster regional development. The study also highlights how GIS tools can enhance the understanding and planning of such market systems.

The study emphasizes the need for an integrated and efficient rural marketing system to maintain threshold levels and drive regional development, highlighting rural periodic markets as vital nodes in the socio-economic fabric of the region.

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