A Study Of Geospatial Assessment Of Rural Settlement Patterns in Chamba District Of Himachal Pradesh (2001-2011)

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Abstract:
    Chamba district, nestled within the captivating landscapes of Himachal Pradesh, India, stands as a remarkable testament to the intricate relationship between geography, culture, and rural settlements. Its distinctive settlement intensity is a reflection of the challenging terrain and rich cultural heritage that has sculpted its identity over centuries. The rugged geography of Chamba plays a pivotal role in shaping the intensity of rural settlements. With steep slopes and deep valleys defining the landscape, dispersed settlements have naturally emerged. These geographic features not only influence the distribution of settlements but also contribute to the region's unique charm. Historical trade routes and cultural traditions have further left their indelible mark on settlement patterns. Centuries-old traditions and the legacy of trade have fostered the development of clusters around significant towns and heritage sites. These clusters serve as hubs for both economic activities and cultural exchange, preserving the rich heritage of Chamba. The district's predominantly agrarian economy, complemented by the growth of tourism, significantly affects settlement distribution and density. People gravitate towards agricultural land or seek proximity to tourism hubs, resulting in varying settlement densities across Chamba. This economic dynamism underscores the need for a nuanced understanding of settlement patterns. The implications of settlement intensity in Chamba are multifaceted. On one hand, it presents opportunities for landscape preservation and cultural continuity. The unique settlements and traditions of Chamba are integral to its identity and must be safeguarded. On the other hand, there are challenges, including infrastructural development and socio-economic disparities. The uneven distribution of settlements and resources can exacerbate disparities within the district.
Keywords:- Heritage, Terrain, Tourism, Cultural, Activities, Rural.

Introduction

The intensity of rural settlement, characterized by the distribution and density of human habitation in non-urban areas, is a critical aspect of land use planning and sustainable development. Rural settlement intensity encompasses a spectrum of patterns, ranging from sparse and dispersed settlements to compact and dense agglomerations. Understanding these patterns is vital for assessing the impacts of human activities on the natural environment, resource management, and the overall quality of life in rural areas. Since industrialization began, urbanization has altered urban spaces, but it has also profoundly affected rural settlements land.(Song, 2020,)

Several factors influence the intensity of rural settlements, including geographical features, historical development, economic activities, cultural traditions, and policy interventions. Geography plays a pivotal role, with factors such as topography, climate, and proximity to resources influencing settlement patterns. Historical development shapes settlement intensity through legacy land-use patterns and infrastructure development. Economic activities, such as agriculture, industry, and tourism, can either promote concentration or dispersion of settlements. Cultural factors, including traditions and social norms, also influence how and where people choose to settle. Additionally, government policies, land use regulations, and infrastructure investments significantly impact settlement intensity.

The implications of rural settlement intensity are far-reaching. High-intensity settlements can lead to increased infrastructure costs, environmental degradation, and social challenges.

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Conversely, low-intensity settlements may strain service delivery, limit economic opportunities, and contribute to isolation. Striking a balance between these extremes is crucial for achieving sustainable rural development.

Study Area:

The Chamba district is situated within the Lesser Himalaya region and is surrounded by various geographical features. To the northwest, it shares its border with Jammu and Kashmir, while to the north-east and east, it is adjacent to the Ladakh region of Jammu and Kashmir and the Lahaul and Bara-Bangal area of Himachal Pradesh. On the southeast and south, it is bordered by the Kangra District of Himachal Pradesh and the Gurdaspur District of Punjab. The district's geographical coordinates range from approximately 32° 11′ 30″ to 33° 13′ 06″ north latitude and 75° 49'00" to 77° 03'30" east longitude. The total area of the district covers 6,522 square kilometers, with its administrative center located in Chamba. There are a total of 1,591 villages in this district.

The Chamba district features a wide range of altitudes, spanning from 609 to 6,402 meters above mean sea level. Some areas in the district are relatively flat, bordering the Pathankot district of Punjab to the south and the Kangra district of Himachal Pradesh to the south. In the eastern direction, it meets the Lahaul Spiti district, while to the north, it shares boundaries with Jammu and Kashmir. The primary river flowing through the Chamba district is the Ravi, which holds immense significance for the Chambyals. Along with its tributaries, the Ravi River drains the entire Chamba valley situated between the Dhauladhar and Pangi ranges, encompassing the largest and most crucial part of the district.
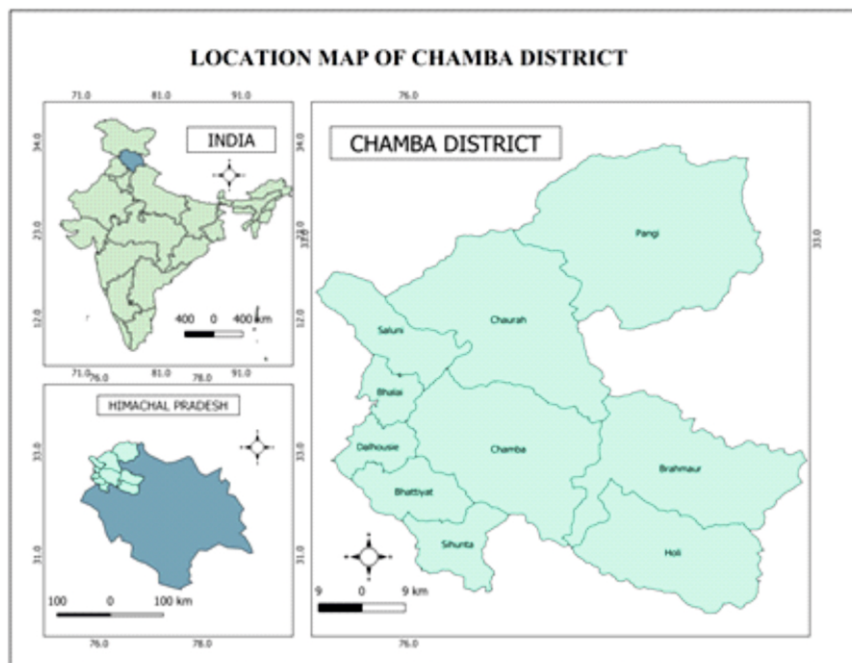
Objectives :

The current research paper aims to achieve the following primary objectives:

1. To analyze the spatial distribution of rural settlements within Chamba district.
2. To assess the concentration and density of rural settlements in Chamba district.

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Data Source & Methodology:

The current discussion relies on secondary data sourced from the Chamba District Census Reports of 2001 and 2011. In assessing the intensity of rural settlements, the formula introduced by Debouverie in 1943 has been utilized. This formula aids in quantifying settlement intensity, and the results have been visualized on a map to depict the distribution across the district.

$$X = I \times \frac{H}{L}$$

X   -   Intensity of Rural Settlement
I   –   Constant Value (0.25)
H   –   Number of Households in Tehsil
L   –   Number of Rural Settlements in Tehsil

The basis of our analysis is the census data for the years 2001 and 2011. These data sets provide valuable insights into the evolution and dynamics of rural settlements within Chamba District over this decade-long period.

Results And Discussion :

Distribution of Rural Settlements in Chamba District :
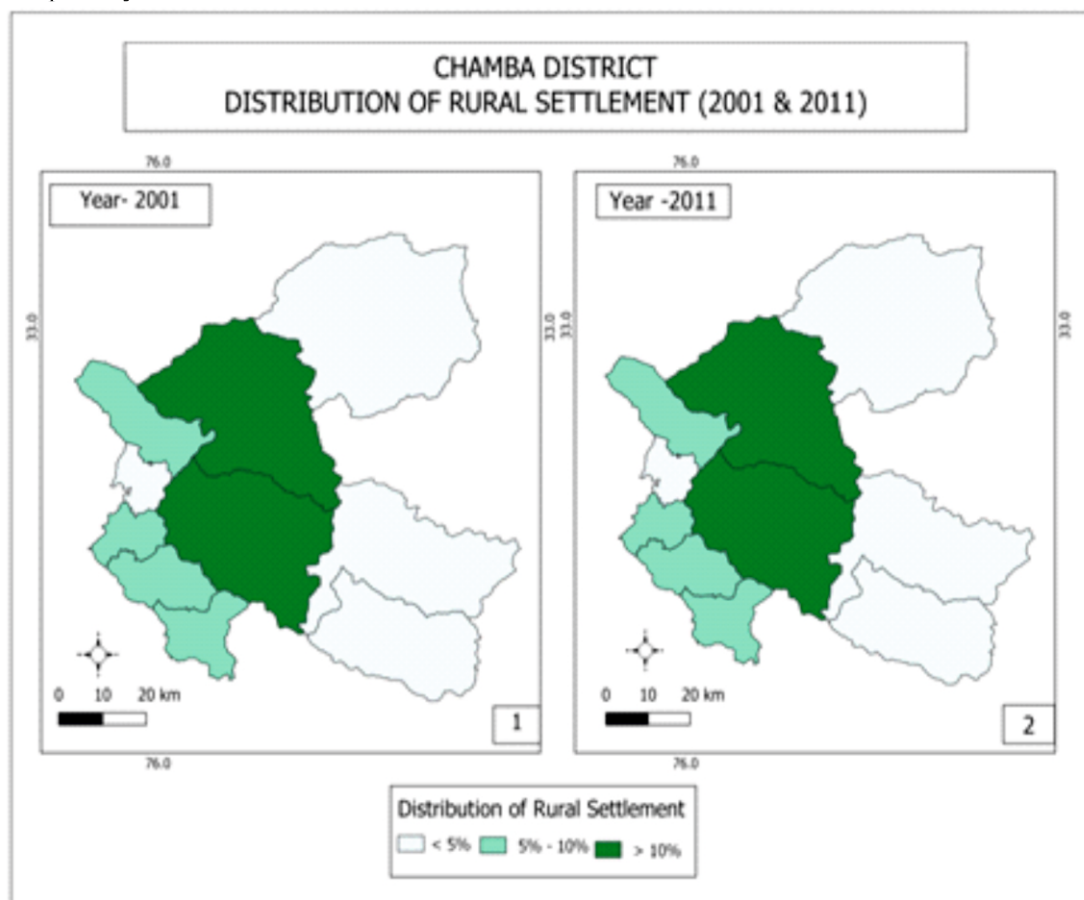
1. District has Distinct Features reflecting Backwardness

In the year 2001, a total of 1,118 rural settlements were recorded. By 2011, there was an increase of 75 rural settlements, bringing the total to 1,193. However, it's important to note that this growth was not consistent across all tehsils. Table No. 1 provides the tehsil - wise distribution of rural settlements for both the years 2001 and 2011.

Table No. 1
Chamba District – Distribution of Rural Settlements (2001 – 2011)

Tahsils	Number of Rural Settlements (2001)	%	Number of Rural Settlements (2011)	%
Pangi	59	5.3	60	5
Chaurah	194	17	181	15
Saluni	124	11	132	11
Bhalai	78	7	78	6
Dalhousie	120	11	126	10
Bhattiyat	121	11	133	11
Sihunta	81	7.2	80	7
Chamba	240	21.5	307	26
Holi	47	4	46	4
Brahmaur	54	5	50	4
Total	**1,118**	**100%**	**1,193**	**100%**

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Compiled by the Author.

CHAMBA DISTRICT
DISTRIBUTION OF RURAL SETTLEMENT (2001 & 2011)

Year- 2001

Year -2011

Distribution of Rural Settlement
< 5%   5% - 10%   > 10%

The distribution of rural settlements in Chamba District in 2001 and 2011 can be attributed to various factors that influence settlement patterns and population concentration across different tehsils.

In 2001, Chamba tehsil recorded a substantial 240 rural settlements, and this number increased to 307 by 2011, indicating notable growth during the decade. The significance of Chamba tehsil, which accounted for over 26% of the total rural settlements, can be attributed to factors such as its geographic location, economic activities, and historical development.

Furthermore, the distribution of the population within the district in 2001 revealed that Chamba, Chaurah, Saluni, Dalhousie, and Bhattiyat tehsils had more than 10% of the total population. These tehsils likely attracted higher populations due to factors like accessibility, economic opportunities, and historical significance.

In 2011, the distribution of rural settlements remained largely consistent with the previous decade. Chamba tehsil continued to have the highest distribution at 26%, suggesting that its attractiveness as a settlement area persisted. Similarly, Chaurah, Saluni, and Bhattiyat tehsils continued to account for more than 10% of the population, indicating a stable demographic pattern in these areas.

In contrast, the remaining tehsils of the district had lower distribution percentages in both 2001 and 2011. Geographic constraints, limited economic opportunities, and population density variations likely contributed to these lower percentages. For instance, Dalhousie, Sihunta, Bhalai, Pangi,

Brahmaur, and Holi tehsils consistently had lower distribution percentages due to factors like hilly terrain, lower population concentrations, and limited economic development.

Pangi tehsil, in particular, stood out as having only one settlement with an increase over the decade, suggesting that this remote and less accessible area experienced minimal growth and development during this period.

Intensity of Rural Settlements :

Table No. 2 displays the Tehsil-wise Intensity Index of the rural population for the years 2001 and 2011

Table No 2

Chamba District – Intensity of Rural Settlements (2001-2011)

Tehsils	Intensity Index by Debouverie's (1943)		
	2001	**2011**	**Change**
Pangi	14	16	2
Chaurah	15	20	5
Saluni	15	29	14
Bhalai	13	15	2
Dalhousie	13	19	6
Bhattiyat	13	17	4
Sihunta	21	26	5
Chamba	27	12	15
Holi	16	16	0
Brahmaur	21	26	5
Total District	**17**	**20**	**5.8**

The intensity of rural settlements within a district can be a valuable indicator of population concentration and development trends. In the case of Chamba District, this intensity index, categorized into three groups as low, moderate, and high, serves as a crucial measure to understand the distribution and dynamics of rural settlements.

In 2001, Chamba District exhibited an intensity index of 17, placing it in the category of moderate intensity. This suggests that the rural settlements within the district, while sparse, were also moderately concentrated. The moderate intensity index could be attributed to a balance between factors such as geographic distribution, economic opportunities, and historical settlement patterns.

By 2011, the intensity index had risen to 20, still maintaining its classification as moderate. This observation indicates that over the decade from 2001 to 2011, there was a slight increase in the intensity of rural settlements. However, it's essential to note that this increase was not significant enough to shift the district into a higher intensity category.

The reasons behind this relatively stable intensity index may include factors like controlled urbanization, steady population growth, and balanced economic development across different tehsils within the district. The geographic and topographic features of the region, combined with government policies and infrastructure development, likely contributed to this moderate and consistent distribution of rural settlements over the decade.

Dense Concentration of Rural Settlements :

The dense concentration of rural settlements in various tehsils of Chamba District in both 2001 and 2011 can be attributed to a combination of factors that contribute to a concentrated and densely populated rural environment.

In 2001, Chamba tehsil was the sole area with a rural settlement intensity index exceeding 20. This dense concentration can be primarily attributed to the significant number of households in the tehsil relative to the total number of villages. The close proximity and density of houses within the villages further accentuated the concentration of the rural population.

In 2011, the intensity index surpassed 20 in Saluni, Brahmaur, and Sihunta tehsils, signifying high intensity of rural settlements. This increase in high-intensity areas could be due to similar factors observed in Chamba tehsil in 2001, such as a substantial number of households compared to the number of villages and dense housing arrangements.

Holi tehsil, while having fewer rural settlements, stands out for its unique characteristic of having an exclusively rural population. The higher housing density in this tehsil concentrates the rural settlements within a limited geographical area.

Paithan tehsil, on the other hand, records the highest number of houses in rural areas within the district. The 2011 data reveals that Saluni tehsil alone comprises a substantial number of houses, indicating a higher population in that area. Similar trends, albeit to a lesser extent, can also be observed in Chamba and Chaurah tehsils. The increased agricultural activities in these tehsils contribute to the higher density of settlements, as they attract people to live in proximity to their farmlands and agricultural activities.

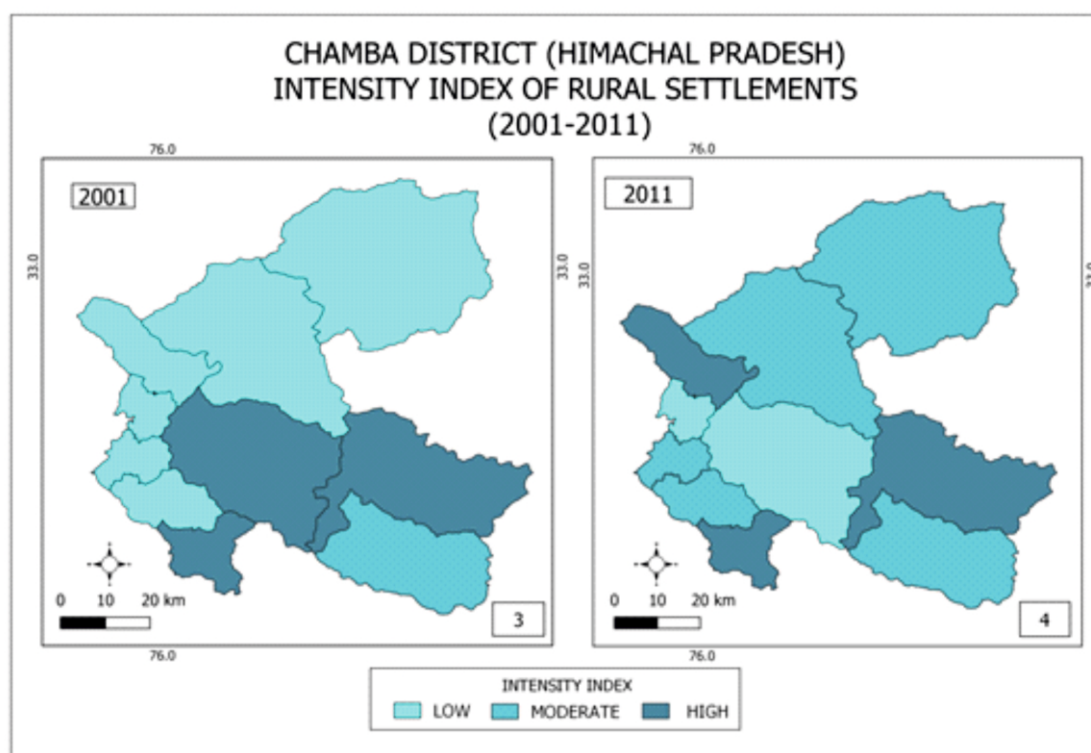**Balanced Distribution of Rural Settlements :**

The balanced distribution of rural settlements observed in specific tehsils of Chamba District in both 2001 and 2011 can be attributed to a set of unique factors that contribute to a balanced level of rural settlement development in these areas.

In 2001, Chaurah and Saluni tehsils had intensity indexes falling within the moderate range of 15 to 20, indicating that these areas maintained a reasonable level of rural settlement intensity. The reasons behind this balanced distribution might have included factors such as their geographic location, historical development, and the distribution of economic opportunities.

By 2011, Dalhousie, Bhattiyat, Holi, Pangi, and Bhalai tehsils recorded moderate intensity levels, demonstrating a continuation of this balanced settlement pattern. Notably, some of these tehsils had low-intensity levels in 2001, and while there was some development by 2011, it remained relatively modest.

One common characteristic of these tehsils is the presence of extensive forests within the district and hilly natural terrain. This topography can limit the availability of arable land and suitable areas for settlement. Consequently, the population tends to concentrate in specific pockets or areas within these tehsils. While some settlements may be situated at a distance from each other due to geographic constraints, the houses within these settlements are closely packed. This close packing of houses resulted in a moderate density of settlements in these tehsils by 2011.

Additionally, the balanced distribution levels in these tehsils might also be influenced by factors such as the availability of resources, infrastructure development, and the pace of urbanization. These factors collectively contribute to a balanced and moderate level of rural settlement intensity, ensuring that neither overpopulation nor underdevelopment becomes a significant issue in these areas.

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CHAMBA DISTRICT (HIMACHAL PRADESH)
INTENSITY INDEX OF RURAL SETTLEMENTS
(2001-2011)

INTENSITY INDEX — LOW — MODERATE — HIGH

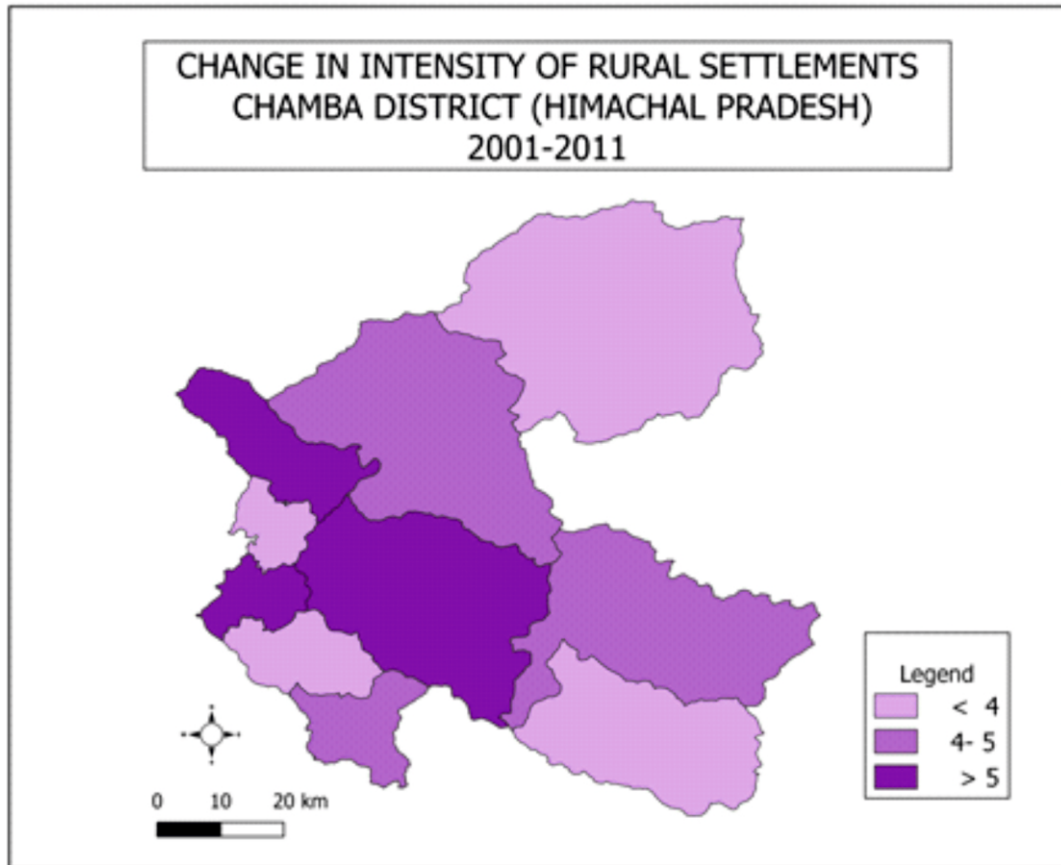**Sparse Distribution of Rural Settlements :**

The sparse intensity of rural settlements observed in certain tehsils of Chamba District in both 2001 and 2011 can be attributed to specific factors that result in a dispersed and sparsely populated rural landscape.

In 2001, Pangi, Bhalai, Bhattiyat, and Dalhousie tehsils displayed sparse-intensity indexes, indicating a limited concentration of rural settlements in these areas. Notably, Bhalai, Bhattiyat, and Dalhousie tehsils experienced a decline in both the number of rural settlements and the number of households, contributing to their sparse-intensity index. Furthermore, the settlements and houses within these tehsils were scattered across the landscape, resulting in the sparsest intensity category.

However, in 2011, Chamba tehsil stood out as the sole tehsil with the sparsest intensity of rural settlements, displaying an index of 12. Interestingly, this index was even lower than the 2001 figure but still signified the sparsest intensity in the district. One key contributing factor to this low intensity was the widespread spacing between houses within almost every settlement in Chamba tehsil. The architectural structure of the houses was irregular, potentially indicating a less dense population in these areas.

Moreover, another contributing factor was the limited presence of agricultural businesses in Chamba tehsil, as industrial development took precedence in the region. This shift in economic activities might have led to a lower population density as people migrated to urban areas for employment opportunities rather than settling in rural areas for traditional agricultural livelihoods.

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Variation in Intensity :

CHANGE IN INTENSITY OF RURAL SETTLEMENTS
CHAMBA DISTRICT (HIMACHAL PRADESH)
2001-2011

Legend
< 4
4- 5
> 5

The variation in the intensity of rural settlements across the various tehsils of Chamba District from 2001 to 2011 reflects a complex interplay of demographic, economic, and geographic factors.

In the case of Chaurah and Saluni tehsils, both of which had a moderate rural settlement intensity in 2001, a remarkable shift occurred, with their intensity increasing to a high level in 2011. This dramatic change could be attributed to several factors, including population growth, economic development, and possibly changes in land-use patterns. The transition to a high-intensity level in these tehsils signifies significant shifts in settlement dynamics and possibly a concentration of economic activities.

Holi tehsil, on the other hand, maintained a consistent intensity of rural settlements between 2001 and 2011. This suggests that the factors influencing settlement patterns in this tehsil remained relatively stable over the decade, resulting in an unchanged intensity index.

In Bhalai tehsil, despite the number of rural settlements remaining consistent throughout both decades, the intensity remained low to moderate. This can be attributed to the wide spacing between settlements and the low density of houses within each settlement. The dispersed nature of settlements in this tehsil contributed to the persistence of a low to moderate intensity level.

In Pangi, Bhattiyat, and Dalhousie tehsils, a transition from a low intensity in 2001 to a moderate level in 2011 was observed. This change could be due to various factors, including population growth, improved infrastructure, and economic development, which may have led to a higher concentration of rural settlements and increased housing density.

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In the remaining tehsils, while there was an overall increase in the intensity index, significant development was not readily evident. These tehsils may have experienced more gradual changes in settlement patterns or had other factors influencing their intensity indexes that did not result in a noteworthy shift.

Key Findings and Recommendations:

In key findings, the analysis of the distribution and intensity of rural settlements in Chamba District between 2001 and 2011 reveals a dynamic landscape shaped by various factors. The district's growth and development are influenced by geographic constraints, economic opportunities, population trends, and historical patterns.

The distribution of rural settlements indicates that certain tehsils, such as Chamba, Chaurah, Saluni, Dalhousie, and Bhattiyat, consistently attracted higher populations due to their accessibility, economic prospects, and historical significance. These tehsils maintained their prominence in both decades. In contrast, tehsils like Pangi, Brahmaur, and Holi had relatively fewer rural settlements and lower population concentrations, largely due to geographic constraints and limited development.

The intensity of rural settlements, categorized into low, moderate, and high, offers insights into population concentration and development trends. Notable shifts in intensity were observed in some tehsils, with Chaurah and Saluni transitioning from moderate to high intensity, signaling significant changes in settlement dynamics. Holi tehsil maintained a stable intensity, while Bhalai remained low to moderate, attributed to the dispersed nature of settlements. Pangi, Bhattiyat, and Dalhousie tehsils shifted from low intensity in 2001 to moderate in 2011, possibly due to population growth and improved infrastructure.

Suggestively, policymakers and local authorities should consider these findings when planning for future development and resource allocation. Efforts to balance development across tehsils, addressing geographic constraints, and fostering economic opportunities in less-intense areas may promote equitable growth and reduce population pressure in high-intensity regions. Additionally, monitoring population trends and settlement patterns can help guide sustainable development strategies that cater to the diverse needs of Chamba District's population.

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