Identification and Analysis of Intra-Regional Disparities in Socio-Economic Development in Kalaburagi District, Karnataka

Mohammadmuzammil Mulla[1] & Dr. L.T. Nayak[2]

[1]_Research Scholar, Department of Geography, Karnatak University, Dharwad, Karnataka._
[2]_Professor and Head, Department of Geography, Karnatak Science College, Dharwad, Karnataka._
Corresponding Author – Mohammadmuzammil Mulla

Abstract:

Regional disparities in socio-economic development at the intra-district level often remain concealed within aggregate development indicators, thereby limiting the effectiveness of decentralized planning. This study examines taluk-level disparities in socio-economic development within Kalaburagi district, located in the Kalyan Karnataka region of northeastern Karnataka, using a Composite Z-score approach. A total of thirty-two indicators representing five key sectors, namely education, health, finance, veterinary services, and communication were analysed using secondary data primarily sourced from Kalaburagi District at a Glance, 2023–24.

The Z-score technique was applied to compute values for individual indicators, which were then aggregated to derive sectoral and overall composite indices. This enabled the classification of taluks into three categories, namely areas of high, moderate, and low levels of development. The results reveal a highly polarized and uneven development structure within the district. Kalaburagi taluk consistently emerges as the most developed unit across all sectors, with an overall Composite Z-score of 1.76, reflecting the concentration of administrative functions, institutional infrastructure, and higher-order services. Moderately developed taluks, with Composite Z-scores ranging from -0.66 to 0.63, include Afzalpur (0.32), Alanda (0.63), Chincholi (0.19), Chittapur (0.20), Jewargi (0.03), and Sedam (-0.09), which display average performance across sectors but lack consistent strength in advanced services. In contrast, taluks such as Kalagi (-0.69), Kamalapur (-0.68), Yadrami (-0.78) and Shahabad (-0.90) exhibit persistently low composite scores (Composite Z-score < -0.67) across multiple sectors, indicating structural and multidimensional deprivation rather than isolated sectoral deficiencies.

The spatial pattern of development is fragmented, with no contiguous clustering of backward taluks, suggesting that intra-district disparities are driven more by unequal institutional distribution and historical investment patterns than by geographical location alone. The limited diffusion of development benefits from the district headquarters further underscores the failure of spillover mechanisms. The study highlights the inadequacy of uniform district-level planning and emphasizes the need for taluk-specific, multi-sectoral interventions to address localized development constraints and promote balanced regional development within Kalaburagi district.

Keywords: Intra-District Disparity, Composite Z-Score, Micro-Level Spatial Analysis, Socio-Economic Development, Kalaburagi District.

Introduction:

Regional disparities pose a major challenge to India's development trajectory, particularly in semi-arid and historically neglected regions. Karnataka is characterized by pronounced regional imbalances, with northeastern districts lagging behind the southern and coastal regions. The concept of regional

imbalance in Karnataka has historically been discussed with reference to historical administrative regions such as Old Mysore, Hyderabad Karnataka (now Kalyan Karnataka), and Bombay Karnataka (now Kittur Karnataka) **(Nayak & Ajjodi, 2021).** Kalaburagi district, located in the Kalyan Karnataka region, has long remained underdeveloped despite its historical significance, mineral resources, and agricultural potential. These disparities are not only the result of historical and structural inequalities but also reflect uneven policy interventions and economic transitions that have shaped regional development patterns over time **(Novkovska, 2017).**

Several theories explain why some regions develop faster than others. **Myrdal's** cumulative causation theory **(1957)** and **Friedmann's** core periphery model **(1966)** suggest that resources and development often concentrate in certain areas, leaving others behind. **Hirschman's** unbalanced growth theory **(1959)** explains how investments in selected sectors or regions can create inequalities. Similarly, the inverted-U hypotheses proposed by **Kuznets (1958)** and **Williamson (1965)** suggest that inequality may initially increase with development and later decrease. These theoretical perspectives help explain why regions like Kalyan Karnataka, including Kalaburagi district, show significant differences in socio-economic development.

Previous studies have largely examined regional disparities at the macro level **(Ohlan, 2012; Dey, 2015; Guan, 2023),** while inter-block micro-level inequalities within districts remain less examined. However, some recent studies have assessed disparities in socio-economic development at block level **(Samanta, 2015; Sam & Chakma, 2016; Karmakar et al., 2019; Dhibor, 2021; Halder et al., 2021; Nayak & Ajjodi, 2021; Murmu, 2023).** Micro-level analysis provides deeper insights into local variations in developmental facilities and access to services. This is particularly important for Kalaburagi, where socio-economic conditions vary widely across taluks. Accordingly, the present study seeks to analyse intra-regional disparities in socio-economic development at the taluk level using Composite Z-score techniques across five sectors such as education, health, finance, veterinary services, and communication. The study aims to assess spatial variations in development levels among taluks and to identify relatively developed and underdeveloped areas to inform micro-level planning.

Study Area: Kalaburagi District

Kalaburagi district is situated in northern Karnataka between 16°12′ and 17°46′ N latitudes and 76°04′ and 77°42′ E longitudes (Fig. 1). The district spans an area of 10,954 sq. km and comprises 11 taluks: Afzalpur, Alanda, Chincholi, Chittapur, Jevargi, Kalagi, Kalaburagi, Kamalapur, Sedam, Shahabad, and Yadrami. As per Census 2011, the population was 2,566,326 and its projected population for 2025 is 3235770, according to District at a Glance (Kalaburagi) 2023-24. The region has a semi-arid climate, recurrent droughts, and agriculture-based livelihoods. Internal variations in infrastructure development make it suitable for micro-level analysis.
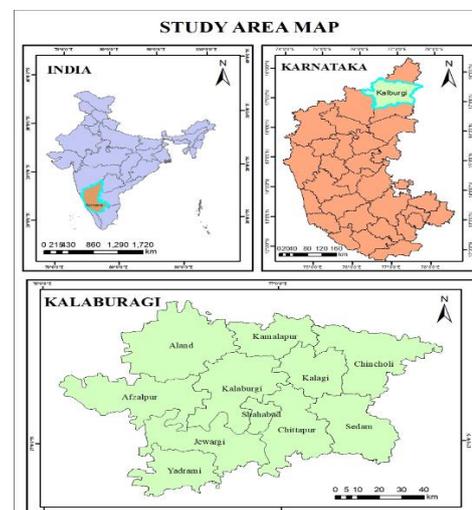

Fig. 1

Objectives of the Study:

1. **To examine intra-regional disparities** in socio-economic development across taluks of Kalaburagi district using selected indicators such as education, health, financial services, veterinary facilities, and communication infrastructure.

2. **To assess the overall level of socio-economic development** of taluks in Kalaburagi district by constructing a composite index based on Z-score methodology.

3. **To identify and classify relatively developed, moderately developed, and backward taluks** within Kalaburagi district on the basis of composite Z-score values.

Database and Methodology:

Database: This study is based on secondary data gathered from Kalaburagi District at Glance 2023-24: Directorate of Economics and Statistics Karnataka, K-GIS and KSRSAC.

Methodology: The study employs Z-score and Composite Z-score techniques to examine intra-regional disparities in socio-economic development. The Z-score shows how far a value is from the average. A positive Z-score means the value is above the average, a negative Z-score means it is below the average, and a Z-score of zero indicates that the value is equal to the average. To understand the level of disparities in socio-economic development across different taluks within the district, Z-scores were calculated for each selected indicator and then combined to form a Composite Z-Score. This composite score was mapped using ArcGIS 10.8 software to show the disparities in socio-economic development among the taluks of Kalaburagi district **(Das et al., 2025).** Further, the taluks are classified into areas of low development, areas of medium development, and areas of high development categories based on Composite Z-scores values.

Z-Score:

$$z_i = \frac{x_i - \bar{x}}{\sigma}$$

Where,

z_i = Z-score of the ith variable.

x_i = Individual observation,

$\bar{x}$ = Mean of the variable and

σ = Standard deviation.

Composite Z-Score:

$$C.S = \frac{\Sigma z_{ij}}{N}$$

Where,

C.S = Composite Z-Score,

Z_{ij} = Z-score of indicator j in the area i, and

N = Total number of indicators.

Selection of variables:

In all thirty-two indicators have been selected and categorized them into five groups. The selected indicators represent key dimensions of socio-economic development that directly influence human well-being and regional functionality at the taluk level. Education and health indicators capture human capital development, finance indicators reflect access to institutional credit and economic opportunities, veterinary indicators are crucial in an agrarian district like Kalaburagi where livestock supports rural livelihoods, and communication indicators reflect connectivity and service accessibility. All indicators were assigned equal weight in the Composite Z-score calculation to avoid subjective bias and because no universally accepted weighting scheme exists for micro-level regional development analysis. This approach is widely used in regional disparity studies to ensure transparency and comparability across spatial units.

1) **Education:** Lower Primary School (X1), Higher Primary School (X2), High school (X3), Pre-University Colleges (X4), General Degree Colleges (X5), Medical Colleges – AYUSH (X6), Allopathy (X7), Dental (X8), Polytechnic Colleges (X9), Engineering Colleges (X10).

2) **Health:** Sub Primary Care Centres (X11), Primary Healthcare Centres (X12), Community Healthcare Centres (X13), Taluk Hospital (X14), Allopathy Hospitals (X15), AYUSH Hospitals (X16), Medical Shops (X17), Blood Banks (X18), First Referral Units (X19), Ambulances (X20), 24*7 Working Hospitals (X21).

3) **Finance:** Public Sector Banks (X22), Private Sector Banks (X23), Regional Rural Banks (X24), DCC Banks (X25), KSCARD/PLD Banks (X26).

4) **Veterinary:** Veterinary Hospitals (X27), Primary Veterinary Centres (X28), Dispensaries (X29), Mobile Dispensaries (X30).

5) **Communication:** Post Offices (X31) Telephone Exchanges (X32).

Result Analysis and Discussion:

Intra-regional disparities widely exist across all development parameters. The overall development of a region depends on the development of all its indicators. Disparities among these indicators lead to the backwardness of an area; therefore, it is indispensable to evaluate each parameter separately and then combine the results of all indicators to obtain the overall developmental scenario of the area under study. In the present study, indicator-wise disparities have been examined first and then combined results of indicators to understand intra-regional development. Results obtained with the help of Z.Score technique and grouped the area into three categories like areas of low disparities (Higher development), areas of moderate disparities (Moderately development) and high disparities (low development).

A) Inter-Taluk Disparities in Levels of Educational Development:

The spatial distribution of educational development in Kalaburagi district has been examined using a composite Z-score derived from ten selected educational indicators (Table 1). The analysis reveals substantial inter-taluk disparities, indicating uneven access to educational facilities and infrastructure across the district. Based on the composite Z-score values, taluks have been classified into three levels of educational development: taluks of High development (Z-score > -0.04), taluks of Moderate development (-0.32 to -0.04), and taluks of Low development (Z-score < -0.32).

High Levels of Development: Kalaburagi taluk exhibits a high level of educational development with a composite Z-score of 3.03 (Table 1). The consistently high positive Z-values across all indicators reflect the concentration of higher educational institutions, better enrolment levels, and improved infrastructural facilities. The dominance of Kalaburagi taluk is spatially evident in Fig. 2, where it appears as a distinct high-development core.

Moderate Levels of Development: Taluks such as Afzalpur, Aland, Chincholi, Jewargi, and Sedam fall within the moderate development category, with composite Z-scores ranging between -0.04 and -0.32 (Table 1). These taluks show moderate educational attainment, supported by basic institutional presence but constrained by limited access to advanced educational infrastructure. Their spatial arrangement around the central taluk, except Chincholi Sedam, suggests a partial diffusion of educational benefits from the core region (Fig. 2).

Low Levels of Development: The taluks namely; Chittapur, Kalagi, Kamalapur, Shahabad, and Yadrami are characterized by low levels of educational development, as indicated by composite Z-scores below -0.32 (Table 1). The predominance of negative Z-values across indicators highlights persistent educational deprivation in these areas. As depicted in Fig. 2, these taluks are largely located near the central region and it suggests that administrative proximity alone is insufficient to ensure educational advancement.

Overall, the spatial pattern shows that educational development is mainly concentrated in Kalaburagi taluk, with very limited spread to the surrounding taluks. This clearly indicates the presence of educational inequalities within the district. Therefore, there is a need for micro-level and taluk-specific educational planning, especially in taluks located near the district headquarters, to achieve balanced and inclusive educational development

Table-1: Composite Z-Score of Educational Indicators and levels of developments of taluks

SL. No.	Name of the Taluks	Indicators of Education										Composite Z-Score	Level
		X1	X2	X3	X4	X5	X6	X7	X8	X9	X10		
1	Afzalpur	0.23	-0.11	-0.15	-0.14	-0.25	-0.37	-0.32	-0.32	-0.04	-0.32	-0.18	Moderate
2	Alanda	0.33	0.36	0.18	-0.11	0.03	0.21	-0.32	-0.32	-0.43	-0.32	-0.04	Moderate
3	Chincholi	1.04	-0.26	-0.35	-0.29	0.03	-0.37	-0.32	-0.32	-0.43	-0.32	-0.16	Moderate
4	Chittapur	-0.51	-0.09	-0.13	-0.19	-0.53	-0.37	-0.32	-0.32	-0.43	-0.32	-0.32	Low
5	Jewargi	-0.17	-0.29	-0.26	-0.16	-0.53	-0.37	-0.32	-0.32	-0.04	-0.32	-0.28	Moderate
6	Kalagi	-0.48	-0.64	-0.51	-0.47	-0.53	-0.37	-0.32	-0.32	-0.04	-0.32	-0.40	Low
7	Kalaburagi	2.25	3.01	3.09	3.13	3.06	3.12	3.16	3.16	3.12	3.16	3.03	High
8	Kamalapur	-0.59	-0.47	-0.48	-0.50	-0.25	-0.37	-0.32	-0.32	-0.43	-0.32	-0.40	Low
9	Sedam	0.39	-0.08	-0.27	-0.32	0.03	-0.37	-0.32	-0.32	-0.43	-0.32	-0.20	Moderate
10	Shahabad	-1.77	-0.75	-0.59	-0.40	-0.25	-0.37	-0.32	-0.32	-0.43	-0.32	-0.55	Low
11	Yadrami	-0.72	-0.68	-0.54	-0.55	-0.80	-0.37	-0.32	-0.32	-0.43	-0.32	-0.50	Low

Source: Computed by author from Kalaburagi District at Glance 2023-24: Directorate of Economics and Statistics Karnataka.
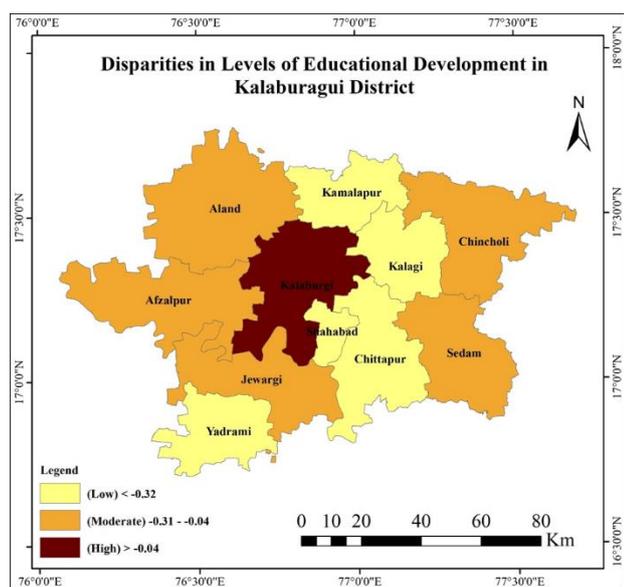

Fig. 2

B) Inter-Taluk Disparities in Levels of Health Development:

The analysis of health development in Kalaburagi district, based on Composite Z-Scores derived from eleven health indicators (X11–X21), reveals significant variations among the taluks (Table. 2). The Composite Z-Scores were classified into three categories: high (> 0.57), moderate (-0.75 to 0.57), and low (< -0.76) to understand the spatial pattern of health development. This classification has been represented spatially in Fig. 3, which clearly highlights the intra-district disparities.

High Levels of Development: Taluks showing a high level of health development include Kalaburagi and Aland. Kalaburagi taluk records

the highest Composite Z-Score (1.16), indicating better availability of health infrastructure and services (Table. 2). This can be attributed to its status as the district headquarters, where major hospitals, health institutions, and medical personnel are concentrated. Aland taluk also exhibits a high level of health development with a Composite Z-Score of 0.82, reflecting relatively better performance across most health indicators.

Moderate Levels of Development: In this category five taluks Afzalpur, Chincholi, Chittapur, Jewargi, and Sedam taluks included with Composite Z-Scores ranging from -0.75 to 0.57 (Table 2). These taluks show average performance, with reasonable access to basic health facilities but limited advanced health services. As shown in Fig. 3, these taluks are spatially scattered between high and low development areas, indicating uneven and fragmented distribution of health infrastructure.

Low Levels of Development: Taluks classified under the low level of health development include Kalagi, Kamalapur, Shahabad, and Yadrami, all recording Composite Z-Scores below -0.76 (Table. 2). Shahabad taluk registers the lowest score (-1.06), reflecting poor health infrastructure and limited access to medical services. As shown in Fig. 3, these low-developed taluks are spatially dispersed across both interior and peripheral parts of the district, indicating that low health development is not confined to the district margins but is influenced by local socio-economic and infrastructural factors.

Overall, the analysis of health indicators reveals significant disparities in health development across Kalaburagi district. Taluks with greater urban influence and administrative importance show relatively higher levels of health development, while several rural taluks continue to record lower development levels. These variations highlight the need for micro-level health planning, focused improvement of health infrastructure, and balanced distribution of health resources.

Table-2: Composite Z-Score of Health Indicators and levels of development of taluks

| SL. No	Name of Taluks	Health Indicators											Composite Z-Score	Level
		X11	X12	X13	X14	X15	X16	X17	X18	X19	X20	X21		
1	Afzalpur	0.48	-0.05	0.55	0.91	0.36	1.65	-0.22	-0.32	0.76	1.42	0.68	0.57	Moderate
2	Alanda	1.23	1.28	1.56	0.91	1.21	0.25	-0.24	-0.32	0.76	0.60	1.82	0.82	High
3	Chincholi	0.60	-0.24	0.55	0.91	0.42	0.25	-0.32	-0.32	0.76	1.42	0.10	0.38	Moderate
4	Chittapur	1.14	0.14	1.56	0.91	0.95	0.25	-0.29	-0.32	0.76	-0.22	0.39	0.48	Moderate
5	Jewargi	0.56	-0.24	-0.46	0.91	0.36	-1.14	-0.22	-0.32	0.76	-0.22	0.10	0.01	Moderate
6	Kalagi	-1.27	-0.24	-0.46	-1.10	-1.12	-1.14	-0.41	-0.32	-1.32	-1.05	0.10	-0.76	Low
7	Kalaburagi	0.89	2.42	-1.47	-1.10	1.47	1.65	3.15	3.16	0.76	1.42	0.39	1.16	High
8	Kamalapur	-1.27	-0.62	-1.47	-1.10	-1.22	0.25	-0.40	-0.32	-1.32	-1.05	-1.04	-0.87	Low
9	Sedam	0.19	-0.05	0.55	0.91	0.13	0.25	-0.29	-0.32	0.76	-0.22	0.68	0.24	Moderate
10	Shahabad	-1.27	-1.38	-0.46	-1.10	-1.31	-1.14	-0.38	-0.32	-1.32	-1.05	-1.90	-1.06	Low
11	Yadrami	-1.27	-1.00	-0.46	-1.10	-1.25	-1.14	-0.38	-0.32	-1.32	-1.05	-1.33	-0.96	Low
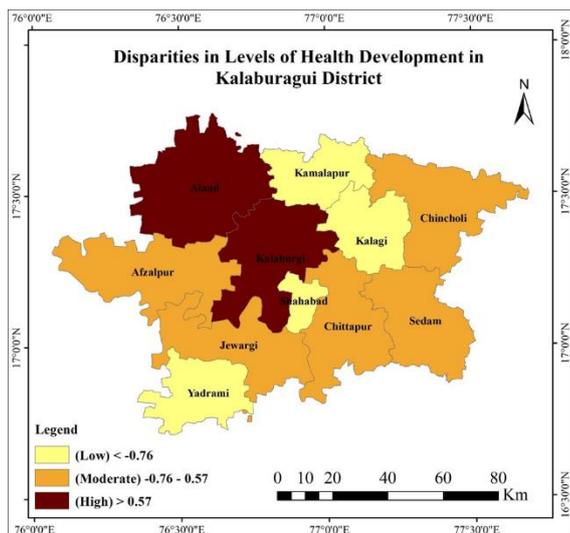
Fig. 3

C) Inter-Taluk Disparities in Levels of Financial Development:

Financial development plays a critical role in determining access to credit, savings, and institutional support for both agricultural and non-agricultural activities. The Composite Z-score analysis of financial indicators reveals a highly centralized financial structure in Kalaburagi district, with banking and credit institutions overwhelmingly concentrated in the district headquarters (Table 3). This pattern reflects structural urban bias rather than balanced financial diffusion across taluks. To understand these variations, the Composite Z-Scores were classified into three categories: high (> 0.43), moderate (-0.73 to 0.43), and low (< -0.74). The spatial pattern of finance development is presented in Fig. 4, which highlights the extent of intra-district disparities.

High Levels of Development: Taluks with a high level of finance development are limited to Kalaburagi taluk. It records the highest Composite Z-Score of 2.05, clearly standing apart from the other taluks (Table 3& Fig. 4). This high level of finance development is due to the concentration of banks, financial institutions, and better access to banking services, supported by its

urban nature and administrative importance. As shown in Fig. 4, Kalaburagi emerges as the main centre of financial development in the district.

Moderate Levels of Development: A moderate level of finance development is observed in Afzalpur, Aland, Chincholi, Chittapur, Jewargi, and Sedam, with Composite Z-Scores ranging from -0.73 to 0.43 (Table 3). These taluks show average financial development, with basic banking and credit facilities available. As shown in Fig. 4, these moderately developed taluks are distributed across different parts of the district, indicating uneven availability of financial facilities.

Low Levels of Development: This category includes Kalagi, Kamalapur, Shahabad, and Yadrami, all recording Composite Z-Scores below -0.74 (Table 3). Among them, Shahabad has the lowest Composite Z-Score (-1.06), indicating very weak financial development. These taluks have limited banking facilities, poor access to credit, and low levels of financial inclusion. As shown in Fig. 4, these taluks are found in both interior and peripheral parts of the district, indicating that low financial development is not limited to a particular area.

Overall, the analysis of finance indicators reveals pronounced disparities in financial development across Kalaburagi district. While Kalaburagi taluk exhibits a very high level of financial development, most other taluks remain in the moderate or low categories. These findings emphasize the need for micro-level financial planning, expansion of banking and credit facilities in underserved areas, and promotion of financial inclusion to reduce intra-district inequalities.

Table-3: Composite Z-Score of Finance Indicators and levels of development of taluks

SL. No.	Name of Taluks	Indicators of Finance						Level
		X22	X23	X24	X25	X26	Composite Z-Score	
1	Afzalpur	0.06	-0.33	0.02	0.76	0.76	0.25	Moderate
2	Alanda	0.00	-0.33	0.94	0.76	0.76	0.43	Moderate
3	Chincholi	-0.40	-0.04	-0.67	0.76	0.76	0.08	Moderate
4	Chittapur	-0.10	-0.14	-0.21	0.76	0.76	0.21	Moderate
5	Jewargi	-0.25	-0.24	-0.67	0.76	0.76	0.07	Moderate
6	Kalagi	-0.61	-0.52	0.02	-1.32	-1.32	-0.75	Low
7	Kalaburagi	3.07	3.12	2.56	0.76	0.76	2.05	High
8	Kamalapur	-0.51	-0.33	-0.21	-1.32	-1.32	-0.74	Low
9	Sedam	-0.10	-0.14	0.02	0.76	0.76	0.26	Moderate
10	Shahabad	-0.56	-0.52	-1.59	-1.32	-1.32	-1.06	Low
11	Yadrami	-0.61	-0.52	-0.21	-1.32	-1.32	-0.80	Low

Source: Computed by author from Kalaburagi District at Glance 2023-24: Directorate of Economics and Statistics Karnataka.
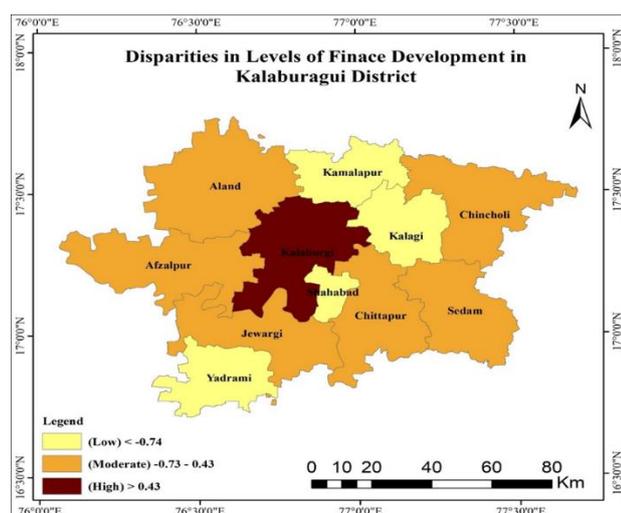

Fig. 4

D) Inter-Taluk Disparities in Levels of Veterinary Development:

The analysis of veterinary development in Kalaburagi district is based on Composite Z-Scores calculated from four veterinary indicators (X27–X30) and is presented in **Table No. 4.** The Composite Z-Scores were classified into three categories**: high (> 0.49), moderate (-0.61 to 0.49), and low (< -0.62)** to understand the level of veterinary development across taluks. The spatial distribution of these categories is shown in **Fig. 5**, highlighting clear intra-district variations.

High Level of Development: The **high level of veterinary development** is observed only in **Aland** taluk, which records the highest Composite Z-Score of **1.25 (Table. 4)**. This indicates better availability of veterinary hospitals and dispensaries. As seen in **Fig. 5**, Aland stands out distinctly from other taluks, suggesting stronger veterinary infrastructure supporting livestock activities.

Moderate Level of Development: A moderate level of veterinary development is noted in Afzalpur, Chincholi, Chittapur, Jewargi, Kalaburagi, and Sedam, with Composite Z-Scores ranging from **-0.61 to 0.49** (Table. 4 & Fig. 5). These taluks show average veterinary development. Fig. 5 shows that moderately developed taluks are spread across different parts of the district, reflecting uneven availability of veterinary services.

Low Level of Development: This category includes Kalagi, Kamalapur, Shahabad, and Yadrami, all recording Composite Z-Scores below -0.62 (Table. 4). Among them, Shahabad records the lowest score (-1.20), indicating severe shortages in veterinary facilities and services. As

shown in Fig. 5, these low-developed taluks are located in both interior and peripheral areas, suggesting that poor veterinary development is not restricted to a specific region.

Overall, the veterinary development pattern in Kalaburagi district shows noticeable disparities among taluks. While Aland taluk exhibits a high level of development, most taluks fall under moderate or low categories. This highlights the need for targeted improvement of veterinary infrastructure and services, particularly in low-developed taluks, to support livestock-based livelihoods and balanced regional development.

Table-4: Composite Z-Score of Veterinary Indicators and levels of development of taluks

SL. No	Name of Taluks	Indicators of Veterinary					Level
		X27	X28	X29	X30	Composite Z-Score	
1	Afzalpur	0.09	-0.04	0.65	0.76	0.36	Moderate
2	Alanda	0.71	2.26	1.28	0.76	1.25	High
3	Chincholi	0.09	0.19	0.34	0.76	0.34	Moderate
4	Chittapur	0.09	-0.04	0.96	0.76	0.44	Moderate
5	Jewargi	0.09	-0.96	1.28	0.76	0.29	Moderate
6	Kalagi	-0.23	-0.96	0.03	-1.32	-0.62	Low
7	Kalaburagi	-0.23	1.11	0.34	0.76	0.49	Moderate
8	Kamalapur	-0.23	0.19	-1.22	-1.32	-0.65	Low
9	Sedam	0.40	0.42	-1.22	0.76	0.09	Moderate
10	Shahabad	-0.54	-1.42	-1.53	-1.32	-1.20	Low
11	Yadrami	-0.23	-0.73	-0.91	-1.32	-0.80	Low

Source: Computed by author from Kalaburagi District at Glance 2023-24: Directorate of Economics and Statistics Karnataka.
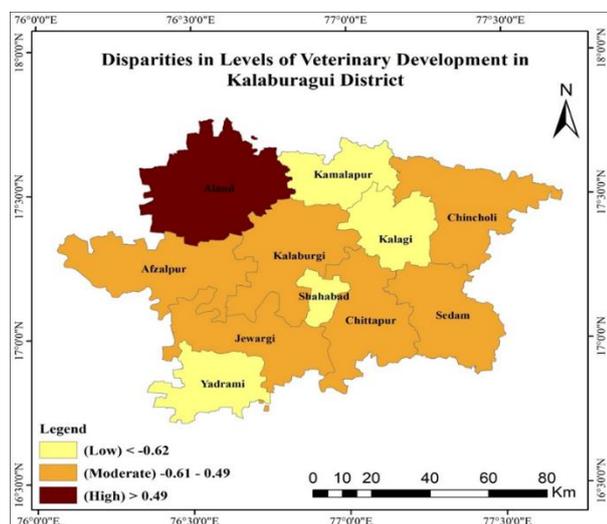

Fig. 5

E) Inter-Taluk Disparities in Levels of Communication Development:

Based on Composite Z-Scores, the levels of communication development in Kalaburagi district are classified into three divisions: high (> 0.67), moderate (-0.60 to 0.67), and low (< -0.61).

This classification is derived from two indicators: Post Offices (X31) and Telephone Exchanges (X32). The taluk-wise Composite Z-Scores and corresponding development levels are presented in Table No. 5, while their spatial pattern is depicted in

High Levels of Development: A high level of communication development is observed only in Kalaburagi taluk, which records a Composite Z-Score of 2.09 (Table No. 5). This indicates a strong concentration of communication facilities due to its role as the district headquarters. As shown in Fig. 6, Kalaburagi clearly emerges as the most developed taluk in terms of communication infrastructure.

Moderate Levels of Development: A moderate level of communication development is found in Afzalpur, Aland, Chincholi, Chittapur, Jewargi, and Shahabad, with Composite Z-Scores ranging

from 0.06 to 0.67 (Table 5) these taluks possess basic communication facilities, though the intensity and accessibility vary across space. are distributed across different parts of the district.

Low Levels of Development: it is recorded in Kalagi, Kamalapur, Sedam, and Yadrami, all having Composite Z-Scores below -0.61 (Table No. 5). These taluks suffer from inadequate communication infrastructure. As shown in Fig. 6, low-developed taluks are scattered across different parts of the district.

Table-5: Composite Z-Score of Communication Indicators and levels of development

SL. No.	Name of Taluks	Indicators of Communication			
		X31	X32	Composite Z-Score	Level
1	Afzalpur	0.97	0.25	0.61	Moderate
2	Alanda	1.10	0.25	0.67	Moderate
3	Chincholi	1.31	-0.66	0.33	Moderate
4	Chittapur	-0.58	0.97	0.19	Moderate
5	Jewargi	0.05	0.07	0.06	Moderate
6	Kalagi	-0.79	-1.02	-0.91	Low
7	Kalaburagi	1.60	2.59	2.09	High
8	Kamalapur	-0.79	-0.66	-0.72	Low
9	Sedam	-1.38	-0.29	-0.84	Low
10	Shahabad	-0.75	-0.48	-0.61	Moderate
11	Yadrami	-0.71	-1.02	-0.86	Low

Source: Computed by author from Kalaburagi District at Glance 2023-24: Directorate of Economics and Statistics Karnataka.
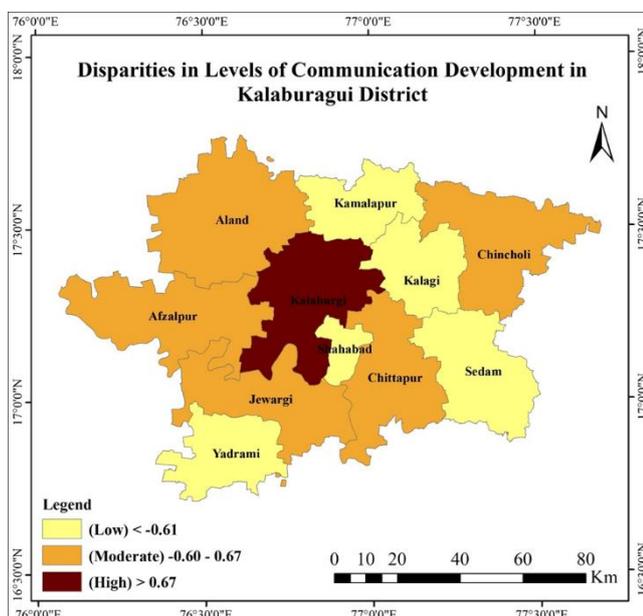

Fig. 6

F) Disparities in Levels of Overall Development in Kalaburagi District:

The overall level of development in Kalaburagi district shows clear disparities among the taluks, based on the combined Composite Z-Scores of education, health, finance, veterinary, and communication indicators (Table. 6). the taluks have been classified into high (>0.63), moderate (-0.66 to 0.63), and low (< -0.67) levels of development, as presented in Table. 7 and Fig. 7.

High Level of Development: Kalaburagi taluk stands out as the only highly developed taluk, with a very high overall Composite Z-Score of 1.76, ranking first in the district. Its strong performance is mainly due to high values in education, health, finance, and communication, reflecting its urban character and administrative importance.

Moderate Level of Development: A moderate level of overall development is observed in Aland, Afzalpur, Chittapur, Chincholi, Jewargi, and Sedam, with Composite Z-Scores ranging from -0.09 to 0.63 (Table No. 6). These taluks

show average performance across most sectors, with some strengths in individual indicators but no consistent dominance across all categories. As shown in Fig. 7, moderately developed taluks occupy a large part of the district.

Low Level of Development: The low level of overall development is recorded in Kalagi, Kamalapur, Shahabad, and Yadrami, all having Composite Z-Scores below -0.67 (Table No. 6). Shahabad ranks last with the lowest score (-0.90), indicating serious deficiencies across multiple sectors. Fig. 7 indicates that low-developed taluks do not form a continuous cluster but occur as isolated pockets within the district.

The overall development pattern indicates a highly polarized intra-district structure, with Kalaburagi taluk functioning as a dominant core and the remaining taluks occupying varying peripheral positions. The absence of a continuous spatial cluster of low-developed taluks suggests that backwardness in Kalaburagi district is not solely determined by geographical location but by uneven distribution of institutions, infrastructure, and administrative attention. The persistence of low development in taluks such as Shahabad and Yadrami reflects cumulative disadvantages, a process widely discussed in regional development literature, wherein areas with initial deficits tend to lag in the absence of targeted policy intervention.

Table-6: Composite Z-Score of Overall Indicators overall development.

SL. No.	Name of Taluks	Composite Z-Score					Overall Composite Z-Score	Rank
		Education	Health	Finance	Veterinary	Communication		
1	Afzalpur	-0.18	0.57	0.25	0.36	0.61	0.32	3
2	Alanda	-0.04	0.82	0.43	1.25	0.67	0.63	2
3	Chincholi	-0.16	0.38	0.08	0.34	0.33	0.19	5
4	Chittapur	-0.32	0.48	0.21	0.44	0.19	0.20	4
5	Jewargi	-0.28	0.01	0.07	0.29	0.06	0.03	6
6	Kalagi	-0.40	-0.76	-0.75	-0.62	-0.91	-0.69	9
7	Kalaburagi	3.03	1.16	2.05	0.49	2.09	1.76	1
8	Kamalapur	-0.40	-0.87	-0.74	-0.65	-0.72	-0.68	8
9	Sedam	-0.20	0.24	0.26	0.09	-0.84	-0.09	7
10	Shahabad	-0.55	-1.06	-1.06	-1.20	-0.61	-0.90	11
11	Yadrami	-0.50	-0.96	-0.80	-0.80	-0.86	-0.78	10

Source: Computed by author from Kalaburagi District at Glance 2023-24: Directorate of Economics and Statistics Karnataka.
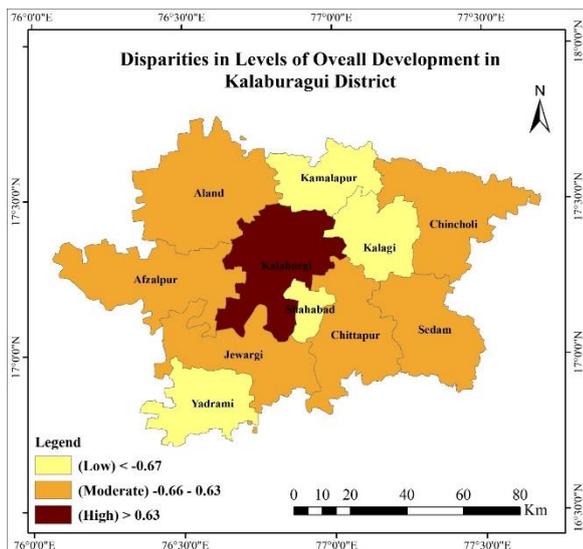
Fig. 7

Table-7: Levels of Socio-Economic Development in Kalaburagi District:

Level	Range	Name of Taluk
High	> 0.63	Kalaburagi
Moderate	-0.66 - 0.63	Afzalpur, Alanda, Chincholi, Chittapur, Jewargi, and Sedam
Low	< -0.67	Kamalapur, Kalagi, Shahabad and Yadrami

Source: Computed by author

Conclusion:

The present study has examined intra-district disparities in socio-economic development in Kalaburagi district at the taluk level using a Composite Z-score index derived from thirty-two indicators across education, health, finance, veterinary services, and communication. The taluk-level approach adopted in this study enabled the identification of spatial variations in development that remain obscured in conventional district-level assessments.

The analysis reveals a highly uneven and polarized development structure within the district. Kalaburagi taluk demonstrates consistently higher levels of development across all sectors, reflecting the concentration of administrative functions, institutional infrastructure, and service facilities. In contrast, several taluks, particularly, Kalagi, Kamalapur, Shahabad, and Yadrami exhibit low development levels across multiple sectors, indicating structural and multi-dimensional deprivation rather than sector-specific shortfalls.

The spatial pattern of development is characterized by fragmentation rather than continuity, with low- and medium-developed taluks distributed irregularly across the district. This suggests that intra-district disparities are influenced more by unequal institutional distribution, infrastructure availability, and historical investment priorities than by geographical location alone. The limited diffusion of development benefits from the district headquarters to nearby taluks further highlights the absence of effective spillover mechanisms within the district.

Overall, the findings demonstrate the limitations of uniform district-level planning approaches in addressing localized development disparities. The study underscores the need for decentralized, taluk-specific, and multi-sectoral planning interventions that focus on strengthening institutional access and basic infrastructure in lagging taluks. Such an approach is essential for reducing persistent intra-district inequalities and for promoting more balanced and inclusive regional development in the Kalyan Karnataka region.

Recommendations:

The observed intra-district disparities in socio-economic development in Kalaburagi district call for a shift from uniform district-level planning toward more spatially differentiated and evidence-based interventions. Based on the composite development patterns identified at the

taluk level, the following recommendations are proposed:

1. **Adoption of Taluk-Level Micro-Planning:** District-level averages obscure significant local disparities. Development planning and resource allocation should therefore be guided by taluk-specific development profiles derived from composite indices, with priority attention to persistently low-performing taluks such as Kalagi, Kamalapur, Shahabad, and Yadrami.

2. **Decentralization of Institutional and Service Infrastructure:** The excessive concentration of higher-order educational, health, and financial institutions in Kalaburagi taluk reinforces spatial polarization. Establishing decentralized or satellite service centres in moderately developed taluks can improve accessibility and reduce pressure on the district headquarters.

3. **Strengthening Basic Health and Veterinary Services in Lagging Taluks:** Low composite scores in health and veterinary sectors indicate weak service delivery in rural taluks. Upgrading primary-level facilities, improving outreach through mobile service units, and ensuring adequate staffing should be prioritized to support rural livelihoods and improve overall well-being.

4. **Enhancing Financial Inclusion through Spatial Expansion of Formal Institutions:** Taluks with low financial development require improved access to formal banking and cooperative credit systems. Expanding institutional coverage and strengthening digital financial infrastructure can reduce regional financial exclusion and support local economic activities.

5. **Integrated Multi-Sectoral Planning Approach:** Sectoral interventions should be planned in an integrated manner, recognizing interlinkages between communication infrastructure, access to education and health services, and financial inclusion. Coordinated planning across departments can enhance development outcomes and avoid fragmented investments.

6. **Use of Composite Indices for Monitoring and Evaluation:** The Composite Z-score framework employed in this study can be institutionalized as a monitoring tool for periodically assessing taluk-level development. Regular updates can help evaluate policy effectiveness and support adaptive planning in response to changing socio-economic conditions.

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