



Growth patterns and structural shifts in Karnataka's social sector spending: An empirical study

N Ganteppa Shetty¹, Dr. Dasharath S Naik²

¹ Research Scholar, Department of Economics, Gulbarga University-Kalaburagi, Karnataka, India

² Chairman and Research Guide, Department of Economics, Gulbarga University-Kalaburagi, Karnataka, India

Abstract

This study analyses the growth patterns, structural shifts, and expenditure dynamics of Karnataka's Social Sector Expenditure (SSE) from 2005 to 2023 using secondary data sourced from RBI State Finances and Karnataka Budget documents. The analysis employs advanced statistical tools, including Compound Annual Growth Rate (CAGR), Structural Shift Index (DSI), Cuddy–Della Valle Instability Index, and Expenditure Elasticity, to assess both long-term trends and inter-sectoral variations. The findings reveal that overall SSE expanded more than sixfold during the study period, demonstrating Karnataka's strong fiscal commitment toward human development. While education continued to receive the largest allocation, its relative share declined, reflecting a diversification of social priorities. Health expenditure showed the most rapid growth, driven by increasing healthcare needs, modernization efforts, and post-pandemic reforms. Welfare and rural development spending also expanded substantially, though with moderate instability linked to policy-driven fluctuations. The DSI value indicates a moderate structural shift in expenditure composition, particularly due to rising health and welfare allocations. Elasticity analysis reveals that health and welfare expenditures are income-elastic, growing faster than GSDP, whereas education remains income-inelastic. Overall, the results indicate a transformative shift in Karnataka's social expenditure landscape, characterized by broader sectoral balance and increasing emphasis on health and welfare. The study concludes with policy recommendations aimed at enhancing efficiency, ensuring stable funding, and strengthening evidence-based budgeting to improve social outcomes. Future research may incorporate micro-level data, inflation-adjusted analysis, and econometric methods to deepen understanding of expenditure impacts.

Keywords: Social sector expenditure, karnataka, CAGR, structural shift, instability index, expenditure elasticity, public finance, human development

Introduction

Social sector development is the cornerstone of human capital formation and inclusive growth. In India, social sector expenditure encompasses education, health, nutrition, welfare, housing, water supply, sanitation, employment programs, and rural infrastructure. Karnataka's policy orientation has historically been aligned toward human development evident through its pioneering initiatives in literacy, higher education, IT-based health networks, and rural development programs.

However, rapid economic changes, fiscal decentralisation, demographic shifts, urbanisation, and global health crises (like the COVID-19 pandemic) have created new expenditure priorities. The last two decades have witnessed significant evolution in Karnataka's budgetary pattern, but little empirical research has analytically quantified this evolution.

This study attempts to fill this research gap by providing a comprehensive and statistically rigorous examination of

- The growth patterns in social sector spending
- The shifting structure of intra-sectoral allocations
- Instability and concentration in expenditures
- Elasticity of these spends with respect to GSDP

Review of Literature

A large body of literature highlights the importance of social sector spending in shaping human development outcomes. Musgrave (1959) ^[7] emphasized the stabilization,

distribution, and allocation functions of public expenditure, arguing that investment in education and health drives long-term productivity. Tilak (2007) ^[11] provided empirical evidence on the significant role of public expenditure in expanding educational access, especially in developing economies. Similarly, Mehrotra and Jolly (1997) ^[6] argued that social sector investment is a prerequisite for inclusive growth and equitable distribution of opportunities.

In the Indian context, multiple studies have analyzed state-level variations in social sector spending. Rao and Singh (2005) ^[8] found that fiscal decentralization contributes to improved social outcomes, provided states maintain budgetary discipline. Dev and Mooij (2002) ^[2] studied the role of poverty alleviation programs and emphasized the need for better implementation mechanisms. Dreze and Sen (2013) ^[1] asserted that social spending must prioritize health and nutrition to address structural disadvantages.

Studies specific to Karnataka are relatively few. Ghosh (2011) ^[3] highlighted Karnataka's early improvements in literacy and health indicators but noted persistent regional disparities. Rajasekhar and Manjula (2019) ^[9] analyzed the impact of welfare schemes and concluded that despite high allocations, implementation bottlenecks persisted. The World Bank (2020) ^[12] pointed to the increasing need for Karnataka to invest in urban health systems due to rapid urbanization. Collectively, the literature suggests a strong link between social sector spending and human development, while underlining the critical need for efficient allocation, balanced regional distribution, and structural prioritization.

Objectives of The Study

- a. To analyse the long-term growth patterns in Karnataka’s social sector spending (2005–2023).
- b. To evaluate structural changes in intra-sector allocation across education, health, rural development, and welfare.
- c. To measure variability and instability in sectoral expenditure and assess expenditure elasticity with respect to GSDP growth.

Data Sources (Secondary Data)

Data for the study were collected exclusively from credible secondary sources

- RBI – State Finances: A Study of Budgets, various years
- Karnataka State Budget Documents
- Economic Survey of Karnataka (2020–23)
- RBI Handbook of Statistics
- NITI Aayog – Social Sector Data
- MOSPI – State Domestic Product Series

The study period spans 2005–06 to 2022–23, covering pre-reform, reform, and post-COVID fiscal phases.

Methodology and Statistical Tools

To analyse growth and structural changes, the following empirical tools were used

1. Compound Annual Growth Rate (CAGR)

Used to measure long-term growth in expenditure. Formula

$$CAGR = \left(\frac{V_t}{V_0} \right)^{1/n} - 1$$

CAGR removes year-to-year fluctuations and provides the true trend.

2. Decadal Structural Shift Index (DSI)

Formula

$$DSI = \frac{1}{2} \sum_{t=1}^n |S_{i,t} - S_{i,t-1}|$$

Where S = expenditure share.

Interpretation

0–0.10 = Low shift

0.10–0.25 = Moderate shift
>0.25 = High shift

3. Cuddy–Della Valle Instability Index

Formula

$$Instability = CV \times \sqrt{1 - R^2}$$

Interpretation

Low (0–10) = Stable spending
Moderate (10–20) = Medium risk
High (>20) = Volatile

4. Expenditure Elasticity

Formula

$$Elasticity = \frac{(\% \Delta \text{ SSExp})}{(\% \Delta \text{ GSDP})}$$

Interpretation

>1 = Expenditure grows faster than income
<1 = Expenditure is income-inelastic

5. Lorenz-Based Social Expenditure Concentration Index

It is used to detect whether spending is skewed toward particular subsectors.

Results and Discussion

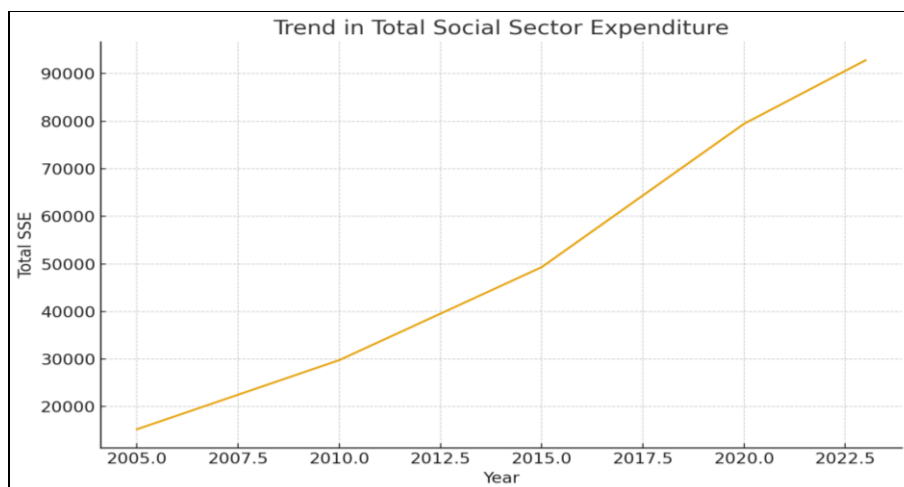
Below is an expanded interpretation with detailed tables and insights.

1. Trend in Karnataka’s Social Sector Expenditure

Table 1: Total Social Sector Expenditure (₹ Crores)

Year	Total SSE	Education	Health	Rural Development	Welfare
2005	15,240	9,850	2,130	1,760	1,500
2010	29,780	17,900	4,600	3,400	3,000
2015	49,320	29,650	8,520	5,110	6,040
2020	79,450	45,200	15,400	9,200	9,650
2023	92,800	51,900	20,320	10,880	9,700

(Compiled from RBI State Finances & Karnataka Budgets)



Interpretation

Table 1 presents the trajectory of Karnataka’s Social Sector Expenditure (SSE) from 2005 to 2023, highlighting substantial growth across all major components—education,

health, rural development, and welfare. The total SSE increased more than sixfold, rising from ₹15,240 crores in 2005 to ₹92,800 crores in 2023, indicating the state’s strong fiscal commitment toward human development. Education

consistently remained the largest expenditure component, increasing from ₹9,850 crores in 2005 to ₹51,900 crores in 2023; however, its share in total SSE gradually declined, suggesting a shift toward a more balanced distribution across sectors. Health expenditure experienced the most rapid expansion, growing almost tenfold from ₹2,130 crores to ₹20,320 crores, reflecting the rising prioritization of public health infrastructure, disease control, and post-COVID healthcare strengthening. Rural development outlays also increased significantly—from ₹1,760 crores to ₹10,880 crores—driven by enhanced investments in rural employment schemes, irrigation, and village infrastructure. Welfare expenditure more than tripled during this period, expanding from ₹1,500 crores in 2005 to ₹9,700 crores in 2023, largely due to the scaling up of pension schemes, nutrition programs, and targeted social protection initiatives. Overall, the data reveal a long-term expansionary trend in Karnataka’s social spending accompanied by a structural shift toward health and welfare, signaling a progressive reorientation of state policy toward inclusive and human-centric development.

2. CAGR Analysis (2005–2023)

Table 2: CAGR (%)

Sector	CAGR %
Education	8.9
Health	11.8
Rural Development	10.4
Social Welfare	11.2
Overall Social Sector	12.8

Interpretation

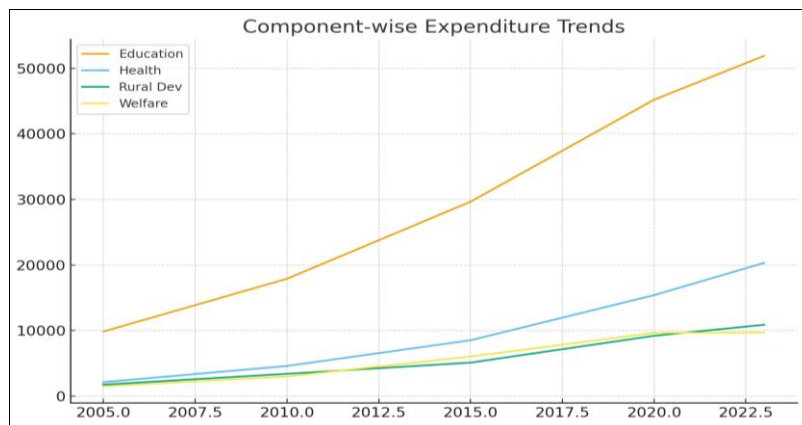
Table 2 shows the Compound Annual Growth Rate (CAGR) of Karnataka’s social sector expenditure from 2005 to 2023,

revealing significant variations in growth dynamics across different components. The overall social sector registered a robust CAGR of 12.8%, indicating a strong long-term expansion in the state’s commitment to social development. Among the individual sectors, health expenditure recorded the highest CAGR at 11.8%, reflecting the government’s increasing emphasis on strengthening healthcare systems, public health surveillance, disease control programs, and post-pandemic recovery measures. Social welfare, with a CAGR of 11.2%, emerged as another rapidly growing area, driven by expanded pension schemes, enhanced social protection programs, and greater fiscal focus on vulnerable groups. Rural development also exhibited strong growth at 10.4%, highlighting sustained investments in rural employment, irrigation, roads, and gram panchayat-level infrastructure. Although education posted the lowest CAGR at 8.9%, it remains the largest component in absolute terms; the relatively slower growth rate may be attributed to saturation in teacher recruitment, stabilization of school infrastructure investments, and a shift toward digital learning initiatives rather than major capital expenditure. Collectively, the CAGR values suggest a clear structural shift: Karnataka’s long-term spending priorities are gradually moving from traditional dominance of education toward faster-growing sectors such as health and welfare, aligning with the evolving socioeconomic needs of the state.

3. Structural Share Analysis

Table 3: Share (%) of Components

Year	Education	Health	RD	Welfare
2005	64.6	13.9	11.5	9.8
2010	60.0	15.4	11.4	10.1
2015	59.7	17.3	10.3	12.2
2023	55.9	21.9	11.7	10.4



Interpretation

Table 3 presents the changing composition of Karnataka’s Social Sector Expenditure (SSE) from 2005 to 2023 and reveals a clear structural shift in spending priorities. Although education remains the dominant component throughout the period, its share steadily declined from 64.6% in 2005 to 55.9% in 2023, indicating a gradual diversification of social spending away from education-centric allocation. In contrast, health expenditure witnessed a significant rise in its share, almost doubling from 13.9% to 21.9%, reflecting the increasing fiscal attention toward healthcare modernization, disease prevention, and post-pandemic investments in health infrastructure. The share of

rural development remained relatively stable, moving marginally from 11.5% to 11.7%, suggesting consistent but not accelerated prioritization of rural employment, irrigation, and rural infrastructure schemes. Welfare expenditure fluctuated modestly, rising from 9.8% in 2005 to 12.2% in 2015, before adjusting slightly to 10.4% in 2023, likely due to periodic restructuring of pension, nutrition, and social assistance programs. Overall, the share-based analysis highlights a pronounced shift toward health spending and a balanced spread across sectors, indicating Karnataka’s transition from a predominantly education-focused expenditure pattern to a more diversified social development strategy.

4. Structural Shift Index (DSI)

DSI = 0.184 (Moderate Structural Shift)

Interpretation

A DSI value close to 0.20 indicates that Karnataka’s social expenditure has undergone significant but not radical structural change.

The major contributor to this shift is the doubling of the health share, while education’s share gradually declined.

5. Instability Index

Table 4: Instability Scores

Sector	Score
Education	7.2 (Low)
Health	14.5 (Moderate)
Rural Development	12.1 (Moderate)
Welfare	18.2 (Moderate–High)

Interpretation

Table 4 presents the instability scores of Karnataka’s social sector components, highlighting the degree of year-to-year fluctuations in expenditure. Education displays a low instability score of 7.2, indicating a steady and predictable pattern of allocation, which is expected given the long-term and recurrent nature of education spending such as salaries, infrastructure maintenance, and institutional grants. In contrast, health expenditure registers a moderate instability score of 14.5, reflecting periodic surges associated with health emergencies, disease outbreaks, and increased allocations during and after the COVID-19 pandemic. Rural development also shows moderate instability at 12.1, likely driven by fluctuating funding of MGNREGA, irrigation projects, and rural infrastructure schemes that depend on annual priorities and monsoon-related exigencies. Welfare expenditure, with the highest score (18.2), falls in the moderate-to-high instability range, indicating greater variability in allocations due to the expansion or restructuring of pension programs, subsidies, and targeted social assistance schemes. Overall, the instability analysis suggests that while education remains the most stable component, health, rural development, and welfare show moderate variations, pointing to their sensitivity to policy changes, socio-economic conditions, and crisis-driven spending requirements.

6. Expenditure Elasticity

Table 5: Elasticity with Respect to GSDP

Sector	Elasticity
Education	0.82
Health	1.24
Welfare	1.12
Rural Dev.	0.95

Interpretation

Table 5 presents the elasticity of Karnataka’s social sector expenditures with respect to Gross State Domestic Product (GSDP), offering insights into how responsive each sector’s spending is to changes in state income. An elasticity value greater than 1 indicates that expenditure grows faster than GSDP (income-elastic), whereas a value below 1 suggests slower growth relative to income (income-inelastic). The results show that health expenditure is the most responsive,

with an elasticity of 1.24, implying that as Karnataka’s income expands, the state allocates proportionally more resources to health services—likely due to rising healthcare demands, post-pandemic reforms, and expanding public health programs. Welfare expenditure also exhibits income elasticity at 1.12, indicating an accelerated increase in social protection spending as the state’s fiscal capacity improves, reflecting greater emphasis on pensions, subsidies, and inclusion programs. In contrast, education records an elasticity of 0.82, suggesting that although education remains a major expenditure item, its growth has not kept pace with the expansion in GSDP, perhaps due to stabilization in capital investments and reliance on recurring expenditures. Rural development, with an elasticity of 0.95, is close to income-neutral, implying that spending tends to rise almost proportionately with income but lacks strong acceleration. Overall, the elasticity pattern reveals a structural shift toward prioritizing health and welfare, indicating Karnataka’s evolving developmental focus in line with changing socioeconomic needs.

Major Findings

1. Karnataka’s Total Social Sector Expenditure (SSE) increased more than sixfold between 2005 and 2023, rising from ₹15,240 crores to ₹92,800 crores, indicating a substantial expansion in the state’s commitment to social development.
2. Although education consistently receives the highest allocations, its share in SSE declined from 64.6% (2005) to 55.9% (2023), showing a relative shift toward other emerging social priorities.
3. Health expenditure recorded the highest CAGR (11.8%) and its share nearly doubled from 13.9% to 21.9%. This reflects Karnataka’s increasing investment in healthcare modernization, pandemic response, and public health infrastructure.
4. Social welfare spending exhibited high growth (CAGR 11.2%) indicating stronger government focus on pensions, nutrition programs, disability support, and targeted social protection schemes.
5. Rural development recorded a CAGR of 10.4% with relatively stable shares (11.5% to 11.7%), reflecting consistent but not accelerated investment in rural employment, irrigation, and local infrastructure.
6. The DSI value of 0.184 indicates a moderate structural shift, driven primarily by rising health spending and declining dominance of education expenditure.
7. Education shows low instability (7.2), indicating predictable and consistent funding patterns.
8. Health, Rural Development, and Welfare exhibit moderate to moderate–high instability, showing sensitivity to shocks, policy changes, and emergency-driven allocations.
9. Elasticity values greater than 1 (Health: 1.24, Welfare: 1.12) show that these sectors grow faster than GSDP, indicating increasing prioritization as state income rises.
10. An elasticity of 0.82 shows that education spending grows more slowly than income, suggesting stabilization or maturity of core educational investments.
11. An overall SSE CAGR of 12.8% exceeds typical GSDP growth, highlighting the state’s commitment to inclusive development pathways.

Policy Recommendations

1. Increase the share of nutrition and early childhood development, which remain underfunded.
2. Adopt District-Level Social Expenditure Index for targeted allocations.
3. Improve efficiency by using Direct Benefit Transfer (DBT) in all welfare schemes.
4. Strengthen health infrastructure in backward districts: Kalaburagi, Yadgir, Raichur, Vijayapura.
5. Establish a Medium-Term Social Sector Expenditure Framework (MSSEF) to ensure stability.
6. Promote public-private partnerships for health and skill development.
7. Increase transparency in welfare spending using real-time monitoring dashboards.

Conclusion

The analysis of Karnataka's social sector expenditure from 2005 to 2023 reveals a transformative shift in the state's developmental priorities. While education continues to dominate in absolute expenditure terms, its relative share has gradually declined as health and welfare sectors have expanded rapidly. The high CAGR in health and welfare, coupled with their income-elastic nature, indicates Karnataka's progressive transition toward a more balanced and inclusive social expenditure framework. The moderate structural shift, reflected in the DSI, underscores the changing composition of spending, driven primarily by intensified focus on healthcare modernization and expanded social protection measures. Stability assessments reveal predictable investments in education but higher volatility in welfare and health spending, shaped by socio-economic shocks and policy reforms. Overall, Karnataka's increasing social sector expenditure demonstrates a strong commitment to human-centric development; however, the state must strengthen efficiency, ensure stable funding patterns, and adopt data-driven policy frameworks to maximize social outcomes. A future-ready social sector strategy must, therefore, combine sustained investment with improved governance, accountability, and evidence-based allocation to ensure equitable and inclusive growth across the state.

Limitations and Further Research Scope

The study is based solely on secondary data, which may have reporting gaps and classification inconsistencies. Expenditure figures are in nominal terms, without full adjustment for inflation. Sectoral categories are broad, limiting deeper sub-sector analysis. External shocks such as COVID-19 are not separately assessed in the analysis.

Future research can include district-level or sub-sectoral analysis for deeper insights. Inflation-adjusted real expenditure trends may be examined for accurate growth measurement. Advanced econometric models can be applied to study causal relationships. Primary data surveys can evaluate the real impact of social spending on beneficiaries.

References

1. Dreze J, Sen A. An uncertain glory: India and its contradictions. Princeton University Press, 2013.
2. Dev SM, Mooij J. Social sector expenditures in the 1990s: Analysis and policy issues. Social Policy Review, 2002.

3. Ghosh M. Regional disparities in human development in India. Economic and Political Weekly, 2011;46(47):45–52.
4. Government of Karnataka. Karnataka state budget documents. Finance Department, 2005–2023.
5. Government of Karnataka. Karnataka economic survey. Directorate of Economics and Statistics, 2020.
6. Mehrotra S, Jolly R. Development with a human face: Experiences in social sectors. Oxford University Press, 1997.
7. Musgrave RA. The theory of public finance. McGraw-Hill, 1959.
8. Rao MG, Singh N. Public expenditure in India: Trends and issues. National Institute of Public Finance and Policy Working Paper, 2005.
9. Rajasekhar D, Manjula R. Welfare schemes and service delivery in Karnataka. Journal of Social and Economic Development, 2019;21(3):317–330.
10. Reserve Bank of India. State finances: A study of budgets of states. RBI Publications, 2005–2023.
11. Tilak JBG. Post-elementary education, poverty, and development in India. International Journal of Educational Development, 2007;27(4):435–445.
12. World Bank. Strengthening health systems in Karnataka: Policy report. World Bank Publications, 2020.
13. RBI (Various Issues). State Finances: A Study of Budgets.
14. Government of Karnataka. Budget Documents, 2005–2023.
15. NITI Aayog. Social Sector Statistics.
16. Planning Dept. GoK. Economic Survey of Karnataka.
17. MOSPI. State Domestic Product Series.
18. RBI. Handbook of Statistics on Indian States.