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CAPITAL**

Karnataka: A \$1 Trillion GDP Vision

SEPTEMBER 2022



A 13-point socio-economic agenda that places the state at the vanguard of India's \$10 Trillion Vision

TV Mohandas Pai • Nisha Holla

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FOREWORD

The Economic Survey of Karnataka 2021-22, released in February 2022, was a unique exercise undertaken by Hon'ble Chief Minister for the first time in India, as Multiple subject matter experts were invited to contribute their ideas for improving state of the economy, investments, exports, banking, rural/urban, employment and productivity. Sri TV Mohandas Pai and Ms. Nisha Holla were also among the galaxy of experts. I am glad to write the foreword about their report on 'Karnataka: A USD 1 Trillion GDP Vision', which is based on the Economic Survey of Karnataka 2021-22. In this report, a comparative analysis of different states was made to replicate successful models. For example, Karnataka's and Gujarat's GDPs have been quite similar for years, 66% of Karnataka's economy is driven by services, whereas Gujarat's economy is primarily driven by industry at 43%. Hence, Karnataka has to focus on labor intensive Industrial growth to improve its GDP.

Harbouring a future-oriented growth mindset, detailed suggestions for realizing Karnataka's vision of \$1 trillion GDP over the coming decade and attaining the Sustainable Development Goals Vision-2030. These innovation measures include economy greening, asset monetization, formalization of employment data, geo-enabled governance practices, sustainable urbanization, focused development of the Bengaluru and Beyond Bengaluru strategies.

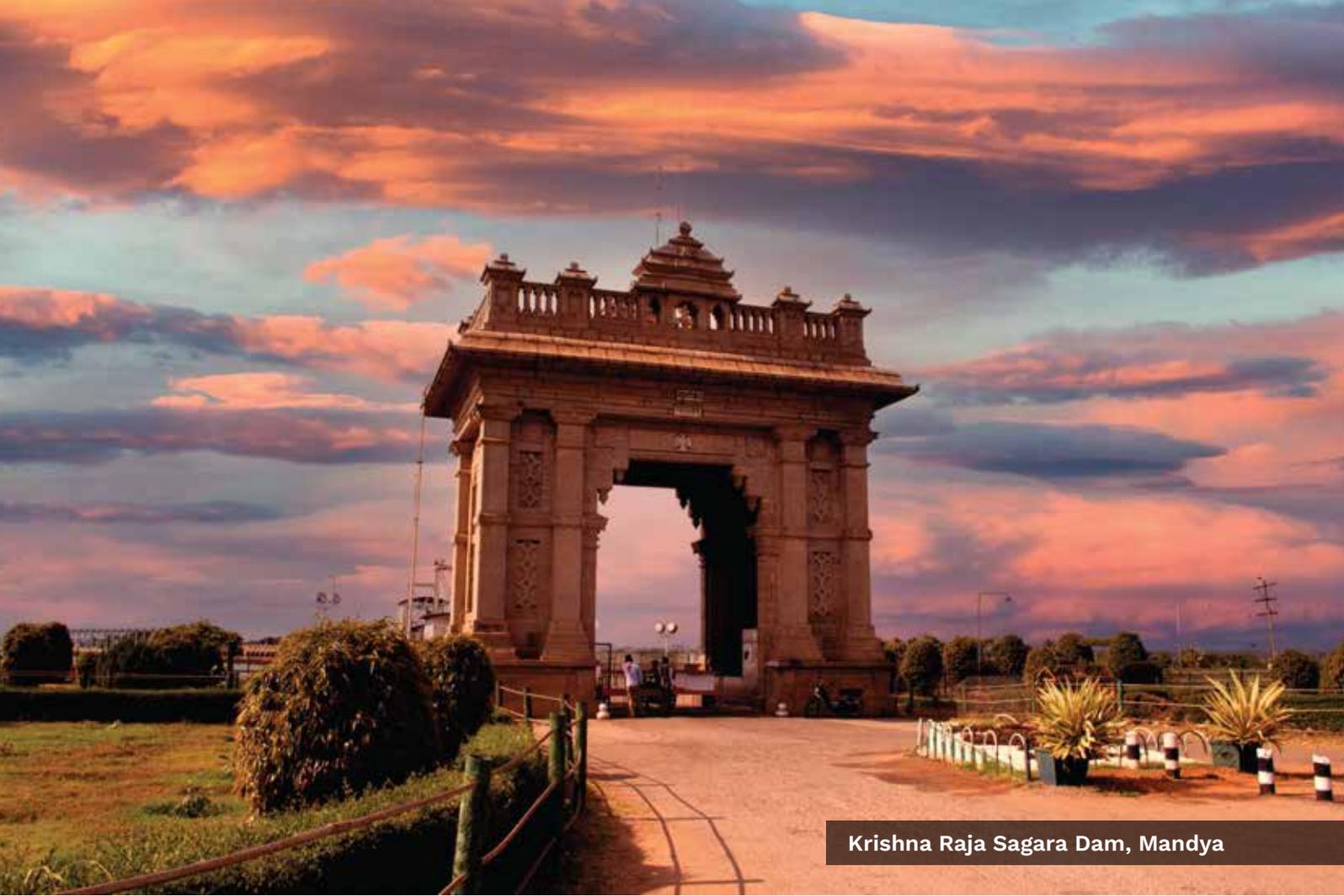
The report has presented 9 point agenda to drive all round economic growth viz (1) boost agriculture sector through technology, branding, marketing and exports, (2) boost manufacturing and exports via labor-intensive industries, (3) boost construction sector through increased infrastructural spending, (4) systematic urbanization, (5) aspirational district program, (6) specialized hi-tech industries to drive high value-add manufacturing and exports, (7) Bengaluru: Global Hi-Tech city, Artificial Intelligence (AI), (8) IT services and (9) Invest in start-up ecosystem.

Human capital is the most significant driver of socio-economic development over the next decades. Karnataka is conscious of the need to institute the appropriate policies that respond to the current and future needs of the population. It is the first state to start the State Institute for Transformation of Karnataka (SITK), modelled after NITI Aayog at the Centre. SITK hopes to build on the human resource development led rapid socio economic growth.

I hope this report will be productively utilised by all the concerned departments in re-formulating their outcome-oriented strategies and plans, in the days to come.



Shalini.
(Dr. Shalini Rajneesh)



Krishna Raja Sagara Dam, Mandya

Authors' Note

India is poised to be only the third economy after the US and China to transcend the \$10 trillion GDP ceiling, with favourable tailwinds in demographics, consumption patterns, open market economics, and technological prowess. India was working towards reaching \$5 trillion GDP by 2025 and \$10 trillion by 2030. However, with the recessionary effect of the COVID-19 pandemic, these targets have shifted. At \$3.16 trillion GDP now, India could reach \$5 trillion by 2026 and \$10 trillion by 2032 at a nominal CAGR of 12.2%; this is at a constant conversion of \$1 = ₹75 and, of course, the dollar-rupee conversion rate will have a

direct impact on the GDP in dollar terms. The country has a strong history of economic growth since the 1991 liberalization – 8.2% CAGR in dollar terms for 31 years from FY 1991 to FY 2022 translating to 13% in rupee terms. Given this history, the 2026 and 2032 targets are certainly achievable but require a strong development agenda that utilizes the growth engines of the 21st century.

India is not a monolith; the needs of the populations in various states, and within states too, vary drastically. History has proved that one policy across the nation

will not work and, indeed, there is a great divergence in state GDP, per-capita income, and growth rates of the various states since the economic liberalization. India is now going through a period of enhanced devolution of agenda to state governments and, barring the pandemic years, the Centre's share in total expenditure is decreasing while aggregate States' share is rising. This places a renewed onus of socio-economic development on State governments who now have the freedom to pursue agendas that respond to their demographic, and enact policies that support entrepreneurship, employment, education, and the welfare of their citizens.

Karnataka is among the Top 5 states in India and has demonstrated strong growth over the years. Its per-capita state GDP of INR 3.05 lakhs in FY 22(E) is the highest among the Top 5 states. A standout feature of the state economy is it has the highest share of services at 66.1% of GSVA in FY 22(E)—the highest among all states; a product of its robust IT services industry and other technology-driven areas. Karnataka is also a major job producer, having generated 11%

of all formal jobs in the country while contributing 8.7% to the national GDP in FY 22 and constituting less than 5% of the population. Karnataka has certainly done well in the past but now, post the pandemic, there is a need to re-orient its strategies by studying the unique needs of its citizens, its demographics, and the sectoral composition of its economy.

This report examines the state of the economy, demographics, and education in Karnataka with in-depth analysis of economic growth trends, revenues and expenditures, workforce, and district-wise growth distribution. These trendlines are then used to suggest a 13-point socio-economic agenda to place the state at the forefront of **India's \$10 trillion vision**. Karnataka can be at the vanguard and demonstrate to other states how an accelerated-growth strategy can be formulated based on data analysis.

About the Authors



TV Mohandas Pai is Chairman of 3one4 Capital, Chairman of Aarin Capital, Chairman of Manipal Global Education, a Member of the Board of Havells India and the Institute of Public Enterprises, Former Chairman of the FICCI Skills and Higher Education Committees, Past President of AIMA, Chairman of the Regulatory and Financial Technology Committee and formerly of the Primary Markets Committee of SEBI, Founder-Trustee of the Akshaya Patra Foundation, Former Investment Committee Member of the SIDBI India Aspiration Fund and the India Fund of Funds, and a former Member of the Board of the National Stock Exchange of India.

Previously, Mohan served as a Member of the Board and CFO at Infosys, one of India's largest software services companies. Over a 17-year period, he was voted 'CFO of the Year' multiple times, spearheaded the first listing of an India-registered company on NASDAQ, and headed several additional departments. Mohan has also helped launch 14+ different investment vehicles across private equity and venture capital which have cumulatively invested in over 250 companies with a capital base of \$500+ million. In 2000, he co-founded the Akshaya Patra Foundation in Bangalore - a mid-day meal program for school children. Today, this program feeds 1.8 million+ children each day in 15,000+ government schools across India.

Mohan was awarded the Padma Shri award by the President of India in 2015 and the Karnataka Rajyotsava Award in 2004. Mohan holds a Bachelor's degree in commerce as a University Rank Holder from St. Joseph's College of Commerce, Bangalore, a Bachelor's degree in law (LLB) from Bangalore University, and is a Fellow Member of the Institute of Chartered Accountants of India as an All-India Rank Holder.



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Nisha was co-founder of Biomoneta Research, a biotech start-up. She previously worked at the cutting edge of hardware product development in the Silicon Valley Bay Area in semiconductors at Applied Materials, and fuel cell technology at Bloom Energy. Nisha is co-inventor of a US patent on optimizing semiconductor flows in a reactor chamber.

The authors publish regularly at the intersection of economics, policy and technology.

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Summary

Karnataka is an economic powerhouse. It is the third largest state economy in the country, at INR 20.5 lakh crore nominal GSDP in FY 22, translating to a per-capita GSDP of INR 3.05 lakhs. Karnataka's per-capita GSDP is the highest among the Top 5 states and, indeed, one of the highest in the country, the result of a substantial 66% contribution to the state economy by the services sectors with incredibly high value-add like IT.

Data shows Karnataka is rebounding strongly from the recessionary impact of COVID-19. In FY 22, the state contributed 8.7% to the national GDP in nominal terms, 11% of the new formal jobs created on the EPF system and exceeded tax revenue collections by INR 23,000 crore over the budget estimates of INR 2.31 lakh crore. The state has a robust revenue and tax profile and is fiscally well-managed. With decisive leadership and time-tested growth drivers, Karnataka can accelerate its growth to GDP of USD 500 billion by 2026 and GDP of USD 1 trillion by 2032. These targets align with India's GDP goals of USD 5 trillion by 2026 and GDP of USD 10 trillion by 2032, meaning the state will become 10% of the national economy. To do this, Karnataka will have to expand faster than India and accelerate its growth drivers.

Alongside the economic agenda, Karnataka must ensure it responds proactively to the population's needs. The state is aging quite rapidly, with fertility dropping to 1.7 in 2019-21 and the number of births stagnating. The young population (18-23) is declining, while senior citizens aged 60+ are projected to grow to 15% in 2030. These trends indicate the state will soon house a large ageing population, accompanied by a shrinking workforce, barring immigration; it is recommended that human capital be strengthened over the next decade to maintain high economic output despite the population downturn.

Four strategies are recommended to respond to the ageing state's needs:

1. Karnataka must focus on a comprehensive social security net for vulnerable sections of the society and its growing population of senior citizens.
2. Education will be vital in maintaining a productive workforce when the population declines. Government must focus on discharging its three mutually-independent roles in education – that of policymaker, instituting a competent accreditation agency and regulator independent of government, and restructuring the education department to deliver a higher quality of public education.
3. Higher education is of particular value in today's knowledge economy-led growth era, and specialization borne from quality higher education will help keep the economic pace up when the population downturn arrives.
4. The state must build a lot more healthcare infrastructure, especially in rural areas, with adequate primary, secondary and tertiary facilities in every district.

Regarding the economic agenda, a detailed survey of the state economic data reveals three significant issues that must be addressed for accelerated growth.

1. There is a considerable asymmetry in workforce-to-sector dependence. 41% of the workforce, and consequently the population, depends on the agriculture sector, contributing only 14% to state GVA. In comparison, 59% of the population depends on industry and services that contribute a combined 86% to state GVA while providing high-growth opportunities and higher-wage employment prospects. Consequently, the wage ratio of an agricultural dependent to one in industry and services is incredibly skewed, at 1:2.7:5.1, calling for an immediate rebalancing.
2. The industry sector, in particular, is a laggard with a 5-year CAGR of only 6.1% compared to 11.6% for services and 16.6% for agriculture. It contains two highly under-utilized growth drivers: manufacturing and construction, that need policies and public investment to grow into massive economic growth engines and provide quality employment to the workforce coming off the land.
3. The state economy is highly skewed towards the Bengaluru urban district, which, counter-productively, hardly receives any investment. Both components need addressal. The rest of the state requires a focused urbanization agenda, while Bengaluru needs the necessary allocation of resources to achieve its potential as a global hi-tech city.

With the above analysis, the report presents a detailed 9-point economic agenda:

1. Amplify the agriculture sector value-add and output with comprehensive technology, branding, marketing and export strategies.
2. Expand manufacturing and exports via labour-intensive industries, predominantly in smaller towns for cost efficiency and in labour-surplus regions like North Karnataka.
3. Boost the construction sector value-add with increased infrastructure spending that will lend impetus to mass employment, generation of taxes, exports and general productivity.
4. Pursue systematic urbanization in 200 smaller towns of the state so they can be developed to sustainably absorb the rural-to-urban shift.
5. Model NITI Aayog's Aspirational District program in Karnataka to rapidly develop the 10-15 poorest districts, primarily located in North Karnataka.
6. Invest in specialized hi-tech industries like biotechnology, semiconductors, electronics component design and materials innovation to develop future-forward manufacturing capabilities, sustain technological leadership, and expand domestic and export markets.
7. Invest in Bengaluru to consolidate its unique potential as a global hi-tech city.
8. Boost the IT services sector to build on feedforward capabilities like artificial intelligence, machine learning, internet-of-things, cybersecurity, agri-tech and other drivers.
9. Invest in the state's startup ecosystem—which leads the rest of the country—so these companies can proliferate and become economic growth engines for Karnataka.

The 13-point socio-economic agenda laid out in this report will accelerate Karnataka's growth and build on its momentum as one of India's leading states.

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STATE OF THE ECONOMY



Vidhana Soudha, Bengaluru

Recent growth and COVID-19 impact analysis

The advanced estimate of Karnataka's Gross State Domestic Product (GSDP) in nominal terms for FY 22 is INR 20.5 lakh crore, up from INR 17.31 lakh crore in FY 21. It contributed 8.7% to the national GDP of INR 236.64 lakh crore in FY 22. Karnataka is estimated to have grown at a robust growth rate of 18.4%, compared to 19.5% for India. The state grew by 7.2% during the pandemic-struck FY 21, compared to a -1.4% decline in the national economy.

Gross State Domestic Product (INR lakh crore)

Product Sector	2016-17	2017-18	2018-19	2019-20 (SRE)	2020-21 (FRE)	2021-22 (AE)	5-year CAGR FY 17-22
Agriculture	1.19	1.50	1.53	1.81	2.24	2.57	16.6%
Industry	2.69	2.90	3.19	3.14	3.04	3.61	6.1%
Services	6.96	7.59	8.64	9.76	10.40	12.06	11.6%
GSVA	10.83	11.99	13.36	14.71	15.68	18.24	11.0%
Net Taxes	1.24	1.34	1.40	1.44	1.63	2.25	-
GSDP	12.08	13.33	14.76	16.15	17.31	20.49	11.2%
YoY growth rate	15.5%	10.4%	10.7%	9.4%	7.2%	18.4%	-
Per-capita GSDP	1.86	2.05	2.25	2.44	2.60	3.05	10.4%
YoY growth rate	14.3%	10.4%	9.5%	8.4%	6.5%	17.4%	-

Table 1: Gross State Domestic Product at current prices of Karnataka state, with composition of GSDP and per-capita GSDP from FY17 to FY 22. Source: MOSPI

Table 1 shows the composition of Karnataka's GSDP over the last half-decade. In FY 22, GSDP comprises INR 2.57 lakh crores from the agriculture sector, INR 3.61 lakh crore from the industry sector and INR 12.06 lakh crore from the services sector, totalling INR 18.24 lakh crore of Gross State Value Added (GSVA). GSDP in FY 21 was INR 17.31 lakh crore, leading to 18.4% growth in FY 22, and marking a robust recovery after the pandemic. GSDP in FY 20 was INR 16.15 lakh crore, leading to 7.2% growth in FY 21, highlighting a dampened year due to the COVID-19 pandemic. The effects of the pandemic and ensuing lockdowns show up in FY 20 itself with 9.4% YoY growth – a sub-10% year compared to the previous 14.4% in FY 16, 15.5% in FY 17, 10.4% in FY 18 and 10.7% in FY 19. The 5-year CAGR of Karnataka's GSDP from FY 17 to FY 22 is 11.2%.

Per-capita GSDP is INR 3.05 lakh, growing at 17.4% over INR 2.6 lakh in FY 21. In FY 21, however, per-capita GSDP grew by only 6.5% due to the pandemic. Per-capita income grew at 13.1% in FY 16, 14.3% in FY 17, 10.4% in FY 18, and 9.5% in FY 19, and thereafter slowing down rapidly with the pandemic. The 5-year CAGR of per-capita income is 10.4%.

The agriculture sector grew at 16.6% CAGR in five years. Agriculture has the largest portion of the workforce dependent on it, as well as the most government support and subsidies, which supported its growth even during the pandemic. The industry sector's growth, which severely lags both agriculture and services, is 6.1%, signifying that its support structures are inadequate and require investment, incentives, and a structured campaign to upskill and transfer excess agricultural workforce to the industry.

The services sector is the mainstay of the Karnataka economy, growing at 11.6% CAGR. Multiple services sub-sectors were

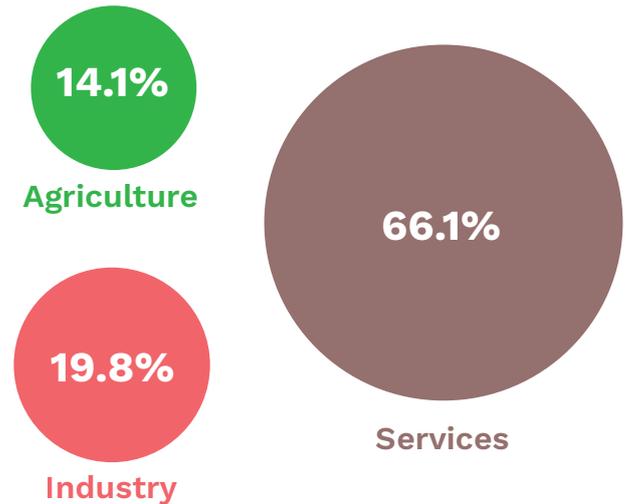


Fig 1: Composition of Karnataka's GSVA in 2021-22.
Source: MOSPI

directly affected by the pandemic and lockdowns—restaurants, hospitality, primarily air travel among other travel modes, trade and so on. However, the sector rallied towards Q3 and Q4 of FY 21 and through FY 22.

The total GSVA's CAGR is 11%, which will increase when the industry sector is accelerated. Overall, the pandemic effect was felt across the whole state economy. The budget estimate for FY 21 GSDP was INR 18 lakh crore—amounting to a difference of nearly INR 70,000 crore. Citizens have felt a loss, with increased healthcare spending, depletion of savings, and other uncertainty losses. The state has, however, rallied towards the end of FY 21 and continued to do so through FY 22. Economic targets have suffered a setback due to the pandemic. The state now requires a focused plan, balanced budgeting, and workforce rebalancing to get back on track and achieve its SDG goals and the USD 1 trillion vision in the next decade.

Bengaluru: India's Technology and Innovation Capital

\$11,000

Per-capita income

1.1 crore

Population of 11 million

15,000+

Startups employing 5 lakh+
India's top hub

50+

Unicorns
India's largest herd

44

Soonicorns
Highest concentration in India

250+

Women led startups
India's top hub

\$62 billion

Raised by startups between
2014 and H1 2022
\$10 billion in H1 2022

\$65 billion

IT services exports in FY 22
38% of India's \$170 billion

2.1 million+

Software engineers
Including IT services, startups,
and others

450+

Research laboratories spanning
multiple and intersecting
disciplines

400+

Fortune 500 companies have
a presence in the city

100,000+

PhDs across a diverse range
of specializations

300,000+

Chip designers and testers
in 250+ companies

2nd largest

Income tax collections
among Indian cities

3rd largest

Bank deposits quantum in India

4th largest

Bank lending among
Indian cities

Sources: YourStory, Inc42, 3one4 Capital Research

Composition of the economy

Table 2 contains the contribution of each of the three major sectors—agriculture, industry, and services, to the state economy. A standout feature of Karnataka’s economy is the significant contribution of the services sectors. Pre-pandemic, in FY 20, the services sector contributed 66.3% to GSVA, followed by 21.3% by the industry sector and 12.3% by the agriculture sector. The pandemic dampened industrial growth more than the other sectors. As a result, in FY 21, industrial share has decreased to 19.4%, while services remain at 66.3%, and agriculture has jumped to 14.3%. Agricultural growth has been supported by favourable monsoons, significant budget spends, and subsidies. This new composition with dampened industrial contribution has continued in FY 22.

Services – A significant pillar for Karnataka’s substantial services economy is the IT industry and the accelerating startup ecosystem. Indian software exports in FY 22 reached USD 170 billion, of which Karnataka’s share is an

estimated 38%. More than 21 lakh people are employed in the software industry with high paying jobs, centered mostly in Bengaluru city. Bengaluru has more than 50 unicorns (companies with valuation of more than USD 1 billion)—47% of India’s total of ~106 unicorns. It has 15,000+ startups today, many of whom proved invaluable in the country’s fight against the COVID-19 pandemic. Karnataka received more than USD 16 billion in Foreign Direct Investment (FDI) during the pandemic-struck CY 21 and an estimated USD 10 billion in the first 6 months of CY 22, signaling the potential of its technology-based growth engines.

In 2011-12 prices, the services sector constituted 70.85% of total GSVA in FY 20. It also made up 8.53% of total services GVA for India in the same year. In the last few years, employment has primarily been driven by the services sector. Among the districts, Bengaluru Urban leads with 83.4% services sector value added, with Dharwad and Hassan after it. This clearly indicates that urbanisation and the

Product Sector	% GSVA 2019-20	% GSVA 2020-21	% GSVA 2021-22	5-year CAGR FY 17-22
Agriculture	12.3%	14.3%	14.1%	16.6%
Industry	21.3%	19.4%	19.8%	6.1%
Services	66.3%	66.3%	66.1%	11.6%
GSVA	100.0%	100.0%	100.0%	11.0%

Table 2: Composition of Gross State Value Added of Karnataka state over FY20 and FY21. Source: MOSPI



service sectors create high paying jobs. From FY 12 to FY 19, Bengaluru Urban led the state with an average growth rate of 10.6% GVA from services.

Tourism also has high potential to create jobs and the state must invest heavily in this area. Karnataka must have a special focus on the various areas of the services sector to increase job opportunities for its citizens.

Further, major growth drivers for the services sector are investments and export-orientation, in which FDI has a significant role. China drove its unprecedented economic growth to become a Top 2 economy today by harnessing the power of FDI. There is a robust growth in India's FDI. Karnataka leads India in innovation with a score of 42.50 on the India Innovation Index of NITI Aayog. Karnataka receives 25.7% of total FDI with an all-time high of USD 25.91 billion between Oct 2019-June 2021. Karnataka is also an export powerhouse with total exports going up from INR 5.49 lakh crore in FY 17 to INR 6.93 lakh crore in FY 21, led by software exports of INR 5.86 lakh crore. This buoyancy continued in FY 22 with total exports up to INR 4.26 lakh crore till September 2021. Electronics

and software together make up 80%+ of total exports. Karnataka's exports also made up 18.9% of total exports from India in FY 21.

Financial Services – The banking and financial services sub-sector under the larger services umbrella is another promising growth driver. India's bank credit to GDP went up from 25% in FY 92 to 58% in FY 21. However, Karnataka's bank credit to GSDP was only 40.5% in FY 21. Karnataka is a high-deposit and high-savings state, but bank lending is rather low, and savings are lent elsewhere across India. This needs to be examined to increase bank lending within the state itself to accelerate growth.

Industry – The industrial sector in Karnataka has been a laggard, growing at only 6.1% CAGR over the last 5 years in GSVA, as against 16.6% CAGR for agriculture and 11.6% CAGR for services in the same period. This obviously has dragged down the growth rate for Karnataka and the creation of jobs. Industry as a segment of GSVA is 19.8% in Karnataka in FY 22, lower than Gujarat at 43%, Tamil Nadu (TN) at 33%, and Maharashtra at 26.8% in FY 21, which again demonstrates that despite the high

share of services there has been inadequate attention paid to industry.

Karnataka offers reasonable infrastructure for industry, but power consumption continues to stagnate due to the high cost of power for the industrial sector. In FY 17, power consumption was 54,183 million units (MU) which remained at 54,284 MU in FY 21 with almost stagnant power generation. Industry consumption has remained small at only 7,500+MU while agricultural consumption is nearly 3 times that. This needs a paradigm shift to increase industrial growth. Captive power generations seem to be the preferred source for industry. Karnataka makes up 20% of India's renewable power generation and has the highest solar installation capacity in the country, which can be capitalized to provide more options for industrial consumption and growth.

Micro, Small and Medium Enterprises (MSMEs) constitute a vital pillar of the industry sector which the pandemic has severely impacted. The state has more than 8.5 lakh MSMEs employing over 55 lakh people. Accelerating this sector requires an out-of-the-box approach which addresses challenges like the availability of a meagre share of loans despite a reasonably high share of bank deposits, a general lack of adequate equity capital, lower productivity, and reduced ease of doing business which fell to 17 in 2019.

The state is richly endowed with natural resources like forests, water, and minerals. Forest accounts for the largest land use after agriculture, and huge tracts are managed as reserve forests. The Western Ghats have high biodiversity and are a treasure trove of

GVO of different crop groups at current prices - India (INR crore)

Crop-group	2011-12	2013-14	2015-16	2017-18	2018-19	CAGR
Cereals	3,36,359	4,22,128	4,31,970	5,23,810	5,85,544	8.2%
Pulses	52,151	68,129	94,787	1,24,764	1,10,081	11.3%
Oilseeds	1,06,654	1,32,506	1,23,411	1,48,484	1,52,730	5.3%
Sugars	76,048	93,685	96,138	1,17,417	1,22,035	7.0%
Fibres	81,944	87,847	70,845	88,392	84,563	0.5%
Other crops	91,975	1,04,961	99,554	99,176	99,551	0.5%
By products	68,855	86,140	89,278	99,854	99,901	5.5%
Kitchen garden	5,107	7,295	8,123	9,673	9,579	9.4%
Total crop	8,19,094	10,02,690	10,14,105	12,11,570	12,59,982	6.3%

Table 3: Gross Value Output of different crop groups at current prices in India. Source: MOSPI

rare flora and fauna. Water resources in the form of rivers, lakes and other water bodies are an irreplaceable asset. The state's rich mineral resources are being managed well under the revamped mineral policies of the Central and State governments.

Agriculture – To accelerate agriculture sector growth, it is necessary to understand the trend of the sub-sectors. The Gross Value Output (GVO) of various crop segments in India is shown in **Table 3** from FY 12 to FY 19. Cereals, growing at 8.2%, is the largest segment with INR 5.86 lakh crore GVO in FY 19 and consists of nearly half of the entire crop group shown with a GVO of INR 12.6 lakh crore. Most of these crop segments, cereals included, have a Minimum Support Price (MSP) guaranteeing a minimum income for the

farmer and protecting their interests—farmers reportedly accrue 80-85% of the total price due to the MSP program which is marked close to the final market price.

Crops, however, are gradually becoming a smaller segment of the agriculture sector, as shown in **Table 4**. In FY 12, crops GVO was INR 8.2 lakh crore which amounted to 43% of the agri sector GVO of INR 19.1 lakh crore. This has gradually decreased to 33.8% of the agri sector GVO of INR 37.3 lakh crore in FY 19. Crops also has the lowest CAGR among the major groups—at 6.3%, compared to 11.2% for fruits & vegetables, 13% for condiments & spices, 13% for livestock and 17.6% for fishing & aquaculture. This signals a shift in the food habits of Indians, and that a larger share of farmer income is coming from

GVO of agriculture sub-sectors - India (INR crore)

Sector	2011-12	2013-14	2015-16	2017-18	2018-19	CAGR
Crop	8,19,094	10,02,690	10,14,105	12,11,570	12,59,982	6.3%
Fruits & vegetables	2,87,427	4,14,814	4,81,405	5,88,077	6,02,929	11.2%
Condiments & spices	46,400	57,738	82,245	97,707	1,09,832	13.1%
Drugs, narcotics & others	38,563	58,183	59,481	63,827	53,317	4.7%
Livestock	4,87,751	6,46,178	8,33,498	10,43,079	11,48,234	13.0%
Forestry & logging	1,48,748	1,87,083	2,20,421	2,59,773	3,03,250	10.7%
Fishing & aquaculture	80,105	1,15,309	1,55,690	2,26,759	2,49,883	17.6%
Agriculture, forestry & fishing	19,08,088	24,81,996	28,46,846	34,90,793	37,27,427	10.0%
Crop as % of agri	42.9%	40.4%	35.6%	34.7%	33.8%	-

Table 4: Gross Value Output of all agricultural sub-sectors at current prices in India. Source: MOSPI

non-cereal and non-crop sectors. These non-crop sub-sectors are growing rapidly, constituted 66.2% of the sector in FY 19, and do not avail MSP. Farmers in these segments, reportedly, only accrue 30-35% of the final price. Facilitating better linkages between the farmers and agricultural producers with the markets through agritech startups will enable these fast-growing segments to rapidly increase incomes and value-adds. The scope for policy measures to increase farmer incomes by facilitating market linkages here is tremendous.

A similar analysis of GVO of Karnataka's crop segments in **Table 5** shows cereals at INR 20,900 crore constitute one-third of the crop GVO of INR 61,750 crore in FY 19.

Here too, crops, are gradually becoming a smaller segment of the agriculture sector as a whole, as shown in **Table 6**. In FY 12,

crops GVO was INR 36,990 crore which amounted to 39.5% of the agri sector GVO of INR 93,682 crore. This has gradually decreased to 33.8% of the agri sector GVO of INR 1.83 lakh crore in FY 19. While India started off with a larger crop percentage in FY 12 at 43%, both Karnataka and India had the same percentage of 33.8% in FY 19—the country's average crop GVO as a percentage of the total agri sector has decreased faster than Karnataka's.

In Karnataka, crops also has the lowest CAGR among the major groups—at 7.6%, compared to 9.8% for fruits & vegetables, 23% for condiments & spices, 11% for livestock and 9.2% for fishing & aquaculture. Just like the rest of India, these non-crop sub-sectors are growing rapidly, constituted 66.2% of the sector in FY 19, and do not have MSP.

GVO of different crop groups at current prices - Karnataka (INR crore)

Crop-group	2011-12	2013-14	2015-16	2017-18	2018-19	CAGR
Cereals	15,103	17,816	16,436	20,540	20,899	4.7%
Pulses	3,279	5,416	6,381	7,906	8,570	14.7%
Oilseeds	5,465	6,719	6,443	8,161	8,426	6.4%
Sugars	6,045	8,799	12,523	10,306	14,127	12.9%
Fibres	2,500	4,600	2,616	4,251	3,801	6.2%
Other crops	1,584	2,160	2,174	2,399	2,370	5.9%
By products	2,729	3,052	3,302	3,118	3,055	1.6%
Kitchen garden	284	414	441	540	501	8.4%
Total crop	36,990	48,976	50,316	57,221	61,748	7.6%

Table 5: Gross Value Output of different crop groups at current prices in Karnataka. Source: MOSPI

In India, while the total agriculture sector GVO grew at a 7-year CAGR of 10%, crops grew by 6.3% and non-crop sectors grew at a combined CAGR of 12.4%—double that of crops. Similarly, in Karnataka, while the total agriculture sector GVO also grew at a 7-year CAGR of 10%, crops grew by 7.6% and non-crop sectors grew at a combined CAGR of 11.5%. Karnataka must focus on creating better market linkages through Agri-tech startups for these farmers and agricultural producers who are not supported by MSP, thereby enabling them to accrue better prices for their products and increase income.

Karnataka has 64.6% of land cultivated, largely depending on rainfall with only 26.5% under irrigation. Because of its sheer size, Karnataka is amongst the Top 10 States in many areas. For example, it

is the second largest milk producing state in India. However, as can be seen from the data, the share of crops especially cereals has been declining as a share of total agricultural output in India and in Karnataka. Fruits and vegetables, spices and condiments, animal husbandry and fisheries have been growing faster than crops, showing increased consumption and demand. There is a need to connect farmers to markets through technology to enable them to get higher income. During the pandemic, the state managed the food situation well along with the Centre to ensure that all citizens were able to access adequate amounts of food.

A detailed study is required to grow the agriculture sector in tune with the consumption and production trends.

GVO of agriculture sub-sectors - Karnataka (INR crore)

Sector	2011-12	2013-14	2015-16	2017-18	2018-19	CAGR
Crop	36,990	48,976	50,316	57,221	61,748	7.6%
Fruits & Vegetables	14,703	19,711	24,148	28,605	28,254	9.8%
Condiments & spices	6,297	9,495	14,508	20,373	26,648	22.9%
Drugs, narcotics & others	6,444	5,722	6,999	8,317	8,091	3.3%
Livestock	18,936	23,933	28,242	35,187	39,829	11.2%
Forestry & logging	7,083	7,894	10,054	10,408	12,315	8.2%
Fishing & aquaculture	3,229	4,532	5,042	7,503	5,969	9.2%
Agriculture, forestry & fishing	93,682	1,20,263	1,39,308	1,67,614	1,82,854	10.0%
Crop as % of agri	39.5%	40.7%	36.1%	34.1%	33.8%	-

Table 6: Gross Value Output of all agricultural sub-sectors at current prices in Karnataka. Source: MOSPI

Food parks have been part of the government strategy to improve farmers' incomes by increased food processing to ensure value added products. In the recent past, Government of India and the Karnataka state have helped in the creation of Farmer Producer Organizations (FPOs) to aggregate farmers' produce and market it at a higher price. However, the

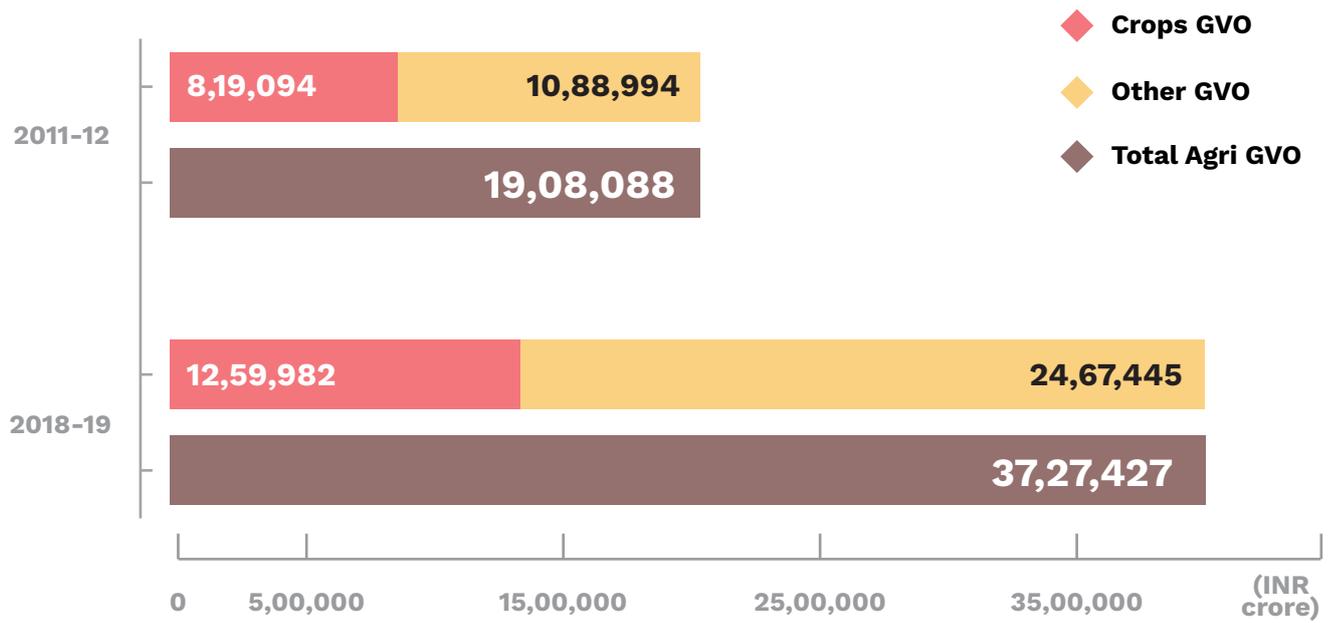
institutional structure has been weak and unamenable to scaling up fast enough to meet the desired goals. Strategic investment and structural changes are required to entrench the large number of well-funded Agri-tech platforms in Karnataka to connect farmers to markets and increase their incomes.

India	Gross Value Output (INR crore)		CAGR
	2011-12	2018-19	7-year
Total agri GVO	19,08,088	37,27,427	10.0%
Crops GVO	8,19,094	12,59,982	6.3%
Other GVO	10,88,994	24,67,445	12.4%
Karnataka			
Total agri GVO	93,682	1,82,854	10.0%
Crops GVO	36,990	61,748	7.6%
Other GVO	56,693	1,21,105	11.5%

Table 7: Comparison of agriculture sector GVO growth rates for India and Karnataka. Other GVO includes fruits & vegetables, condiments & spices, drugs & narcotics, livestock, forestry & logging, and fishing & aquaculture segments. Source: MOSPI



Agriculture sector GVO growth in India (INR crore)



Agriculture sector GVO growth in Karnataka (INR crore)

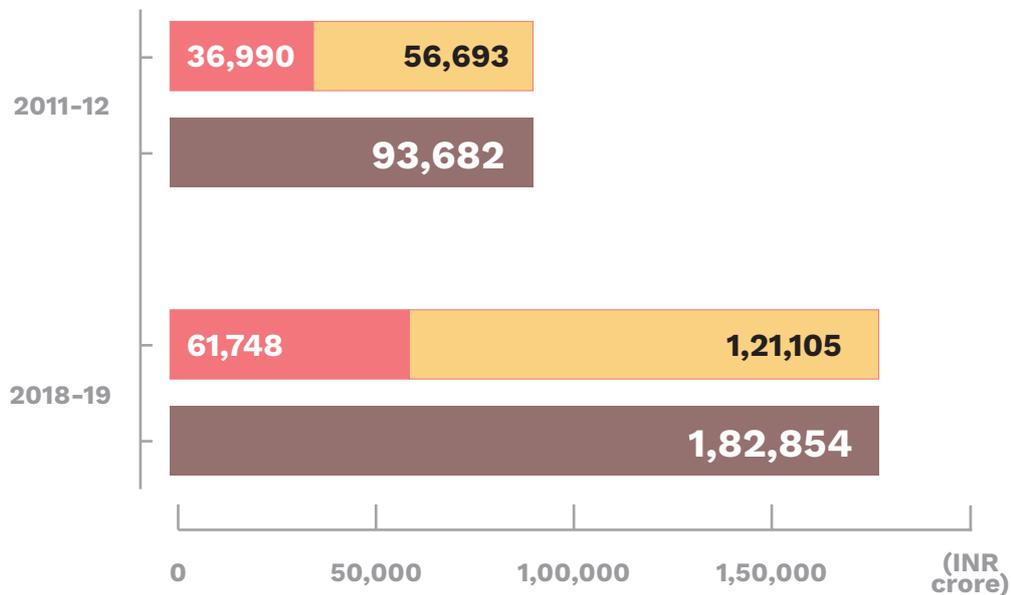


Fig 2: Agriculture sector GVO growth in India & Karnataka.
Source: MOSPI

Karnataka's place in India

Karnataka is among the Top 5 states in India in terms of economic value, currently at third position with INR 20.5 lakh crore economy contributing 8.7% to national GDP of INR 236.64 lakh crore. **Table 8** shows the GDP, growth rate, per-capita GDP and GVA composition of India and of the country's Top 5 state economies in FY 22. Maharashtra at an estimated INR 32 lakh crore in FY 22 leads the country contributing 13.5% to national GDP, followed by TN at INR 21.78 lakh crore contributing 9.2%. Gujarat with an estimated INR 19.44 lakh crore contributing 8.2% is fourth while Uttar Pradesh (UP) at an estimated INR 17.5 lakh crore is fifth contributing 7.4%. These five states together make up a significant 47% of the INR 236.64 lakh crore Indian economy and are crucial growth drivers for the USD 5 trillion and USD 10 trillion national targets over the next decade.

India and Top 5 states - Economic growth and composition in 2021-22

State	GSDP (INR lakh crore)	% of India's GDP	GSDP growth rate	Per-capita GSDP (INR)	GSVA Composition*		
					Agriculture	Industry	Services
Maharashtra	31.98	13.5%	17.9%	2,25,073	13.1%	26.8%	60.1%
Tamil Nadu	21.78	9.2%	14.6%	2,82,986	12.7%	33.0%	54.3%
Karnataka	20.50	8.7%	18.5%	3,05,458	14.1%	19.8%	66.1%
Gujarat	19.44	8.2%	12.0%	2,79,764	20.0%	43.0%	37.0%
Uttar Pradesh	17.49	7.4%	-9.8%	81,398	26.1%	25.0%	48.9%
India	236.64	100.0%	19.5%	1,72,913	18.6%	28.7%	52.7%

Table 8: Gross Domestic Product, growth rate, per-capita GDP and GVA composition of India and of the country's Top 5 state economies in FY 22. Source: MOSPI, Economic Survey of Karnataka 2021-22, Economic Survey of Maharashtra 2021-22, PRS Legislative

* GSVA Composition for Karnataka and India is based on FY 22 data whereas for the other four states, latest available data is FY 21.

India's Top 5 states contribute 47% to national GDP

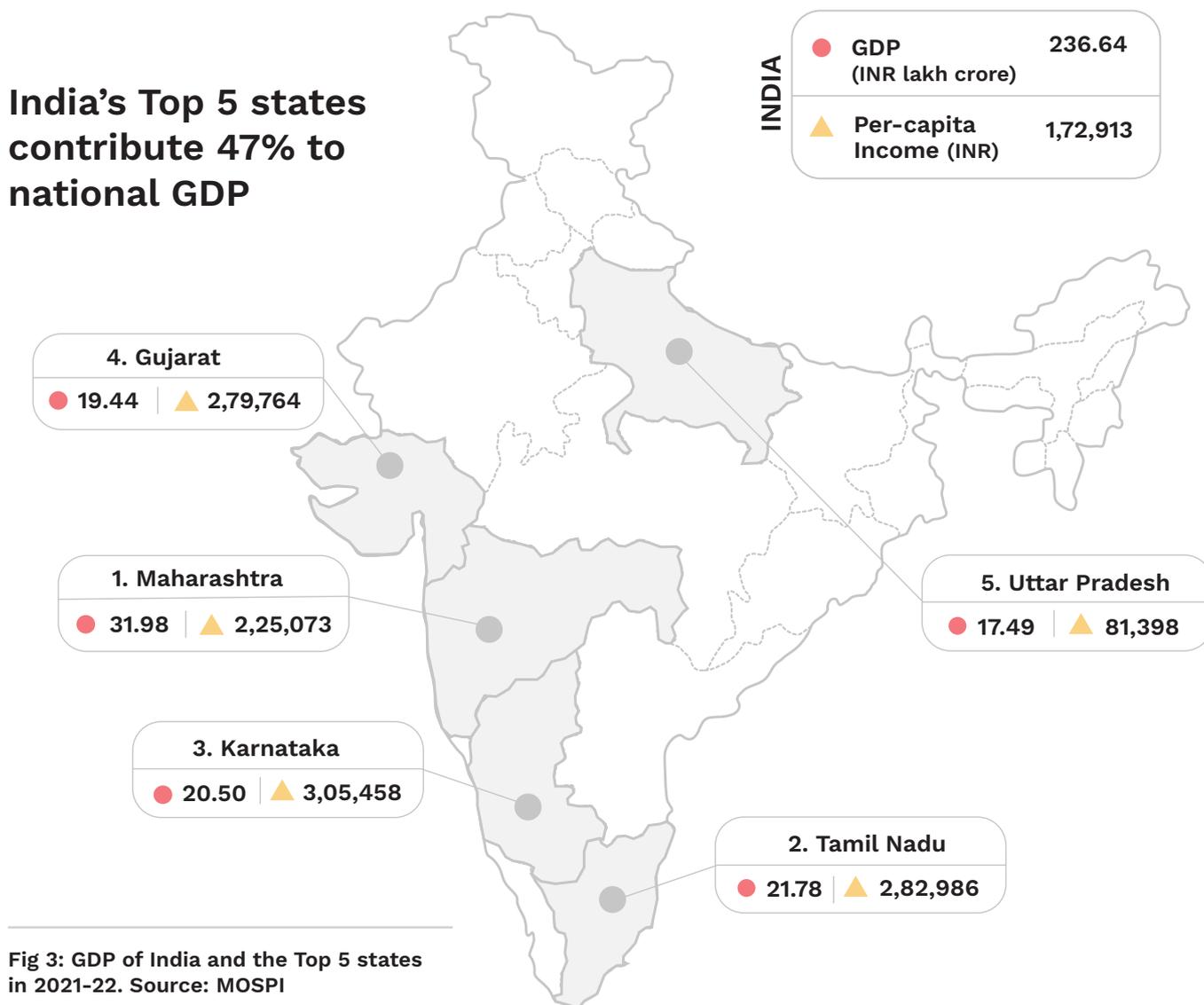


Fig 3: GDP of India and the Top 5 states in 2021-22. Source: MOSPI

The Indian economy grew by 19.5% in nominal terms during FY 22. 19.5% annual growth is unusually high and represents an economic rebound effect from the recessionary effect of FY 21. 18.6% of its GVA comes from agriculture while 28.7% from industry and the balance 52.7% from services sectors. Average per-capita GDP was INR 1,72,913. Except for UP, all the other Top 5 economies' per-capita GDP is INR 2.25 lakh and above—much higher than the India average. UP's is INR 81,398, less than half the national average—a result of its massive 22 crore population. Karnataka leads the Top 5 states, and possibly the country, with a per-capita GSDP of INR 3.05 lakh.

The compositions of the Top 5 state economies are all quite different and vary significantly from that of India's too. In **Table 8**, India's GVA composition and Karnataka's GVA composition is of FY 22 while the latest available data for all the other four Top 5 states is of FY 21. UP has the highest agricultural dependence at 26%, with industry at 25% and services at 49%. Gujarat's agricultural GVA composition is 20%, with services at 37% and industry at a substantial 43%. It has demonstrated how to sustainably industrialize and is the only state with industrial contribution close to 50%. However, with a low services contribution of 37%, if business-as-usual

continues, Gujarat might find it difficult to keep growing with a strong reliance on industry when automation and other factors kick in. Instead, it must develop its services sectors to augment its high industry output.

Maharashtra's and TN's GSVA compositions are more balanced. 13% of Maharashtra's GSVA comes from agriculture, 27% from industry and 60% from services. Meanwhile, 12.7% of TN's GSVA comes from agriculture, 33% from industry and 54.3% from services. They have both mobilized their industrial bases while also driving services sub-sectors to contribute 50%+. While Gujarat can learn from the top three states (Maharashtra, Tamil Nadu and Karnataka) on driving growth by developing services sectors, the other states must learn from Gujarat how sustainable industrialization can act as a vital source of employment and economic growth. Each state must study its unique composition and plan accordingly.

Meanwhile, Karnataka has the most substantial services contribution, at 66.1% of GSVA. This is a direct result of the substantial IT industry which contributes 25-28% to the state economy. It is also due to the sagacious decision taken by successive political leaderships to allow the private sector to compete in the college education sector, thereby allowing for the foundation of a highly skilled workforce in the making. These are all established growth engines Karnataka can use to drive its economic growth up in high value-add sectors. However, Karnataka's industrial GSVA of 19.8% is the lowest of the five and nearly 10 points lower than the national average of 29%. It is imperative to also focus on developing the industry sub-sectors like manufacturing and construction to balance the economy and provide large-scale employment.

Karnataka has demonstrated an appetite for innovative planning, policymaking, and strategic deployment. The District First strategy, Karnataka Evaluation Authority, the use of geospatial technologies for governance, and the SDG-based development model to end poverty are innovations which have changed the economic future of the state for the better. This kind of innovative planning and strategy has enabled Karnataka to remain one of the Top 5 States in India. The extensive use of data in decision making, and the use of technology in management and evaluation of projects has reaped rich dividends in development activities. Post the pandemic, the state needs to focus on growth sectors by catalysing focused investments to increase job creation and income of its citizens.



Asymmetric workforce-sector dependence

India has a significant asymmetry in workforce-to-sector dependence, as analysed in **Table 9**. While the agriculture sector contribution to the GVA is the smallest—18.4% in FY 20, a normal year, and 20.2% in FY 21, a pandemic year—it has the largest segment of the workforce, and consequently the population, dependent on it. In 2018-19, 42.5% of the workforce depended on agriculture which grew to 45.6% in 2019-20. Workforce data is from the Periodic Labour Force Survey (PLFS) which conducts the survey from July (2019) to June (2020). The rapid increase in agri-workforce percentage in 2019-20 is possibly due to the downshift during Q4 of FY 20 and Q1 of FY 21 with the onset of the pandemic leading to the series of national lockdowns and significant labour migration.

India	Gross Value Added Composition					Workforce Distribution		
	2017-18	2018-19	2019-20	2020-21	2021-22	2017-18	2018-19	2019-20
Agriculture	20.3%	19.3%	18.4%	20.2%	18.6%	44.1%	42.5%	45.6%
Industry	26.9%	26.6%	26.7%	25.9%	28.7%	24.8%	25.2%	23.7%
Services	52.8%	54.0%	55.0%	53.9%	52.7%	31.0%	32.4%	30.8%
Total	100%	100%	100%	100%	100%	100%	100%	100%
Karnataka	2017-18	2018-19	2019-20	2020-21	2021-22	2017-18	2018-19	2019-20
Agriculture	12.5%	11.5%	12.3%	14.3%	14.1%	45.7%	41.0%	46.6%
Industry	24.2%	23.9%	21.3%	19.4%	19.8%	21.0%	21.5%	19.8%
Services	63.3%	64.7%	66.3%	66.3%	66.1%	33.3%	37.6%	33.7%
Total	100%	100%	100%	100%	100%	100%	100%	100%

Table 9: Gross Value-Added composition and workforce distribution of India and Karnataka. Source: GVA data from MOSPI and Economic Survey of Karnataka 2021-22, Workforce data from PLFS (latest).

In FY 20, the industry sector contributed 26.7% to GVA which reduced to 25.9% in FY 21. Meanwhile, 25.2% of the workforce depended on it in 2018-19 which decreased to 23.7% in 2019-20. Lastly, the services sector contributed 55% to GVA in FY 20 dropping to 53.9% in FY 21. Workforce dependence on services correspondingly dropped from 32.4% in 2018-19 to 30.8% in 2019-20.

A similar analysis of Karnataka's workforce-to-sector dependence in **Table 9** shows a greater skew. 66.3% of Karnataka's GSVA comes from services in FY 21, whose workforce dependence fell from 37.6% in 2018-19 to 33.7% in 2019-20. Industry workforce dependence fell from 21.5% to 19.8% in the same period whereas agricultural workforce grew from 41% to 46.6%.

Since workforce data collection in FY 20 was disrupted by the pandemic, for the purposes of further analysis and normalization, the 2018-19 workforce distribution has been used. Moreover, as World Bank data shows India's agricultural workforce has reduced from 60% to 42% since 2020, it makes sense to utilize the 2018-19 figures for analysis.

Table 10 analyzes the workforce-to-sector dependence for India and Karnataka. In India, the agricultural GVA in FY 22 was INR 39.8 lakh crore, amounting to 18.6% of GVA, with 42.5% of the workforce dependent on it. By assuming that the dependent population percentage is the same as the workforce, 42.5% of India's 139 crore population can be estimated to depend

India - Sectoral Per-capita Income in 2021-22

Sector	% GVA	GVA (INR cr)	Workforce distribution	Dependent population (cr)	Per-capita GVA (INR)	Ratio
Agriculture	18.6%	39,80,067	42.5%	59.2	67,244	1
Industry	28.7%	61,26,168	25.2%	35.0	1,74,864	2.6
Services	52.7%	1,12,43,165	32.4%	45.1	2,49,265	3.7
Total	100%	2,13,49,400	100%	139.3	1,53,262	-

Karnataka- Sectoral Per-capita Income in 2021-22

Agriculture	14.1%	2,57,171	41.0%	2.8	93,270	1
Industry	19.8%	3,61,283	21.5%	1.4	2,50,151	2.7
Services	66.1%	12,05,928	37.6%	2.5	4,76,942	5.1
Total	100%	18,24,382	100%	6.7	2,71,082	-

Table 10: Estimated per-capita GVA for each sector for India and Karnataka. Source: GVA data from MOSPI and Economic Survey of Karnataka 2021-22, Workforce data from PLFS. Table contains the latest available data.

on agriculture, i.e., 59.2 crore. Per-capita GVA for the agriculture sector can then be calculated as INR 67,389.

India's industrial GVA in FY 22 was INR 61.26 lakh crore, amounting to 28.7% of GVA, with 25.2% of the workforce dependent on it. By the same assumption, 25.2% of India's 139 crore population can be estimated to depend on industry, i.e., 35 crore. Per-capita GVA for the industry sector can then be calculated as INR 1.75 lakh. Similarly, 45 crores of India's population can be estimated to depend on services, with a GVA of INR 112.43 lakh crore, yielding a per-capita GVA of INR 2.49 lakh. The income ratio of an agricultural dependent in India versus that of industry and services is 1: 2.6: 3.7—a massive skew which will become increasingly unsustainable going forward.

The same analysis for Karnataka's workforce-to-sector dependence in **Table 10** yields an even larger skew in incomes. In the state, the agricultural GSVA in FY 22 was INR 2.57 lakh crore, amounting to 14.1% of GVA, with 41% of the workforce dependent on it. Here too, by assuming that the dependent population percentage is the same as the workforce, 41% of Karnataka's 6.7 crore population can be estimated to depend on agriculture, i.e., 2.8 crore. Per-capita GSVA for the agriculture sector can then be calculated as INR 93,270—INR 26,000 higher than the equivalent INR 67,44 for India.

Karnataka's industrial GVA in FY 22 was INR 3.61 lakh crore, amounting to 19.8% of GSVA, with 21.5% of the workforce dependent on it. By the same assumption, 21.5% of Karnataka's 6.7 crore population can be estimated to depend on industry, i.e., 1.4 crore. Per-capita GSVA for the industry sector can then be calculated as INR 2.5 lakhs—INR 75,000 higher than the India

average of INR 1.75 lakhs. Similarly, 2.5 crore of Karnataka's population can be estimated to depend on services, with a GSVA of INR 12.1 lakh crore, yielding a per-capita GSVA of INR 4.76 lakhs—nearly double India's average of INR 2.5 lakhs. The income ratio of an agricultural dependent in Karnataka versus that of industry and services is 1: 2.7: 5.1—much higher than India, and a product of the strong dependence on the services sectors, the IT industry, and Bengaluru-centred economic growth.

Looking at the workforce distribution over the years, it is very clear that agriculture provides the least income per-capita to those who depend on it. The share of agriculture in the GVA—even though the sector has higher growth than industry in Karnataka—cannot meet the growing needs of citizens who depend on it for their income. People's economic needs and aspirations have grown; leaving India's population in villages and wholly dependent on agriculture while being unable to meet their economic needs has resulted in high inequity. The state must invest more in industry and services sectors with appropriate policies and skilling its workforce so they can enjoy a higher income status. The dependent population on industry and services combined is 59% as against 41% in agriculture, which is expected to decrease even further—this trend requires a rebalancing of the workforce.

Expenditure and Budget Allocation

Rebalancing the workforce from agriculture to higher-wage opportunities in industry and services sectors, in turn, requires a strategic budget and development expenditure outlay with a long-term view of robust economic growth. On a macroeconomic level, it is crucial to note that the share of Central spending is reducing (excluding the pandemic years), while aggregate States' share is increasing. As a result, State budget allocations have tremendous effect on socio-economic growth of the citizens of the state and must address their current and future needs.

Aggregate Expenditures (INR lakh crore)

Expenditure Items	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21 (RE)	2021-22 (BE)
A. Central Gross	17.9	20.1	21.5	23.2	26.9	35.1	34.8
B. Transfers from Centre to States	8.2	9.6	10.1	11.9	11.9	13.4	15.7
C. Central Net (A+B)	9.7	10.5	11.4	11.3	15.0	21.7	19.1
D. States Net	23.0	26.4	27.7	31.3	32.5	37.4	43.0
E. Total Spending (C+D)	32.7	36.9	39.1	42.6	47.5	59.1	62.1
% Centre (C/E)	29.6%	28.4%	29.1%	26.6%	31.6%	36.7%	30.8%
% States (D/E)	70.4%	71.6%	70.9%	73.4%	68.4%	63.3%	69.2%

Table 11: Expenditures across state and centre, from FY 16 to FY 22 (exc. IEBR).
Source: Budget Documents, RBI

Table 11 shows the expenditures across the Centre and all States together. Central Gross expenditures are increasing steadily, from INR 17.9 lakh crore in FY 16 to INR 34.8 lakh crore in FY 22—it has doubled, inflation included, in eight years. However, within gross expenditure, the quantum transferred to states has also steadily increased from INR 8.2 lakh crore to INR 15.7 lakh crore in the same period. This is in addition to the states’ own expenditures, netting the state total to INR 23 lakh crore in FY 16 which has increased to INR 43 lakh crore in FY 22. Total spending, Centre and States net, has increased from INR 32.7 lakh crore to INR 62.1 lakh crore in the same period. The percentage spending by States was already more than double that of the Centre in FY 16, at 70.4% against 29.6%. This increased to 73.4% in FY 19, then dipped again to 68.4% in FY 20 and 63.3% FY 21, possibly in response to the pandemic where the Centre had to take

unprecedented measures for securing the lives and livelihoods of citizens. In FY 22, budget estimates show state spending may once again come close to 70% of total expenditure. In a time when the share of central expenditures is reducing and states’ share has increased, state budget allocations have a profound impact on citizens’ lives and employment opportunities. It is imperative for every state to study their budget allocation and evaluate whether it’s in tune with the socio-economic needs of its citizens.

Development expenditure for Karnataka state over the last five years is shown in **Table 12** and grouped under the “Agri/Rural Sectors”, “Other Sectors” and “Common Development” headings. The composition of these grouped expenditure portfolios against the total for each year is calculated at the end.



Karnataka High Court, Bengaluru

Karnataka state development expenditure (INR crore)

Sl no.	Sectors	2017-18 (A/C's)	2018-19 (A/C's)	2019-20 (A/C's)	2020-21 (RE)	2021-22 (BE)
Agri/Rural Sectors						
1	Agriculture & Allied Activities	19,186	18,559	23,258	18,537	17,247
2	Rural Development	5,209	9,686	7,277	9,599	8,916
3	Special Areas Program	506	160	226	160	119
4	Irrigation & Flood Control & Power	22,480	32,521	31,069	29,982	31,996
A	Total (1-4)	47,382	60,926	61,829	58,278	58,278
Other Sectors						
5	Housing & Urban Development	10,365	10,722	7,816	7,838	9,321
6	Labour & Employment	567	769	9,951	10,232	10,480
7	Industries & Minerals	2,477	2,518	2,413	2,772	2,714
8	Transport & Communications	12,348	12,220	12,464	12,082	12,736
9	Science & Technology	96	60	66	60	36
10	General Economic Services	5,476	3,570	4,426	3,344	3,777
B	Total (5-10)	31,328	29,858	37,134	36,327	39,064
Common Development						
11	Education, Sports, Art & Culture	22,450	28,967	27,721	27,633	29,100
12	Health & Water Supply	13,758	16,047	13,779	16,542	18,281
13	Social Security & Social Welfare	17,872	19,727	10,031	7,681	8,762
C	Total (11-10)	54,080	64,740	51,530	51,855	56,142
Composition of expenditure (1-13)						
11	Agri/Rural Sectors	35.7%	39.2%	41.1%	39.8%	38.0%
12	Other Sectors	23.6%	19.2%	24.7%	24.8%	25.5%
13	Common Development	40.7%	41.6%	34.2%	35.4%	36.6%

Table 12: Development expenditure trends in Karnataka state from FY 18 to FY 22 (BE). Source: Economic Survey of Karnataka 2021-22

The FY 22 budget estimate follows the same trend as the previous four years, with higher combined spending on the agriculture and rural sectors, compared to other sectors and common development. The combined spending on agriculture and rural sectors is INR 58,278 crore accounting for 38% of expenditure against INR 39,064 crore for other sectors (25.5% of total spend) and INR 56,142 crore for combined development (36.6%). The differential expenditure impact is even more evident when analyzed per-capita.

Table 13 shows a per-capita analysis of the development expenditure. For this, the workforce distribution from FY 19 from **Table 9** is taken as the baseline, where the workforce dependent on the agricultural and rural sectors is estimated at 41%. The population dependent on these sectors is also estimated at 41%. The balance 59% is estimated to be dependent on other sectors. The common

development expenditure (C) from Table 12 has been weighted at 41:59 towards the respective sectors to produce D and E. Weighted development expenditure on the agriculture and rural sectors can be estimated to be $A + D = F$, while the equivalent for the other sectors to be $B + E = G$. On dividing line items F and G by Karnataka's current population of 6.66 crore weighted by 41:59 distribution (2.73 crore against 3.93 crore), the sectoral per-capita expenditure figures are computed. There is a large difference between the per-capita expenditure for a dependent on the agriculture and rural sectors against a dependent on other sectors. In FY 18, per-capita expenditure for a dependent on the agriculture and rural sectors was INR 25,472 against a dependent on other sectors at INR 16,093. In FY 22, these numbers are estimated at INR 29,772 against INR 18,371. The per-capita expenditure figures underscore the inadequate funding of the industrial, services and urban sectors.

Sl no.	Sectors	2017-18 (A/C's)	2018-19 (A/C's)	2019-20 (A/C's)	2020-21 (RE)	2021-22 (BE)
Weighted Common Development {INR crore}						
D	Agri/Rural Sectors (41% of C)	22,173	26,544	21,127	21,261	23,018
E	Other Sectors (59% of C)	31,907	38,197	30,403	30,595	33,124
Development Expenditure (INR crore)						
F	Agri/Rural Sector (A+D)	69,554	87,469	82,957	79,538	81,296
G	Other Sectors (B+E)	63,235	68,055	67,537	66,921	72,188
Per-capita Expenditure (INR)						
5	Agri/Rural Sectors (F/Popn. 2.73 crore)	25,472	32,033	30,380	29,129	29,772
6	Other Sectors (G/Popn. 3.93 crore)	16,093	17,320	17,188	17,031	18,371

Table 13: Per-capita development expenditure trends in Karnataka state from FY 18 to FY 22 (BE). Source: Economic Survey of Karnataka 2021-22

Year	2011-12	2021-22 (BE)
Education		
Karnataka	14.7%	11.8%
All States Avg.	16.3%	13.9%
Health		
Karnataka	3.9%	5.0%
All States Avg.	4.2%	5.5%

Table 14: Expenditure trends in the education and health sectors in FY 12 & FY 22 (BE) for Karnataka and the average of all states. Source: RBI

Karnataka is investing heavily in rural development and decentralized planning to improve the lives of the majority of its citizens who still live in rural areas today. The focus has been on housing, rural infrastructure, roads, power connections, water supply, sanitation, communication, and other areas. The state has a substantial MGNREGA program to increase rural jobs and build social assets. Karnataka was amongst the first states to decentralize planning to the grass roots and empower the village panchayats and zilla panchayats. The Activity Mapping process of the state ensures that these entities become instruments of downstream accountability. The state has initiated the preparation process of the Grama Panchayat Development Plan. The State has been allocating substantial funds for the districts as well.

While the agriculture and rural sectors require this large budget spend to meet their needs, other sectors, too, require similar spending and impetus. This is because (a) 59% of the population depends on other sectors compared to 41% in agriculture and rural economies, as seen above, indicating disproportionate budgeting, and (b) Karnataka urgently

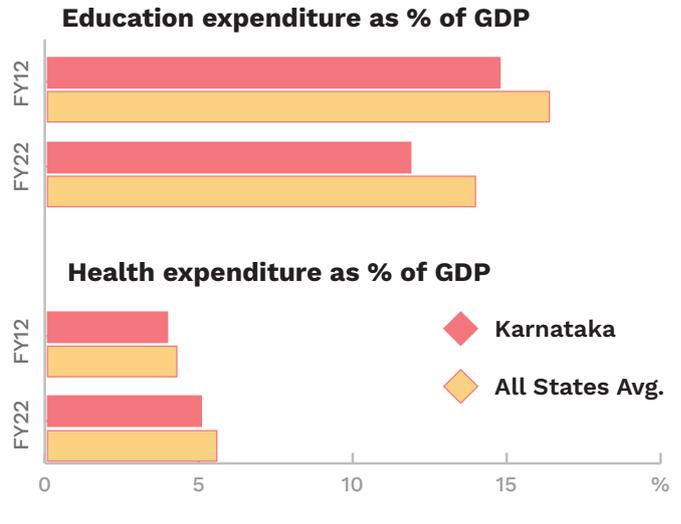


Fig 4: Expenditure trends in the social sector. Source: RBI

needs to rebalance its workforce to enable high-income opportunities to all citizens in industry and services where the potential for growth is higher, as demonstrated above. While maintaining the agriculture and rural spending, there is a need to substantially increase budgets in the areas of industry and services and drive formal employment up in the state.

Further, social infrastructure includes sectors of education, health and medical care, nutrition, water supply and housing. In many of these areas Karnataka’s outlay on the social sector has declined as a percentage of GSDP from 8.03% in 2015-16 to 5.10% in 20-21. These need to be urgently increased as welfare and increasing employment growth must be prioritised.

Crucially, Karnataka must invest in education and health to ensure that a greater skilled population is created, and to take care of its rapidly ageing population. **Table 14** shows in health, all the states’ average spending in FY 12 was 4.2% increasing to 5.5% per FY 22 budget estimates. Karnataka’s corresponding percentages, however, are lower—3.9% (FY 12) and 5% (FY 22 BE). On the other hand, education

spending as a percentage of total budgeted expenditure has reduced over the years and needs reassessment. **Table 14** shows while the states' average in FY 12 was 16.3% reducing to 13.9% per FY 22 budget estimates, Karnataka's corresponding percentages are, again, lower—14.7% (FY 12) down to 11.8% (FY 22 BE). While it is true that the number of children in schools has remained constant or declined over the decade, with the maximum decline in government schools, the higher education system needs a substantially higher allocation to create a world-class knowledge economy.

The additional funding for health and education could emerge from a reassessment in subsidy spending. Total subsidies in the state budget has been increasing as follows: INR 23,330 crore in FY 19, INR 25,649 crore in FY 20, INR 25,133 crore (RE) in FY 21, INR 23,758 (BE) in FY 22—which makes it among the Top 3 amongst the states for outlay on subsidies. Out of this, the major cost was on power subsidy of more than INR 13,500 crore.¹ However, this subsidy is severely undercut by wastage and leakage, and must be rationalized to improve efficiency and subsequently reduced to reallocate the excess. The Karnataka government has set up the K Jairaj Committee to rejuvenate Escoms and fix the financing issues. Today, India has a robust power sector with significant private sector investments alongside the Centre, especially in low-cost green energy, which reduces the need for states to invest in the generation, transmission and distribution of power. This budget could be reallocated towards higher education and health.

Moreover, there is a need to assess the share capital across the entire gamut of state investments in different enterprises. The CAG report on state

accounts 2020-21 shows that Karnataka has an investment of INR 67,816 crore in FY 20 and INR 68,256 crore in FY 21. However, the returns as dividend are meagre—INR 53.34 crore (0.08%) in FY 20 and INR 80.70 crore (0.12%) in FY 21. Karnataka has made these investments out of its borrowings. Assuming a nominal cost of borrowing of at least 7% p.y., the holding costs of such investments was INR 4,747 crore in FY 20 and INR 4,777 crore in FY 21—implying these investments are implicit subsidies.

Karnataka is a resource-rich and people-rich state, and the budget allocations must play to these strengths. The old 1980s paradigm of driving subsidies and state investment in sectors like power when significant private investment is available, is archaic and needs reassessment. These budgets could instead be utilized to reorient development post-COVID-19 and increase spending to educate and skill citizens and provide better access to health. This will accelerate current growth, fuel future socio-economic growth and drive formal employment.

A detailed assessment of the state of social infrastructure and human development is needed to suggest areas of focus. The NFHS-5 survey of 2019-21 data shows reasonable improvement in many of the human development indicators. Karnataka requires an up-to-date database in this area to ensure effective spending. A 10-year plan aligned with the SDG targets can then be deployed to achieve the goal of a good quality of life for all citizens.

¹ Reserve Bank of India, "State Finances: A Study of Budgets 2021-22", November 30, 2021

Towards Formalization of Employment

India has gradually been increasing the number of formal jobs in the economy. The data provided by the Employee Provident Fund (EPF) contain valuable indicators to study and understand the trend of formal employment. Since 2017, EPF has been releasing monthly data on net new subscribers in that month. It is a reliable indicator since it records new subscribers every month only upon payment of contribution and classifies them by age group, gender, industry, and state. EPF applies to entities with 20+ employees across 190 industry classifications.

Net new subscribers on EPF (lakhs)

Year	India - New Methodology	India - Old Methodology	Karnataka	% KA to India
2018-19	112.5	61.1	6.2	10.1%
Ages 22-25	28.6	17.7	2.2	12.4%
2019-20	94.7	78.6	8.1	10.3%
Ages 22-25	24.3	22.0	2.7	12.4%
2020-21	94.5	77.1	6.2	8.1%
Ages 22-25	25.1	21.0	2.1	10.1%
2020-21	138.2	122.3	13.6	11.1%
Ages 22-25	40.3	34.2	4.4	12.9%

Table 15: Net new subscribers to the Employee Provident Fund in India and Karnataka. Source: EPF. EPF updated its methodology of counting new subscribers at a national level and publishes both sets. State data is published in the old methodology only.

An applicable entity, on crossing the 20-employee mark, is inducted into EPF. One criticism is that EPF does not indicate new jobs but only formalization, because existing employees are inducted in this manner. This criticism doesn't hold because we can easily account for this. For example, 62,535 establishments remitted their first electronic challan in 2021-22; multiplying this number by 20 yields 12.51 lakh new subscribers which are existing employees getting formalized. Subtracting 12.51 lakh from the net number of 1.38 crore in 2021-22 yields 1.25 crore new jobs. Further, new employees over the 20-employee threshold of these entities count as new jobs.

EPF's methodology was recently updated. In the old MOSPI format, the subtraction of exiting employees included those that had joined before the FY started instead of only those who had registered in the FY. Methodology was revised to count the number of exits, as well as those who rejoined in the same FY, correctly. If a person quits and joins a new job, the record must reflect in both columns. **Table 15** contains EPF data for India according to both, the old and new, methodologies. State data has not been published in the new methodology and, hence, the analysis of Karnataka's formal job creation is undertaken here in the old format.

According to the new methodology, India had 1.12 crore new subscribers to the EPF system in FY 19, which decreased to 94.7 lakhs in FY 20 and 94.5 lakhs in FY 21, due to the pandemic impact. EPF enrollment has rebounded strongly with the economy, with 1.38 crore new subscribers in FY 22. The corresponding numbers in the old methodology are 61.1 lakhs in FY 19, 78.6

lakhs in FY 20, 77.1 lakhs in FY 21 and 1.22 crore in FY 22. The latter is used to understand Karnataka's weight in formal job creation in the country.

In FY 19, Karnataka had 6.2 lakh new subscribers on the EPF system—one of India's foremost formal job creation states, contributing 10% to the total, which was more than its GDP contribution at 8.3%. In FY 20, Karnataka created 8.1 lakh new jobs on the EPF system, maintaining its 10%+ contribution. The pandemic year FY 21 saw a drop to 6.2 lakh new subscribers with 8% contribution to the national total. In FY 22, Karnataka rebounded strongly with 13.6 lakh new subscribers, contributing 11.1% to the national total and setting a record for the state.

Clearly, Karnataka has already built a robust social security system with its strong services-oriented economy. It can use this foundation to drive formalization up rapidly as it rebalances the workforce towards industry and services sectors. Further, these are formal jobs that provide social security which will become increasingly important as Karnataka's population ages.

Of particular interest is the ability of India and Karnataka to generate formal jobs in the 22-25 age bracket. Every year roughly 2.5 crore people attain the age of 21 in India and 11 lakh people in Karnataka, on average. To maintain a highly productive workforce, it is necessary, at the minimum, to generate formal employment on par with the number for graduates graduating from India's massive higher education system. Karnataka is doing significantly well in this regard—12.4% of total national jobs in the 22-25 age bracket in both FY 19 and FY 20. While this dropped to 10.1% in the pandemic year FY 21, in FY 22, that number is already up to 12.9%. Karnataka has clearly built a strong growth driver in its formal employment engine and can

certainly utilize it to accelerate formalization and socio-economic growth.

An exhaustive study of the employment and jobs situation in Karnataka is required to strategize frameworks to increase formalization in the state economy. The Labour Force Participation Rate for persons above age 15 in the state was 55.5% in 2019-20, above the India average of 53.5%. In the same PLFS 2019-20 study, the unemployment rate was a low 4.2%, with India at 4.8%. Only 27.7% were wage earners as against 23.6% for India. Karnataka needs

a comprehensive framework to gather more data and generate an Employment Strategy to enhance job opportunities for its citizens.

Further, the government runs a comprehensive social security program for disseminating pensions to different beneficiaries like senior citizens, widows, disabled and others. The launch of a world-class IT system to combine all such payments will enable a greater coverage of people in need and reduce any double claimants.



State revenues

A study of the financial indicators of Karnataka and the other Top 5 states shown in **Table 16**, demonstrates that Karnataka's total debt to GSDP is lower than that of TN, UP and the average for all states. Of course, the pandemic-struck FY 21 has increased the debt by nearly 3.3% of GSDP. Early indications for FY 22 are that actual debt may be lower than the budgeted debt-to-GSDP percentage due to buoyancy in tax collections.

Karnataka's revenue receipts as a percentage of GSDP, too, is lower than the states' average and has come down from 10.8% in FY 20 to 9.6% in FY 22 (BE). As regards to own tax revenue as a percentage of GSDP, Karnataka has been stagnating around 6.3%, whereas Maharashtra's has been higher. However, the actual tax collections of

FY 22 is higher for Karnataka. Despite being a Top 5 state, Karnataka's own tax revenue is lower than the all-states' average for FY 21 and FY 22 (BE).

A study of the development expenditure and non-development expenditure as a percentage of GSDP, shown in **Table 17**, among the Top 5 states again shows that

State	Total Debt as % of GSDP			Revenue Receipts as % of GSDP			Own Tax Revenue as % of GSDP		
	2019-20 (A/C)	2020-21 (RE)	2021-22 (BE)	2019-20 (A/C)	2020-21 (RE)	2021-22 (BE)	2019-20 (A/C)	2020-21 (RE)	2021-22 (BE)
Maharashtra	17.1%	19.9%	20.4%	10.0%	10.9%	12.4%	6.7%	6.9%	8.2%
Tamil Nadu	25.7%	29.4%	31.6%	9.7%	9.5%	9.7%	6.0%	5.8%	6.1%
Uttar Pradesh	32.6%	35.2%	34.2%	21.7%	18.0%	21.9%	7.3%	7.3%	9.8%
Karnataka	20.8%	24.1%	25.7%	10.8%	9.6%	9.6%	6.3%	5.7%	6.2%
Gujarat	20.2%	22.8%	21.4%	8.8%	8.0%	8.9%	4.8%	5.0%	5.9%
All States	26.3%	31.1%	31.2%	13.1%	14.1%	15.5%	6.0%	6.3%	7.2%

Table 16: Total debt, revenue receipts and own tax revenue as a percentage of GSDP for the Top 5 states and states aggregate. Source: RBI

Karnataka's spend is less than average and lower than both Maharashtra and TN. A much deeper analysis of the above needs to be undertaken across various parameters to enable the state to increase its own tax revenue and its revenue expenditure to ensure adequate resources for development.

It is useful to benchmark the current state of tax collections in Karnataka. FY 20 and FY 21 were impacted by the COVID-19 lockdowns. FY 22 has shown great buoyancy in tax revenues across the country. Gross Tax Revenues of the Centre exceeded budget estimates by nearly INR 5 lakh crore to a total of INR 27.07 lakh crore. In the case of Karnataka, too, as can be seen in **Table 18**, the actual accounts for total receipts at the end of March 2022 shows there is a growth of 14.9% over FY 21. Actual receipts of INR 2.54 lakh crore exceeded budget estimates by INR 23,000 crore. Total tax revenue exceeded budget estimates by 12.5%. The state's share of Union taxes is much higher than budget estimates due to the buoyancy in the Union taxes. The SGST is higher as can be seen by the all-time record collections across India

in GST in March 2022 of INR 1.42 lakh crore. In 2022, the five-year period of assured GST returns from the Centre will end. However, other tax engines are expected to ensure continuity in Karnataka's tax buoyancy due to expected high economic growth in FY 23.

Budget estimates of total receipts in FY 23 are pegged at a total of INR 2.51 lakh crore. It substantially underestimates receipts since it is only 98.8% of the actual receipts in FY 22. With the state expected to continue its high growth trajectory, it is reasonable to assume that this will translate to higher tax collections as well, as seen in FY 22 and earlier. If one takes a conservative estimate of 10% increase in revenue receipts in FY 23 over FY 22, including taxes, non-tax revenues and grants-in-aid, one could estimate total receipts to exceed INR 2.8 lakh crore. Assuming a 10% increase in FY 23 in tax revenue over actuals of FY 22, the state could collect an additional INR 11,000 crore compared to budget estimates for FY 23.

State	Development Expenditure as % of GSDP			Non-Dvpt. Expenditure as % of GSDP		
	2019-20 (A/C)	2020-21 (RE)	2021-22 (BE)	2019-20 (A/C)	2020-21 (RE)	2021-22 (BE)
Maharashtra	6.4%	7.8%	7.5%	3.5%	4.0%	4.3%
Tamil Nadu	6.5%	7.8%	7.4%	4.3%	4.3%	4.3%
Uttar Pradesh	9.9%	10.4%	11.3%	7.0%	7.5%	8.5%
Karnataka	7.3%	6.8%	6.4%	3.0%	3.6%	3.7%
Gujarat	5.6%	6.1%	5.5%	3.0%	3.1%	3.4%
All States	8.5%	10.2%	10.0%	4.8%	5.5%	5.6%

Table 17: Development expenditure and non-development expenditure as a percentage of GSDP for the Top 5 states and states aggregate. Source: RBI

Accounts at a glance at the end of March 2022 (in INR crore)

Sl no.	Description	BE FY 22	Actuals FY 22	BE FY 23	% BE FY 23 to Actuals FY 22	% Actuals to BE		Actuals FY 21	Growth in FY 22 over FY 21
						FY 22	FY 21		
1	Revenue receipts	1,72,266	1,93,951	1,89,887	97.9%	112.6%	87.1%	1,56,716	23.8%
	(a) Tax revenue (i+ii+iii+iv+v+vi+vii)	1,35,767	1,52,641	1,56,665	102.6%	112.4%	84.4%	1,18,746	28.5%
(i)	SGST/CGST IGST	53,790	59,087	62,999	106.6%	109.8%	78.5%	43,947	34.5%
(ii)	Stamps and registration	12,655	14,019	15,000	107.0%	110.8%	83.5%	10,576	32.6%
(iii)	Land revenue	271	181	42	23.2%	66.9%	74.6%	183	-0.9%
(iv)	Sales tax	16,791	19,271	17,640	91.5%	114.8%	90.1%	16,027	20.2%
(v)	State Excise Duties	24,580	26,377	29,000	109.9%	107.3%	102.7%	23,332	13.1%
(vi)	State's share of Union Taxes	16,430	24,091	20,003	83.0%	146.6%	77.4%	15,437	56.1%
(vii)	Other taxes and duties	11,249	9,613	11,980	124.6%	85.5%	81.8%	9,242	4.0%
	(b) Non-tax revenues	8,253	11,347	10,940	96.4%	137.5%	101.6%	7,893	43.8%
	(c) Grants-in-aid and Contribution	28,245	29,962	22,281	74.4%	106.1%	95.2%	30,075	-0.4%
2	Capital Receipts	58,875	60,574	61,653	101.8%	102.9%	139.9%	64,879	-6.6%
3	Total Receipts	2,31,141	2,54,525	2,51,541	98.8%	110.1%	97.9%	2,21,596	14.9%

Table 18: Karnataka's accounts showing actual collections till March 2022 with comparison to Budget Estimates for FY 23. Source: Comptroller and Auditor General of India

This high growth in revenue in FY 22 and the sedate growth estimated by the central government for FY 23 set the stage for innovative programs to boost growth and jobs in India and Karnataka, and help absorb any fiscal shocks like high oil prices. The Government of India used the excess collections of the

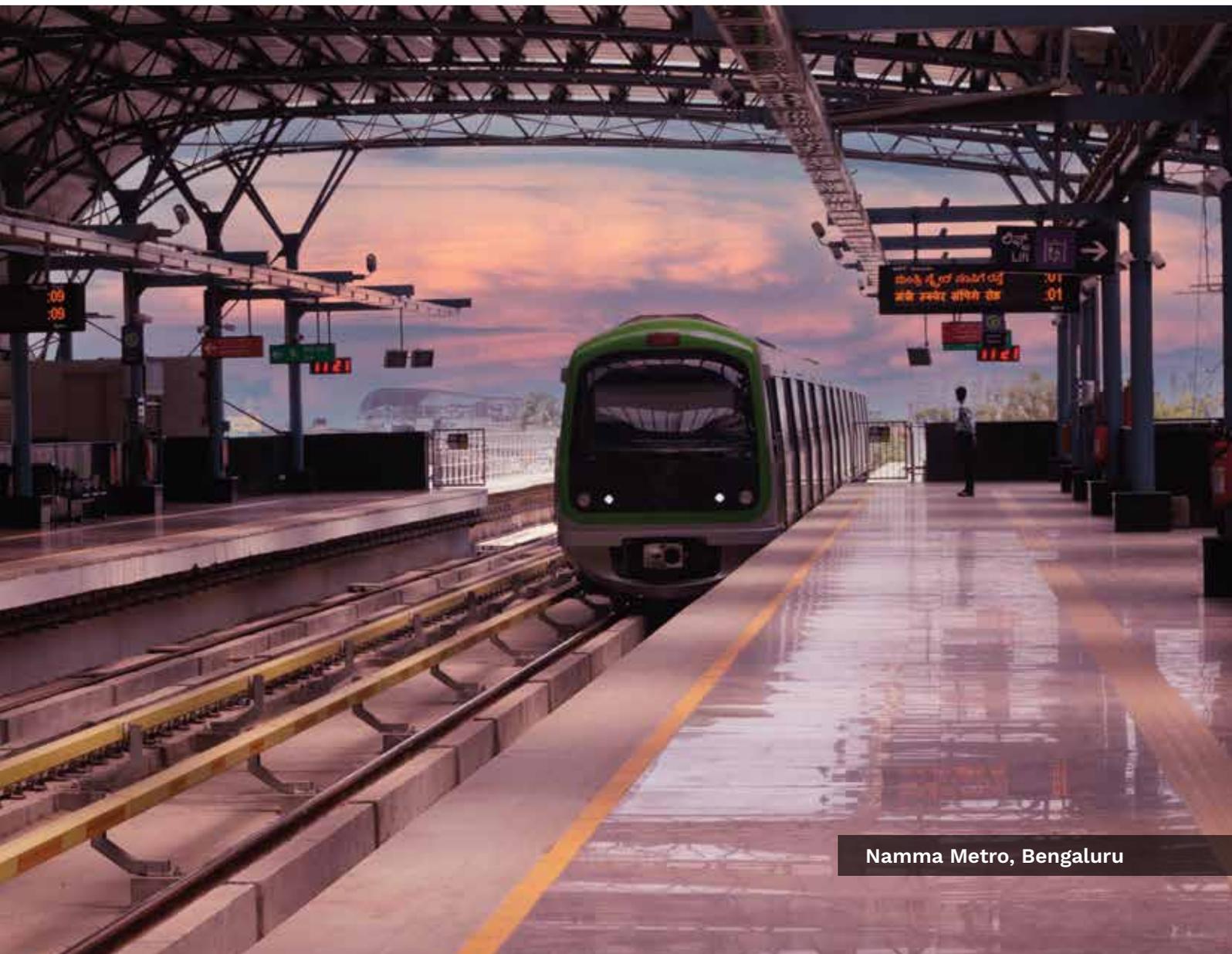
previous years to reduce the borrowings outside the budget and clear all the old claims for expenses and subsidies. Karnataka had a similar strategy to clear old claims and ensure that FY 23 will be a strong one to accelerate growth further, though it has underestimated total receipts for FY 23 as discussed above.

Prudent management of finances enabled Karnataka to manage the impact of the pandemic well. Over the last several years, Karnataka has maintained the fiscal deficit within 3% of GSDP though it was higher during the pandemic. Compared to many other states, the revenue deficit and fiscal deficit have been lower. The state must focus on improving the efficiency of public expenditure. For example, some studies indicate that subsidies in the state are higher than other comparable states.

Asset monetisation seeks to answer a big challenge for all state governments—that of resource mobilisation to meet developmental needs. All governments have historically invested heavily in asset

creation and PSUs. The question now is whether these assets can be monetised and the proceeds used for development. The central government has embarked on a National Monetisation Pipeline with identified assets totalling about INR 6 lakh crore. Karnataka too needs a similar program for asset monetisation.

In conclusion, Karnataka has a robust revenue and tax profile and is a fiscally well-managed state. It will certainly have adequate resources to invest in human capital and growth to increase the income of all its citizens and create adequate jobs.



Namma Metro, Bengaluru

Districts and Urbanisation

While Karnataka is undoubtedly doing well—Top 3 state economy with the highest per-capita GSDP, high services component and strong foundation for formal employment generation—the distribution of per-capita income varies widely across the state. Economic growth in Karnataka is uneven, and concentrated largely around Bengaluru city and the south.

Per-capita Gross District Domestic Product (INR)

Lower-Income Districts		Middle-Income Districts		Higher-Income Districts	
District	Per-capita GDDP	District	Per-capita GDDP	District	Per-capita GDDP
Kalaburagi	1,16,088	Chickballapur	1,51,275	Mandya	2,03,364
Koppal	1,26,766	Gadag	1,54,901	Tumakuru	2,08,555
Bidar	1,27,306	Kolar	1,63,207	Kodagu	2,14,024
Yadagiri	1,29,006	Chamarajanagar	1,69,553	Ramnagara	2,19,336
Vijayapura	1,31,750	Mysuru	1,74,396	Bengaluru Rural	2,29,663
Haveri	1,32,178	Uttara Kannada	1,86,067	Shivamogga	2,40,674
Raichur	1,33,197	Hassan	1,92,656	Chikkamagaluru	3,15,373
Belagavi	1,33,314	Bagalkote	1,93,804	Udupi	3,26,175
Davangere	1,45,107	Ballari	1,97,022	Dakshina Kannada	4,08,496
Chitradurga	1,49,929	Dharwad	1,97,418	Bengaluru Urban	5,72,786
Population weighted avg.	1,32,189	Population weighted avg.	1,80,876	Population weighted avg.	3,94,858 (2,65,854 w/o BLR Urban)
Karnataka State Per-capita GSDP					2,44,381

Table 19: Per-capita GDDP of Karnataka's districts in FY 20. Source: Economic Survey of Karnataka 2021-22

Karnataka's districts by income in 2019-20



Fig 5: Karnataka's districts by per-capita GDDP in 2019-20.
Source: Economic Survey of Karnataka 2021-22

Latest Gross District Domestic Product (GDDP) data is available for 2019-20 only. Per-capita GDDP varies widely between Karnataka's 30 districts. **Table 19** shows the 30 districts categorized according to the ten lower income, ten middle-income and ten higher income district by per-capita GDDP. Bengaluru Urban is by far the richest district in the state, averaging a per-capita GDDP of INR 5,72,786—2.3 times that of Karnataka's per-capita GDP of INR 2,44,381 in 2019-20. This is a result of the IT industry and other high value-add industries located in the city.

The ten poorest districts range from Kalaburgi with a per-capita GDDP of INR 1,16,088 to Chitradurga at INR 1,49,929. The population-weighted average of these ten

districts is INR 1,32,189. All ten are located in North Karnataka, and are characterized by larger populations compared to the south and inadequate high value-add opportunities like industries or technology-based sectors. Human capital development is also rather low here. Agriculture is the mainstay in these districts, without much room for growth. This calls for a revised strategy for regional balancing by following the Aspirational Districts model pioneered by NITI Aayog.

The middle-income set of ten districts range from Chickballapur at INR 1,51,275 to Dharwad at INR 1,97,418. The population-weighted average of this set

District / Division	Gross District Domestic Product (GDDP) (INR lakh)	Per-capita GDDP (INR)	Aggregate population
North Karnataka	4,19,91,624	1,49,221	2,81,40,614
South Karnataka	11,95,54,029	3,14,919	3,79,63,386
Bangalore Urban District	5,96,29,019	5,72,786	1,04,10,343
S KA (Excl. BLR Urban Dist)	5,99,25,010	2,17,490	2,75,53,043
State	16,15,45,653	2,44,381	6,61,04,000
State (Excl. BLR Urban Dist)	10,19,16,634	1,82,995	5,56,93,657
Bangalore Division (Incl. BLR Urban Dist)	8,57,83,989	3,52,009	2,43,69,802
Bangalore Urban District	5,96,29,019	5,72,786	1,04,10,343
Bangalore Division (Excl. BLR Urban Dist)	2,61,54,970	1,87,364	1,39,59,459

Table 20: Aggregated per-capita GDDP of Karnataka's districts in FY 20. Source: Economic Survey of Karnataka 2021-22

is INR 1,80,876—1.4x that of the set comprising of the poorest districts with a difference of INR 48,687 per-capita. The ten higher-income districts range from Mandya at INR 2,03,364 to Bengaluru Urban at INR 5,72,786—with stark variance. The population-weighted average is INR 3,94,858—INR 1,50,476 over the state average. Excluding Bengaluru Urban brings the population-weighted average down to INR 2,65,854—merely INR 21,473 over the state average. Clearly, Bengaluru Urban makes a significant portion – 37% in FY 20 – of the state economy.

A closer look at aggregate division data in **Table 20** demonstrates a stark difference between North and South Karnataka. North Karnataka consists of 13 districts in the Belgaum and Kalaburgi divisions with an aggregate population of 2.81 crore and combined GDDP of INR 4.2 lakh crore. This amounts to a per-capita GDDP of INR 1.49 lakh. South Karnataka's per-capita figure is double that at INR 3.15 lakh—this includes the Bengaluru Urban district. South Karnataka has an aggregate population of 3.8 crore and combined GDDP of INR 11.95 lakh crore. On excluding Bengaluru Urban, combined GDDP of South Karnataka falls to INR 5.99 lakh crore and per-capita GDDP falls to INR 2.17 lakh, which is merely INR 68,000 more than the North Karnataka average.

A similar analysis state-wide also demonstrates a stark difference with and without the Bengaluru Urban district. In 2019-20, Karnataka GSDP was INR 16.15 lakh crore with per-capita at INR 2.44 lakh. Without Bengaluru Urban district, however, those figures drop to INR 10.2 lakh crore and INR 1.83 lakh, respectively. The Bengaluru revenue division, too, similarly drops from an aggregate GDDP of INR 8.58 lakh crore and per-capita of INR 3.52 lakh to INR 2.61 lakh crore and INR 1.87

lakh excluding the Bengaluru Urban district.

These datasets demonstrate two significant points that must be addressed to unlock higher growth in Karnataka. One, the rest of the state excluding Bengaluru, particularly the ten poorest districts in North Karnataka, must be rapidly developed with adequate high-wage employment opportunities in scalable industrial enterprises so the per-capita output and low GDDPs grow faster than the state average. Even other areas in South Karnataka, excluding Bengaluru, need development opportunities that enable them to grow faster and contribute more to the state economy.

Data shows there is a need for a concerted sustainable urbanisation drive across Karnataka. Urbanisation is critical for improving the quality of life for all citizens across the state. Urbanisation concentrates human activity, which leads to specialisation which, in turn, increases productivity and thereby income. The world, on average, is 55%+ urban, with China at nearly 60% today. India's data on urbanisation, at 31%, is still based on the 2011 Census while the economy has multiplied by at least 3 times in the ensuing decade—calling for an immediate update. Karnataka needs up-to-date data on its cities, towns and villages, that can be operationalized into a sustainable urban policy to improve the quality of life and increase income of its citizens.

Two, Bengaluru is the jewel in the crown of Karnataka making up a significant component of GSDP, paying the majority of the taxes, and with the highest per-capita income amongst India's cities. Excluding Bengaluru's contribution, the state's per-capita income drops closer to the national average. The city is India's IT capital, biotechnology capital, science capital, avionics capital, space capital, and, in essence, the hi-tech and innovation capital.

It is imperative to develop the city and allocate the necessary resources for Bengaluru to achieve its potential as a global hi-tech city. Increasing prosperity has led to severe infrastructure challenges with the lack of an appropriate governance mechanism to meet the citizens' needs. A focused plan on the development of Bengaluru Metropolitan Region is required to make the city's future more vibrant and improve the quality of life for all its citizens. One central strategy to develop the whole state economy can no longer work; each region needs a differentiated and focused agenda based on its population's needs.

Indeed, the governance mechanism for all urban areas must be revisited to ensure that there is greater devolution of power and citizens are better served as urban areas are the main engines of growth today. They need better mobility mechanisms to increase productivity and quality of life. This calls for a reorientation of policies to make urban areas walking cities and advance the framework around important issues like waste management, pollution, cleanliness, and other major challenges.



Vidhana Soudha, Bengaluru

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DEMOGRAPHICS AND EDUCATION



Photo by Nikhita S on Unsplash

Demographic Indicators

A welfare state exists for the welfare of its citizens. All policies of a state are tuned towards increasing the quality of life of the state's citizens. It is important to study the demographics of every state and the country to understand how it is changing and to respond to the needs of all citizens and social groups.

Demographic and socio-economic indicator	NFHS – 5 (2019-21)		NFHS – 4 (2015-16)	
	India	Karnataka	India	Karnataka
Population below age 15 years (%)	26.5	22.9	28.6	24.4
Sex ratio of total population (females per 1,000 males)	1,020	1,034	991	979
Sex ratio at birth for children born in the last 5 years (females per 1,000 males)	929	978	919	910
Population living in households with electricity (%)	96.8	99.1	88	98.3
Population living in households with an improved drinking-water source (%)	95.9	95.3	94.4	95.3
Population living in households that use an improved sanitation facility (%)	70.2	74.8	48.5	57.8
Households using clean fuel for cooking (%)	58.6	79.7	43.6	54.7
Households with any usual member covered under a health insurance/financing scheme (%)	41	28.1	28.7	28.1
Women who are literate (%)	71.5	73.4	N/A	N/A
Men who are literate (%)	84.4	85.2	N/A	N/A
Women who have ever used the internet (%)	33.3	35	N/A	N/A
Men who have ever used the internet (%)	57.1	62.4	N/A	N/A

Institutional births (%)	88.6	97	78.9	94
Children under 5 years who are stunted (%)	35.5	35.4	38.4	36.2
Children under 5 years who are wasted (%)	19.3	19.5	21	26
Children under 5 years, severely wasted (%)	7.7	8.4	7.5	10.5
Children under 5 years who are underweight (weight-for-age in %)	32.1	32.9	35.8	35.2
Children under 5 years who are overweight (weight-for-height in %)	3.4	3.2	2.1	2.6
Women who are overweight or obese (%)	24	30.1	20.6	23.3
Children age 6-59 months who are anaemic (%)	67.1	65.5	58.6	60.9
Women having a bank or savings account (%)	78.6	88.7	53	59.4
Women having mobile phone used by themselves (%)	54	61.8	45.9	47.1
Infant mortality rate (per 1,000 live births)	35.2	25.4	40.7	26.9
Under-5 mortality (per 1,000 live births)	41.9	29.5	49.7	31.5
Women aged 20-24 married before age 18 (%)	23.3	21.3	26.8	21.4
Total fertility rate (children/woman)	2.0	1.7	2.2	1.8

Table 21: Various demographic indicators for India and Karnataka. Source: NFHS

The recent National Family Health Survey (NFHS-5) for 2019-21 shows tremendous improvement in many indicators across the country, as shown in **Table 21**. Significantly, for the first time in our history, India has 1,020 women per 1,000 men, while Karnataka has 1,034 women per 1,000 men. The sex ratio at birth for children in India has gone up to 929 from 919 in 2015-16. In the same period in Karnataka, sex ratio at birth has increased from 910 to 978, a phenomenal increase. A study of the indicators in the table is revealing.

Karnataka's demographics is clearly changing rapidly and must be considered in any analysis aimed at socio-economic growth. Crucially, India's total fertility rate (TFR) has plummeted over three decades as shown in **Table 22**, and the Indian population is officially below replacement. Global consensus has placed the replacement rate for emerging economies at 2.3 and for the developed world at 2.1. India's latest TFR according to the NFHS-5 is 2.0, coming under both replacement rates and officially signifying the country's high population growth trajectory is over and the population will peak soon. In a couple of decades, the number of senior citizens will increase multifold and social security will be essential. India's famed youth bulge, the demographic dividend, is passing through the workforce now, and the country will soon have a large ageing population dependent on a gradually shrinking workforce. It is imperative to develop a highly skilled and productive workforce to maintain the economic momentum when the population downturn happens.

Karnataka's TFR has fallen faster than the India-average. When India's TFR was 3.4 in 1992-93, Karnataka's was 2.85. Thirteen years later in 2005-06, the state's TFR had dipped below replacement at 2.1. TFR has

dropped further to 1.8 in 2015-16 and 1.7 in 2019-21, signifying that the fertility drop hasn't levelled off yet.

The steep fertility decline is consistent with other datasets. **Table 23** shows the actual births and actual deaths, with estimates, for both India and Karnataka from the Civil Registration System. Data shows that the estimated births, gross of infant mortality deaths, is stagnating for the last 5 years and possibly declining. Total number of deaths in India is increasing.

In Karnataka, total number of births is reducing in-line with fertility having dropped to 1.7 in 2019-21, with a further expected drop to 1.5 by 2030. It is very clear that the number of deaths is increasing quite dramatically. If the estimated births decrease by 1% every year—in 2030, number of births could be 10.2 lakhs. However, the death rate is almost 7% CAGR, which means the number of deaths in 2030 will be close to 12 lakhs thereby overtaking the number of births, leading to a population decline. A detailed analysis is required to create a demographic profile of the state till 2030, so that appropriate targeted policies can be evaluated.

NFHS/Year	India's TFR	Karnataka's TFR
NFHS -1 (1992-93)	3.39	2.85
NFHS -2 (1998-99)	2.85	2.13
NFHS-3 (2005-06)	2.7	2.1
NFHS-4 (2015-16)	2.2	1.8
NFHS-5 (2019-21)	2.0	1.7

Table 22: Total Fertility Rates of India and Karnataka from 1992-93 to 2019-21. Source: NFHS

Fertility rates in India and Karnataka are plummeting.

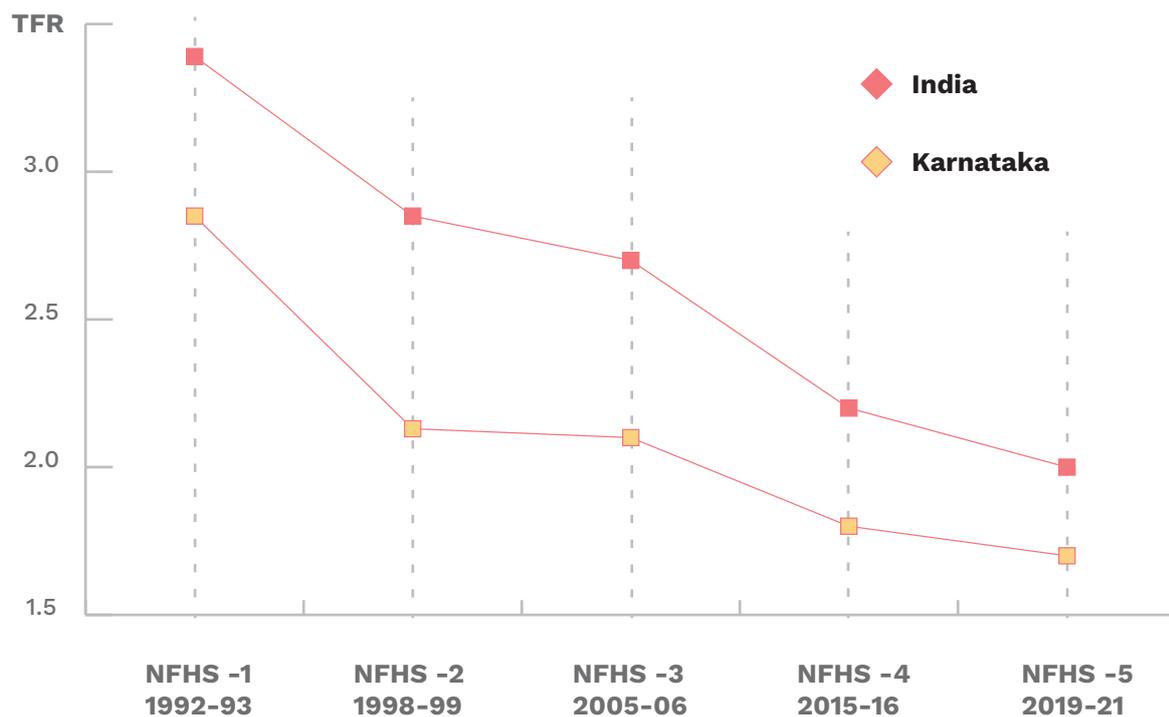


Fig 6: Fertility rates in India and Karnataka from 1992-2021. Source: NFHS

Year	India (in lakhs)				Karnataka (in lakhs)			
	Actual Births	Estimated Births	Actual Deaths	Estimated Deaths	Actual Births	Estimated Births	Actual Deaths	Estimated Deaths
2015	231.4	261.9	62.7	81.8	10.5	11.1	3.9	4.1
2016	222.0	259.9	63.5	81.5	11.1	11.0	4.2	4.2
2017	221.0	260.3	64.6	81.2	11.0	11.0	4.8	4.1
2018	232.7	264.9	69.5	82.1	10.3	10.9	4.8	4.0
2019	248.2	267.8	76.4	83.0	10.5	11.3	5.1	4.2
2020	242.2	N/A	81.2	N/A	9.9	9.7	5.5	5.1

Table 23: Number of births and deaths in India and Karnataka from 2015 to 2020. Source: Civil Registration System

School Enrollment

Similarly, a detailed analysis of school enrollment data in Karnataka shows clearly that the average enrollment across classes I, II and III over the last ten years has been stagnating and possibly trending down as seen in **Table 24**. In FY 11, average enrollment across the three classes was 10.8 lakh which rose to a decadal peak of 11.06 lakh in FY 16 and then fell to 10.85 lakh in FY 20—amounting to a 9-year CAGR of merely 0.05%. At the same time, average enrollment across classes IX and X has increased from 8.23 lakh in FY 11 to 9.18 lakh in FY 20—at a CAGR of 1.2%. There is near universal enrollment in Classes I, II and III today; almost all children enter school and the number of students completing Class X has indeed increased over time. Indeed, the average enrollment figures across Classes I, II and III in **Table 24** compare closely with the number of births in **Table 23**, which means school enrollment will trend down too.

Karnataka school enrollment data

Year	Average of Classes I, II and III	Average of Classes IX and X
2010-11	10,80,363	8,23,676
2011-12	11,04,971	8,59,967
2012-13	10,95,706	8,33,298
2013-14	10,96,707	8,42,668
2014-15	11,03,717	8,83,495
2015-16	11,06,406	8,87,132
2016-17	11,03,956	9,00,125
2017-18	10,88,601	8,79,840
2018-19	11,02,436	9,00,133
2019-20	10,85,550	9,18,446

Table 24: Average school enrollment across Classes I, II and III, and Classes IX and X in Karnataka.
Source: Department of Public Instruction, GoK

Students entering Class I in FY 11 entered Class X in FY 20; here, the data shows the average retention of students through Class X is 78.6% in Karnataka. The state must ensure that all children get an education till Class XII. In India, the average retention of students through Class X is lower, at 60.4%. The new National Education Policy suggests vocational training as a vital part of education, which must be given special budgetary support.

A similar analysis of India's school enrolment is useful to mark Karnataka's progress, as the demographic profile is quite different. **Table 25** shows average enrolment across classes I, II and III over the last ten years is definitely trending

downwards. In FY 11, average enrollment across the three classes was 2.84 crore which rose to a decadal peak of 2.93 crore in FY 12 and then decreased rapidly to 2.47 crore in FY 20—amounting to a 9-year CAGR of -1.6%. At the same time, average enrollment across classes IX and X has increased from 1.59 crore in FY 11 to 1.92 crore in FY 20—at a CAGR of 2.1%. Across India as well, there is near universal enrollment in Classes I, II and III today; almost all children enter school and the number of students completing Class X is increasing over time. Here too, the average enrollment figures across Classes I, II and III in **Table 25** compare closely with the number of births in **Table 23** but is rapidly trending down; a worrisome trend which must be worked out.

India school enrollment data

Year	Average of Classes I, II and III	Average of Classes IX and X
2010-11	2,84,42,418	1,58,89,514
2011-12	2,93,46,225	1,70,26,291
2012-13	2,77,31,218	1,73,20,052
2013-14	2,69,41,111	1,86,48,342
2014-15	2,64,01,731	1,91,50,800
2015-16	2,61,41,094	1,95,72,526
2016-17	2,51,28,334	1,94,11,927
2017-18	2,48,84,230	1,92,40,012
2018-19	2,43,05,624	1,91,67,286
2019-20	2,46,66,691	1,92,32,217

Table 25: Average school enrollment across Classes I, II and III, and Classes IX and X in India. Source: Department of Public Instruction, GoK

Another useful societal shift to track is the percentage of children enrolled in private schools versus in public schools. Government spends an enormous quantum funding the public education system and must focus this spending to ensure the children enrolled have access to quality education. **Table 26** shows the percentage of children enrolled in public and private schools in Karnataka in every class from I to X in FY 13 and in FY 20.

It is evident that the percentage of children in public schools has dropped from FY 13 to FY 20 in every single Class. In Class I, it

has dropped from 51.4% to 40.2%; a dramatic 10-point drop. Similar steep declines are seen in Classes II (52.7% to 41.3%), III (54.2% to 41.9%), IV (55.2% to 45.5%), V (57.7% to 47.3%) and VI (59.1% to 49.7%). Classes VII through X are not as steep, but downward nevertheless. Total enrolment across all classes was 52.4 lakh in FY 13, constituting 52%, which has decreased to 45.1 lakh or 43.4% in FY 20. **Table 27** shows this is a pan-India phenomenon.

In India too, the percentage of children in public schools has dropped from FY

Schools in Karnataka

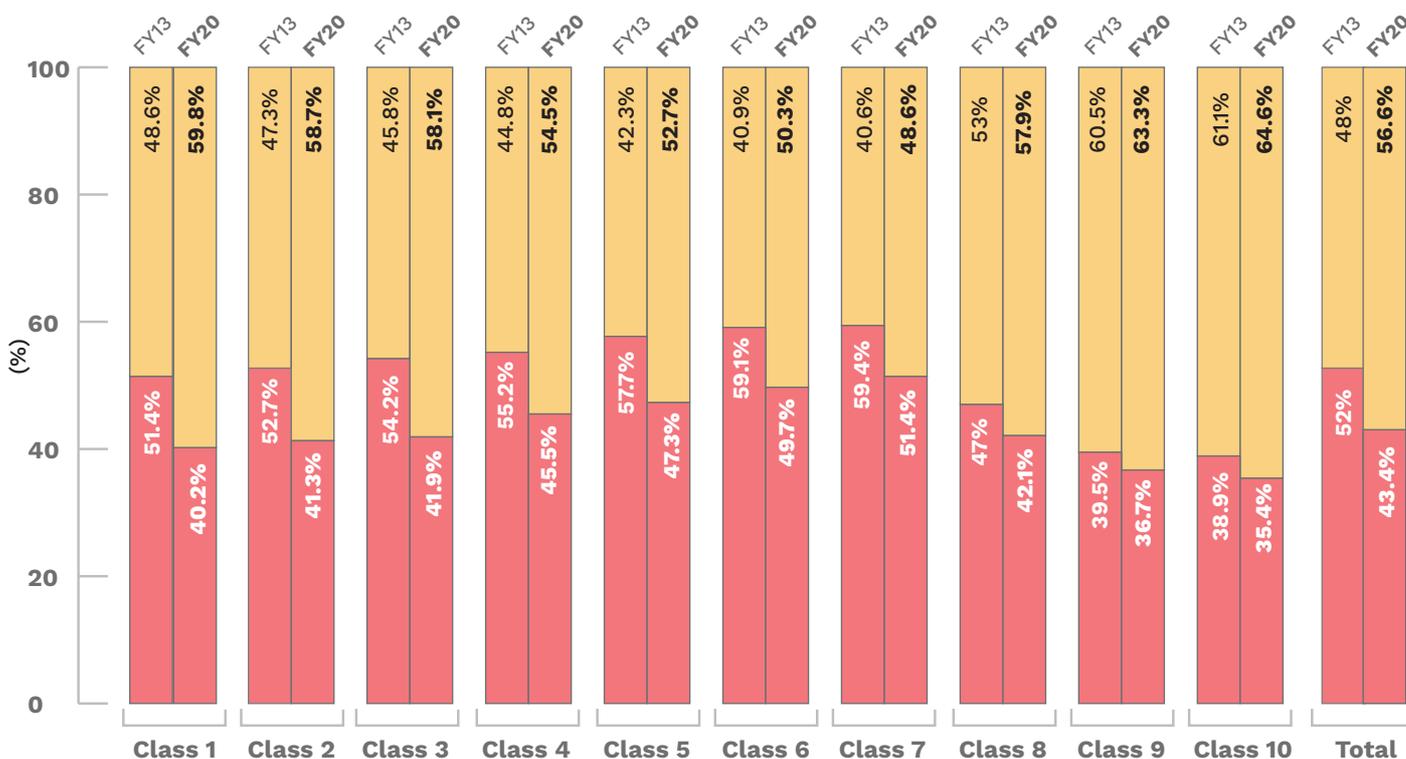


Table 26: Percentage of students enrolled in public and private schools in Karnataka.
Source: Department of Public Instruction, GoK



Enrollment in lakh			
Year	Public	Private	Total
FY13	52.36	48.26	100.63
FY20	45.13	58.96	104.09

13 to FY 20 in every single Class. In Class I, it has dropped from 62.8% to 51.6%; a steep 11-point decline in seven years. Similar steep declines are seen in Classes II (64.2% to 54%), III (65.1% to 54.7%) and IV (65.4% to 55.9%). Decline in Classes V through X are within 10-points, but all trending definitively downward. Total enrolment across all classes was 14.1 crore in FY 13, constituting 60.2%, which has decreased to 11.73 crore or 52.1% in FY 20. Across India, and Karnataka, citizens overwhelmingly prefer private schools. This trend is ominous and calls for an overhaul of the

infrastructure and human capital spend in the education sphere. For example, in FY 20, only 40% of all Class I students in Karnataka were enrolled in government schools against an extensive number of teachers employed by the government. Karnataka’s analysis will show that an enormous sum of expenditure is spent on teachers’ salaries and is increasing every year. With the drastic downward trend of government school enrollment, the government must re-evaluate teacher training and other aspects. It is also obvious the quality must improve in public schools to be on par with private schools.

Schools in India

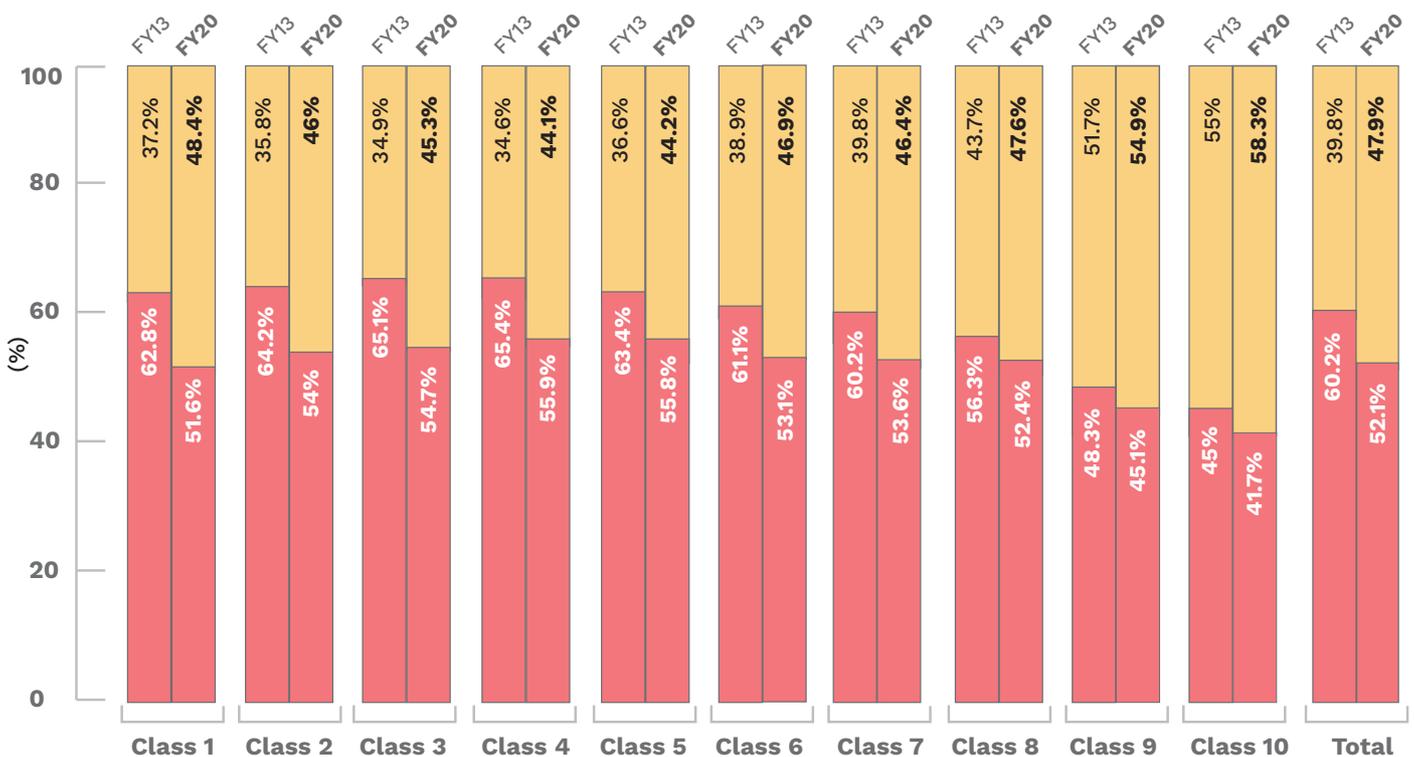


Table 27: Percentage of students enrolled in public and private schools in India.
Source: Department of Public Instruction, GoK

- ◆ Private Schools
- ◆ Public Schools

Enrollment in crore			
Year	Public	Private	Total
FY13	14.11	9.32	23.43
FY20	11.73	10.77	22.5



Ageing Society

Returning to the subject of the population downturn, over the last decade, the 18–23-year-old population in Karnataka has been decreasing at the rate of 1% YoY. Data from AISHE in **Table 28** shows in FY 13, Karnataka's 18–23-year-old population was 73.3 lakhs, reducing at the rate of 1%p.y. to 68.4 lakhs in FY 20. In the same period, India's 18–23-year-old population barely grew at 0.2% YoY from 14.06 crore to 14.23 crore. Except for a few populous states in the north and east like Bihar and Uttar Pradesh, most Indian states are ageing rapidly. States in the south, particularly, are facing a steep decline in their youth populations.

Subsequently, the percentage of the population above 60 years is rising. **Table 29** shows in 2001, 7.4% of India's population was 60+, growing to 8.6% in 2011. It is projected that 10.1% of the population was 60+ in 2021 which might increase to 13.1% in the next decade

based on the decline in the population growth rate and fertility. Karnataka's 60+ population composition remained 7.7% from 2001-2011 but is likely to have grown to 11.5% in 2021 and is further projected to rise to 15% in 2031 based on the steeper decline in fertility.

Year	India	Karnataka
2012-13	14,05,58,699	73,31,743
2014-15	14,10,45,558	71,91,845
2016-17	14,15,37,252	70,52,447
2017-18	14,18,29,528	69,82,633
2018-19	14,20,78,501	69,12,759
2019-20	14,23,28,704	68,42,880
7-year CAGR	0.2%	-1.0%

Table 28: Trend of 18-23-year age group population in India and Karnataka. Source: AISHE

Population above 60 years in India and Karnataka (% of total population).

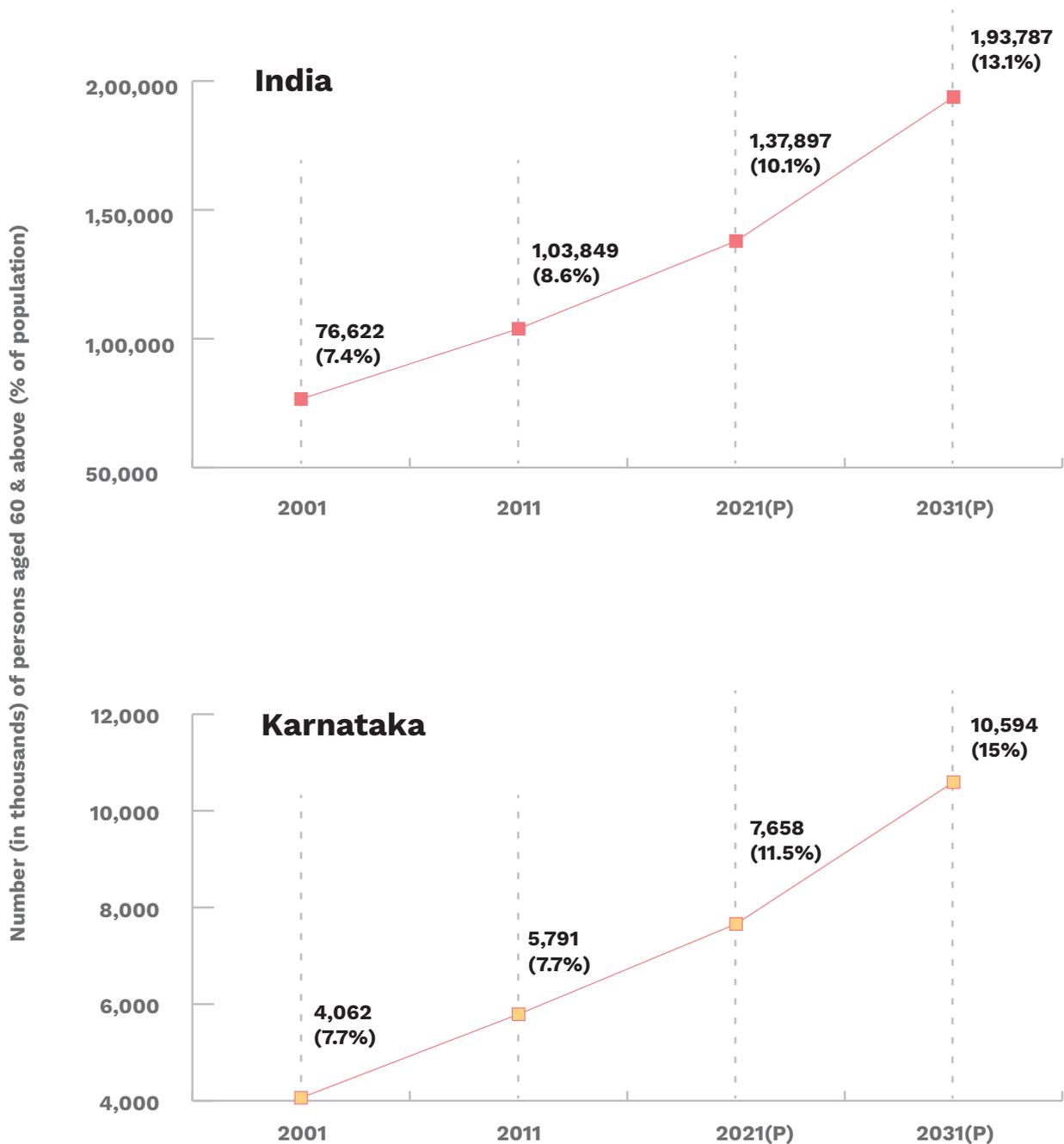


Table 29: Percentage of population above 60 years in India and Karnataka.
Source: Elderly in India 2021 (MOSPI)

Effect of Education on Communities

Education has a significant role to play in the stabilization of a country's population. Trendlines around the world have demonstrated that as women become educated, they have fewer children than their counterparts with lesser education. In India, too, fertility of women steeply drops as the education level rises. **Table 30** shows that while illiterate women tend to have 3 children, literate women have 2.1, on average. Among them, women with school education may have 1.9-2.5 children while women with pre-university education, 1.8, and women with a graduate degree and above, 1.7.

In keeping with Karnataka's low overall TFR, illiterate women in the state may have 1.8 babies while literate women have 1.7, on average. A school educated woman may have 1.7-2.1 children, while women with pre-university education 1.5, and women with a graduate degree and above, a mere 1.3.

Furthermore, a country can truly rise when all its communities are economically empowered. Higher

education is one of the most powerful drivers towards economic empowerment. It unlocks new avenues for aspiring citizens to develop their human capital, access better employment and financial opportunities, and improve quality of life. Today, socio-economic growth is driven by the knowledge economy and the biggest benefactors of this new economy are people and countries that are focusing on human capital development.

Educational level of women	Illiterate	Literate						
		Below primary	Primary	Middle	Class X	Class XII	Graduate and above	Total literate
India	3.0	2.9	2.5	2.2	1.9	1.8	1.7	2.1
Karnataka	1.8	2.3	2.1	2.1	1.7	1.5	1.3	1.7

Table 30: Correlation of Total Fertility Rates with women's education levels. Source: Sample Registration System Statistical Report 2018

The recently released AISHE 2019-20 report indicates tremendous change across India among all communities except for those designated 'general merit', as seen in **Table 31**. The 7-year compound annual growth rates (CAGR) of the communities are 5.7% (SC), 7.3% (ST), 6.1% (OBC), 7.3% (Muslims), and 6.7% (other minority communities), between 2012-13 and 2019-20. In the same period, enrollment of general merit dropped at a CAGR of negative 0.3%. GoI's institution of the 10% EWS category may be a response to this decline.

Enrollment proportions for the SC, ST and OBC communities in 2019-20 are close to their population composition—14.9% enrollment against 16.6% of the population for SCs, 5.5% enrollment against 8.6% of the population for STs, and 36.3%

enrollment against 40.9% of the population for OBCs. Towards the objectives of inclusive enrollment and coverage, affirmative action has indeed yielded results.

Minorities, however, have not demonstrated the same progress. Minorities constitute 20.2% of India's population, but only 7.5% in HE enrollment. AISHE only tracks Muslims separately, who represent 5.2% of HE enrollment against 14.2% of the population. All other designated minority religions are jointly categorised—Christians, Sikhs, Jains, Buddhists, and others—and are collectively at 2.3% of total enrollment against 6% of the population. The upcoming 2021 census will inform us of the latest composition. The Muslim

Social Group	AISHE 2019-20		Population %	AISHE 2012-13		7-yr CAGR
	Enrollment	% of total	Census 2011	Enrollment	% of total	FY 13-20
Women	1,88,92,612	48.64%	48.46%	1,35,35,123	44.89%	4.88%
Men	1,96,43,747	51.36%	51.54%	1,66,17,294	55.11%	2.42%
SC	56,57,672	14.89%	16.60%	38,47,942	12.76%	5.66%
ST	21,56,109	5.53%	8.60%	13,20,361	4.38%	7.26%
OBC	1,42,49,114	36.34%	40.9%	94,16,299	31.23%	6.10%
Muslim	21,00,860	5.24%	14.20%	12,51,656	4.15%	7.68%
Other Minorities	8,87,750	2.32%	6%	5,64,227	1.87%	6.69%
General Merit	1,34,84,854	35.68%	13.60%	1,37,51,932	45.61%	-0.28%
All	3,85,36,359	100.00%	100.00%	3,01,52,417	100.00%	3.57%

Table 31: Higher education enrolment of various social groups in India compared to the corresponding population. Source: AISHE, Census 2011, NSSO

community requires special care to ensure they have access to higher education opportunities; the 7-year CAGRs are the most promising in among the Muslim community, at 7.7%, signifying their aspirations.

A similar analysis of Karnataka's social groups in HE is shown in **Table 32**. The 7-year compound annual growth rates (CAGR) of the communities are 3.8% (SC), 5% (ST), 5% (OBC), 7.8% (Muslims), and 6.7% (other minority communities), between 2012-13 and 2019-20. In the same period, enrollment of general merit dropped at a CAGR of negative 4.6%, steeper than India's. Special programs for economically weaker sections of non-reserved categories are needed as undertaken by the central government. Special scholarships for this section will

ensure even those without means can access quality education.

Enrollment proportions for the SC, ST and OBC communities in 2019-20 are, again, close to their population composition—13% enrollment against 17% of the population for SCs, 5% enrollment against 7% of the population for STs, and 49.5% enrollment against 55.5% of the population for OBCs. Towards the objectives of inclusive enrollment and coverage, affirmative action has indeed yielded results in Karnataka as well.

Minorities constitute 16% of Karnataka's population, versus 10.5% in HE enrollment. AISHE only tracks Muslims separately, who represent 6.3% of HE enrollment against 13% of the population. All other designated minority religions are jointly

Social Group	AISHE 2019-20		Population %	AISHE 2012-13		7-yr CAGR
	Enrollment	% of total	Census 2011	Enrollment	% of total	FY 13-20
Women	10,99,009	50.04%	49.31%	8,73,555	46.98%	3.33%
Men	10,88,883	49.96%	50.69%	9,86,024	53.02%	1.43%
SC	2,90,162	13.14%	17.15%	2,23,384	12.01%	3.81%
ST	1,05,761	4.78%	6.95%	75,000	4.03%	5.03%
OBC	11,00,154	49.59%	55.50%	7,80,324	41.96%	5.03%
Muslim	1,44,511	6.31%	12.92%	85,675	4.61%	7.75%
Other Minorities	87,770	4.10%	3.09%	55,639	2.99%	6.73%
General Merit	4,59,534	22.07%	4.39%	6,39,557	34.39%	-4.61%
All	21,87,892	100.00%	100.00%	18,59,579	100.00%	2.35%

Table 32: Higher education enrolment of various social groups in Karnataka compared to the corresponding population. Source: AISHE, Census 2011, NSSO



Karnataka Arts College, Dharwad

categorised—Christians, Sikhs, Jains, Buddhists, and others—and are collectively at 4% of total enrollment against 3% of the population. Here, too, the 7-year CAGRs are the most promising among the Muslim community, at 7.8%. A large-scale scholarship program is required for the Muslim community to meet their aspirations for greater enrolment in higher education as their enrolment is the lowest among all groups compared to their population but growth is the fastest.

Women have overtaken men in Karnataka's higher education where they constitute 50.04% of enrolment compared to 49.96%. Their 7-year enrolment CAGR, at 3.3%, is more than double that of men at 1.4%. Gross Enrolment Ratio of women is now 32.7, compared to 31.2 for men. These trends show a silent revolution over the last decade, where women are increasingly turning towards higher education with aspirations.

Sustainable Development Goals

The 2030 Agenda for Sustainable Development is a comprehensive framework launched by the United Nations and adopted by the member states in 2015. India is a prominent signatory and has integrated the framework into its socio-economic policymaking. It uses the Sustainable Development Goals (SDG) blueprint to track the progress at the national and state levels.

Category (Score)	Sustainable Development Goals	Score	Rank among States
Achiever (100)	SDG 7: Affordable and Clean Energy	100	1
Front Runner (65-99)	SDG 1: No Poverty	68	10
	SDG 3: Good Health and Well-being	78	5
	SDG 6: Clean Water and Sanitation	85	11
	SDG 8: Decent Work and Economic Growth	66	6
	SDG 10: Reduced Inequalities	67	12
	SDG 11: Sustainable Cities and Communities	78	7
	SDG 12: Responsible consumption and production	89	3
	SDG 15: Life on Land	67	11
	SDG 16: Peace, Justice and Strong Institutions	76	7
Performer (50-64)	SDG 2: Zero Hunger	53	10
	SDG 4: Quality Education	64	6
	SDG 5: Gender Equality	57	6
	SDG 9: Industry, Innovation and Infrastructure	64	6
	SDG 13: Climate action	62	7
	SDG 14: Life below water	60	NA
	Karnataka's Consolidated SDG Score	72	3

Table 33: Karnataka's Sustainable Development Goals matrix. Source: NITI Aayog

NITI Aayog maintains a composite SDG India Index, developed in collaboration with the UN, which ranks the states across 115 indicators. Per the 2020-21 index, Karnataka ranks third with a score of 72 as shown in **Table 33**. Kerala is number one at 75, followed by Himachal Pradesh and Tamil Nadu, jointly at second with scores of 74. The state has a top score of 100 in SDG7 on affordable and clean energy. Karnataka claims a frontrunner position in SDGs 1, 3, 6, 8, 10, 11, 12, 15 and 16, with scores between 65-99. These are areas where the state continues to make commendable progress and can reach the achiever position (Score of 100) with

focused agendas and investment. In SDGs 2, 4, 5, 9, 13 and 14, Karnataka has a performer position with scores between 50-64, showing the improvement areas for the state.

Karnataka has integrated the SDG framework into its policymaking, and plans to detail it further at the district level to track district-level goals. It has developed an exhaustive plan to realize its SDG targets. It has also set up a decision support system – AVALOKANA, to help achieve this target and map out the budget spending towards these targets.

Karnataka's Index Score : SDG-wise

Overall Composite Score : 72, from 66 in 2019



Fig 7: Karnataka's SDG Index score.
 Source: NITI Aayog



Dubare Elephant Camp, Kodagu

ವಿತ್ತಿಗಲ ಫಲಶ್ರುತಿ

POLICY OUTPUTS



UB City, Bengaluru
Photo by Neeraj Negi on Unsplash

From the study of Karnataka's demographics in the context of the macroeconomic data, the following actionable observations come to the fore:

1. The number of children being born are declining year after year, with fertility down to 1.7 and still in a declining trend. With the increase in higher education enrolment, a rising number of women are bearing fewer children. The population is projected to age faster, and the percentage of 60+ population is slated to rise rapidly.
2. Number of people dependent on agriculture is decreasing rapidly and the aspirations among the educated is to work in industry and services which require investment.
3. The industry sector has been a laggard in Karnataka with a lower growth rate compared to agriculture and services, and requires further investment.

Future strategies for economic growth must focus on:

1. Improve the access of school education so every child gets an education till Class XII. Quality, too, needs to improve so school-educated children have the ability to get a higher education and aspire for high-wage jobs.
2. The GER in higher education must go up to 60% by 2030 from 32% in 2020 as the increase in enrolment across all sections show the increasing aspirations of young students. With the decline in the 18-23 age group every year, both in absolute numbers and as a percentage of the population, there is a need for greater investment in higher education, improvement in quality, and greater spending on research and development to develop a highly skilled workforce that can maintain economic output when the population downturn comes.

3. Increase development expenditure in industry and services sectors so that people are able to move from agriculture to industry and services which provide opportunities for higher growth in income in the future. Formal job creation in EPF demonstrates very clearly that the formal job potential of Karnataka is very high.
4. Investment in agriculture must focus on getting farmers higher prices than in the status quo and developing segments where farmers can accrue higher value-add. A significant contributor here is to connect the farmer to the market so they can realize full value. Agri-tech platforms that directly connect the farmers to the markets can be significant drivers and have validated this approach over the last decade. Krishikalpa and other Farmer Producer Organisations (FPOs) have leveraged technology to great use in deriving the maximum benefit for the farmers and are valuable role models to scale across the state.

5. Strengthen the agricultural food value chain by incentivising agroprocessing, FPOs, and Self Help Groups, and developing denser market linkages and state-of-the-art post-harvest infrastructure.
6. A special program is required to ensure Karnataka's bottom 10-15 districts grow faster than the state with increased per-capita incomes. This requires focus because the variance between the poorest districts and the richer districts is only increasing. NITI Aayog's Aspirational District Model is yielding results and is a valuable role model to replicate here in the state so every citizen in Karnataka can attain a decent standard of living.

7. A State Level Bankers Committee (SLBCs) is required to set higher credit allocation targets to sectors with low credit-to-GSDP ratio like transport and trade sectors.
8. Banks must be encouraged and incentivized to open branches in unbanked rural centers (URCs), with priority given for opening branches in districts with the lowest per capita income and GDDP.
9. Karnataka must roll out a gradual phasing out program of subsidies having negative implications on the environment like fuel subsidies for fishing, chemical fertilizers, and others.
10. It is imperative to provide greater access to electricity to the industrial sector, aiming for higher productivity and efficiency at reduced prices as industrial consumption of Escoms power has been stagnant for many years due to the higher cost.
11. Create an asset monetisation pipeline by identifying underutilised and unutilised assets, land and buildings and channelling them towards efficient use through public-private partnership.
12. Develop a focused 10-year policy and implementation framework for attaining the SDGs, and use it to drive socio-economic development.
13. Increase non-tax revenues by evaluating and increasing the various charges currently levied.
14. Increase investment in urban sector to improve productivity, employment, higher quality job generation and growth.
15. Create jobs and infrastructure in the tourism sector which is a high job multiplier and is currently an untapped growth driver.



Bagmane Tech Park, Bengaluru

ಮುಂಬರುವ ದಶಕದಲ್ಲಿ ಕರ್ನಾಟಕದ ಉತ್ತಮ ಅವಕಾಶಗಳು

THE COMING DECADE:
UNLEASHING KARNATAKA'S POTENTIAL



Jog Falls, Shivamogga

Karnataka@2030 – A Demographic Evaluation

Karnataka has been a Top 5 state in India, and post-COVID-19, needs to reorient its strategies keeping in view its demographic character, its ability to grow, and the available growth drivers to accelerate socio-economic development. Future growth will be led by technology which is disrupting all industries. India will experience high economic growth along with lower population growth in the next decade as the country aspires to break through the USD 10 trillion ceiling. Only two countries have transcended this so far, the US and China. Karnataka has a significant role to play in leading the states with a structured and strategic economic initiative to achieve this aim.

Further, Karnataka is a welfare state; citizens' welfare is the prime objective of all levels of governments. Citizens' welfare implies that everyone has the necessities of life, nobody suffers on account of

poverty, there exists a social security net to protect vulnerable sections, undertake investment in education, particularly higher education, so young people have assured access irrespective

Parameter	2021	2030 (Projections)
Fertility	1.7	1.5*
Population (crore)	6.66	7.06
18-23 population (lakh)	67.8 (10.2%)	62 (8.7%)
60+ population (lakh)	76.6 (11.5%)	105.9 (15%)
Number of children born (lakh)	11.1* (1.7%)	10.2* (1.4%)
Number of deaths (lakh)	6.3* (1%)	11.6* (1.6%)

Table 34: Karnataka's demographic parameters in 2021 and projected to 2030. Source: NFHS-5, MOSPI, AISHE, CRS. * Denote author estimates based on CRS data for analytical purposes.

of means, and universalize health security so all citizens can access quality medical care when in need. After welfare, availability of jobs is top priority. Adequate investment must be directed towards infrastructure and fast-growing areas so high-quality jobs are available to all citizens, especially for young people.

To direct the appropriate social and economic strategies, one must start by studying and projecting the demographic characteristic of the state for the decade, as analysed in **Table 34**. Today, Karnataka has a fertility rate of 1.7 and a population of 6.66 crore, with the share of population over 60 years estimated to be at 10%. By 2030, the total population is estimated to peak close to 7 crores with 15% of the population over 60 years of age and fertility could plummet to 1.5-1.6.

The broad implications of such demographic dynamics are:

1. The number of children being born has stagnated and will decline soon, possibly at the rate of 1% per year.
2. The number of people ageing and passing away is increasing at the rate of 7% per year and may exceed the number of children born by 2030.
3. The working age group will decline; the 18-23-year-old population is decreasing at the rate of 1% per year. The state will soon have a large ageing population supported by a shrinking workforce.
4. The number of 60+ people may increase to over 1 crore, many of whom may depend on the government for a social security net.
5. Women have done exceedingly well. Almost all girls are in school, and women dominate higher education with Gross Enrolment Ratio having jumped 10 points from 22.7 in 2011-12 to 32.7 in 2019-20, against 24.9 to 31.2 for men in the same period. Women's enrolment growth rate is 3.3% CAGR, more than double that of men's at 1.4%, which implies women's enrolment in absolute terms will overtake that of men soon. This is encouraging considering Karnataka's gender ratio at birth is 978 (per 1,000 males) and gender ratio of total population is 1,034 (per 1,000 males).
6. There is significant technology disruption with automation happening around the world, of which Karnataka is at the forefront in India. The state hosts the largest and most diverse tech ecosystems in the country. Technology disruption has significant bearing on job creation and skilling for the future.



Amba Vilas Palace, Mysuru

\$1 Trillion Vision

The Government of India announced a bold vision of maturing into a USD 5 trillion economy by 2025. With the COVID-19 recessionary impact in FY 21, the USD 5 trillion goal may be set back to 2026 or 2027. Regardless, every growing economy needs an ambitious goal, one that all stakeholders can align to and focus on. Looking past USD 5 trillion to the significant goal of USD 10 trillion—the US, now USD 22.94 trillion, and China, now USD 16.86 trillion in GDP. India is poised to be the third economy to break through this ceiling, with favourable tailwinds in demographics, domestic consumption, open market economics, and technology development and adoption. With a focused agenda, India could join the USD 10 trillion economy club by 2031-32.

To reach this vision, we must first take stock. As shown in **Table 35**, in FY 22, India's nominal GDP is estimated to reach INR 236.64 lakh crores or USD 3.16 trillion (at INR 75 = 1 USD) at 19.5% over nominal GDP of INR 198 lakh crore in FY 21. 19.5% annual growth is not normal, and is a result of the 3% decline over FY 21 due to the pandemic followed by the economy

rebounding strongly in FY 22. If India grows at a CAGR of 12.2% for the next four years starting at USD 3.16 trillion - in constant currency of INR 75 = 1 USD, - the USD 5 trillion goal by FY 26 is well within reach. Similarly, to reach USD 10 trillion by FY 32, India must continue growing at 12.2% CAGR in dollar terms from USD 5 trillion in FY 26 - in constant

India - Gross Domestic Product Growth (Nominal)

FY	INR (lakh crore)	USD (trillion)	CAGR Needed
2021-22	236.64	3.16	-
2025-26	375.00	5.00	12.2%
2031-32	750.00	10.00	12.2%

Table 35: Growth rates required for India to reach USD 5 trillion in 2026 and USD 10 trillion in 2032. Source: MOSPI (CAGRs estimated based on MOSPI data)

currency of INR 75 = 1 USD. Putting aside considerations like the depreciation of the INR, the critical issue is, can India sustain 12.2% growth p.y. over the next decade?

To answer this, we must look at our past growth. When India's economy opened up in 1991, GDP was USD 275 billion or INR 5.32 lakh crore; reaching USD 3.16 trillion today translates to a growth of 8.2% CAGR in dollar terms—despite the recessionary effect of the pandemic. 8.2%p.y. growth in dollar terms for 31 years is phenomenal growth and a testimony to the healthy growth drivers India possesses. This translates to 13% in rupee terms, the difference stemming from the USD-to-INR conversion dynamics and inflation. Given India's strong 31-year history and capacity for growth, it is indeed possible for India to grow at the 12.2% in rupee terms required to meet its USD 5 trillion and USD 10 trillion targets this decade, but only with a focused agenda and rebalancing of investment and resources.

In a time when the role of the Centre is increasingly being limited, and share of spending by all states is growing, Karnataka can demonstrate how states must lead future growth. Can Karnataka

grow its economy to USD 500 billion, in nominal terms, when India aims for USD 5 trillion in FY 26? Further, can the state grow to USD 1 trillion, in nominal terms, when India aims for USD 10 trillion in the 2030-2032 timeframe? These goals in the context of India's mean the state will contribute 10% to the national economy by 2026, up from the current 8.7%. This implies Karnataka has to accelerate growth higher than India to hit its target.

Karnataka's nominal GSDP in FY 22 is estimated at INR 20.5 lakh crore which translates to USD 273.3 billion at a conversion of INR 75 = USD 1. As shown in **Table 36**, for Karnataka to reach USD 500 billion in FY 26, when India meets the USD 5 trillion target, the state must grow at a CAGR of 16.3%. It must grow faster than India at 12.2% because it aims to become 10% of the national economy from the current 8.7%.

For Karnataka to grow to USD 1 trillion nominally in a decade by 2032, the state must grow at 12.2% CAGR from the USD 500 billion in FY 26. Alternatively, from USD 273.3 billion in FY 22, Karnataka must grow at 13.8% YoY to reach USD 1 trillion in FY 32 when India reaches USD 10 trillion. The state has demonstrated an appetite for rapid growth in the recent half-decade itself; for example, in FY 17, the state's

Karnataka - Gross State Domestic Product Growth (Nominal)

FY	INR (lakh crore)	USD (billion)	CAGR Needed
2021-22	20.5	273.3	-
2025-26	37.5	500	16.3%
2031-32	75.0	1,000	12.2% (from USD 500 bn in FY 26) 13.8% (from USD 273.3 bn in FY 22)

Table 36: Growth rates required for Karnataka to reach USD 500 billion in 2026 and USD 1 trillion in 2032. Source: MOSPI (CAGRs estimated based on MOSPI data)

GSDP grew by 15.5%.

The dream of USD 1 trillion by 2032 is within the realm of possibility for Karnataka, based on historical growth and the course-corrections it will have to undertake. To achieve these growth

targets as well as attain the SDG targets, Karnataka must pursue focused socio-economic strategies. Particularly post the COVID-19 pandemic, a reorientation of strategies might be required.



Karnataka's Achievements

Karnataka is among the Top 5 states in India and has demonstrated strong growth over the years. Its per-capita GSDP of INR 3.05 lakhs is the highest among the Top 5 states as shown in **Table 8**. A standout feature of the state economy is it has the highest share of services in the Gross State Value Added (GSVA) of 66.1%—the highest among all states, a product of its robust IT services industry and other technology-based areas. Karnataka is also a major job producer, having produced 11% of the formal jobs per EPF data in the country while contributing 8.7% to the national Gross Domestic Product (GDP) and constituting less than 5% of the population. Unemployment rate is 3.9% in the 15-59 age group per PLFS. Considering the

Sustainable Development Goals (SDGs) 2030, Karnataka ranks third among states in their efforts to achieve the SDGs.

Karnataka has certainly done well in the past but now, post the COVID-19 pandemic and the resulting recessionary effect, there is a need to re-orient its strategies by studying the unique needs of its citizens, its demographics, and its sectoral composition. Every state must do this now. Karnataka also has a significant advantage with its comprehensive technology ecosystem and advanced capabilities in data analytics. It can apply these capabilities to build technology-first growth engines. Karnataka can be a leader to demonstrate to other states how a high-growth strategy can be formulated based on data analysis and technology.



Namma Metro, Bengaluru

Karnataka's Challenges

All states have their own set of strengths and challenges, unique to their capabilities, sectoral compositions, workforce distributions, and demographics. Karnataka's challenges are:

1. Large disparity between North and South Karnataka:

The northern districts in the state, on average, have lower per-capita incomes and larger populations than their southern neighbors. The ten poorest districts, from Kalaburgi to Chitradurga, as discussed above are all in the north and had a population-weighted average of INR 1.32 lakhs per-capita income in FY 20—more than INR 1 lakh lower than the state average. These populations largely depend on agriculture and other rural economic activities which suffer from lower value-add and growth, exacerbated by the higher population- and workforce-dependence.

2. Low incomes in agriculture and rural economy:

Rural populations do not have access to enough high-growth and value-add opportunities. 41% of the workforce—and by extension, the population, depends on agriculture with per-capita income of INR 82,176. The state's average per-capita GSVAs is nearly three times higher at INR 2.33 lakhs. While people who can access a good education leave to work in Bengaluru and other urban opportunity-filled areas, most rural citizens cannot emigrate. Instead, they need opportunities to be set up near their hometowns and villages, in the form of labour-intensive industries, infrastructure development projects and services-based employment. This will usher in a rebalancing of the workforce—if the agricultural workforce

is reduced from 41% to, say, 20-25%, it will stop the overdependence on the agriculture sector and allow the remaining agri-workforce to improve productivity and increase their incomes.

3. Inadequate spending in industry and services sectors:

86% of Karnataka's GSVAs comes from the services and industry sectors supporting a combined 59% of workforce—and by extension, the population. The services sector grew at 11.6% CAGR from FY 17 to FY 22, whereas industry grew at 6.1% in the same period. Both sectors are not adequately invested in. The industry sector, particularly, is lagging due to inadequate impetus. While it is undoubtedly important to support the rural economy with a large budget and other support, the other sectors and the urban economy also require an equal impetus which will allow them to grow faster and become globally competitive. The state's investment will also be an important signal to entrepreneurs that Karnataka means business.

4. Human capital and resource development is lagging compared to other southern states:

Karnataka's higher education GER, at 32.2, lags other southern states who all have GERs over 35. Tamil Nadu leads with a GER of 51.4. Higher education and specialization will increasingly become more important for innovation and knowledge creation—both crucial for the knowledge economy-led growth over the next decade and beyond. The state also requires massive skilling and vocational training programs that

can help rebalance the workforce from over-dependence on agriculture towards other sectors.

5. Ageing state with declining fertility:

Karnataka is an ageing state with the number of citizens over 60 years of age rapidly increasing, and the number of children being born as well as the 18-23-year-old population rapidly decreasing. When the population downturn comes where the large ageing population will be supported by a gradually shrinking workforce, Karnataka must be ready with a highly productive workforce that can sustain and increase the socio-economic output without the

demographic advantage. For this, the young population must be highly skilled in different areas of technology and other drivers.

6. Technology disruption and automation will impact service jobs in many sectors:

Much like the rest of the world, Karnataka, too, faces the challenge of technology disruption and automation which may render certain existing skilled groups redundant. It is important to understand where automation may have the greatest impact and use it to the state's advantage while skilling its population in other areas where human capital will remain predominant.



Kempegowda Bus Terminus, Bengaluru

Way Forward

Karnataka must focus on instituting policy frameworks, arranging for investment in growth areas and continual easing of excessive regulations in major growth areas. These must necessarily respond to Karnataka's challenges while developing its strengths into significant competitive advantages. The following growth drivers can accelerate growth and enable the state to reach USD 1 trillion in this coming decade. The state will need a combination of social and economic strategies that accelerate current growth and build engines for future growth.



Hassan, Karnataka

ಮಾನವ
ಸಂಪನ್ಮೂಲದ
ಅಭಿವೃದ್ಧಿ

INVESTING IN HUMAN CAPITAL



Lalbagh Glass House, Bengaluru

Social Security Net

Create a social security net to protect all vulnerable sections and ensure everyone has food on the table, a roof over their head, water in the tap, internet and unimpeded access to digital platforms, power in their switch, toilet in the house, education for their children, gas in the stove and other basic necessities. All these factors are currently largely supported by Central Government funding. Karnataka must set up a mission group to ensure these facilities are disseminated to all its citizens by 2025, thereby effectively eliminating poverty. As per NITI Aayog's 2021 report on the Multidimensional Poverty Index shown in **Fig 8**, which is based on NFHS-4 data from 2015-16, 13.2% of Karnataka's population is multidimensionally poor; the state must aim to reduce this below 1% by 2030.

Karnataka must focus on a comprehensive social security net for vulnerable sections of the society and the population above 60 years. A pension system for different groups—old age pension, widow pension, and others—can be consolidated and disseminated from one program. Healthcare can be assured through Ayushman Bharat in which the state must aim for universal enrollment. The state must also work with civil society to ensure old age care is woven into the fabric of the society, and the state's senior citizens can lead a rewarding life with dignity. With the population declining, the rise of nuclear families and increased mobility of younger age groups, this could become a daunting issue if the net isn't instituted soon.

NOTE
Poverty Rate is calculated by the NITI Aayog according to the Alkire-Foster method of computing Multi Dimensional Poverty. It takes into account factors like health, education and standard of living

What % of people in Each State are Poor?

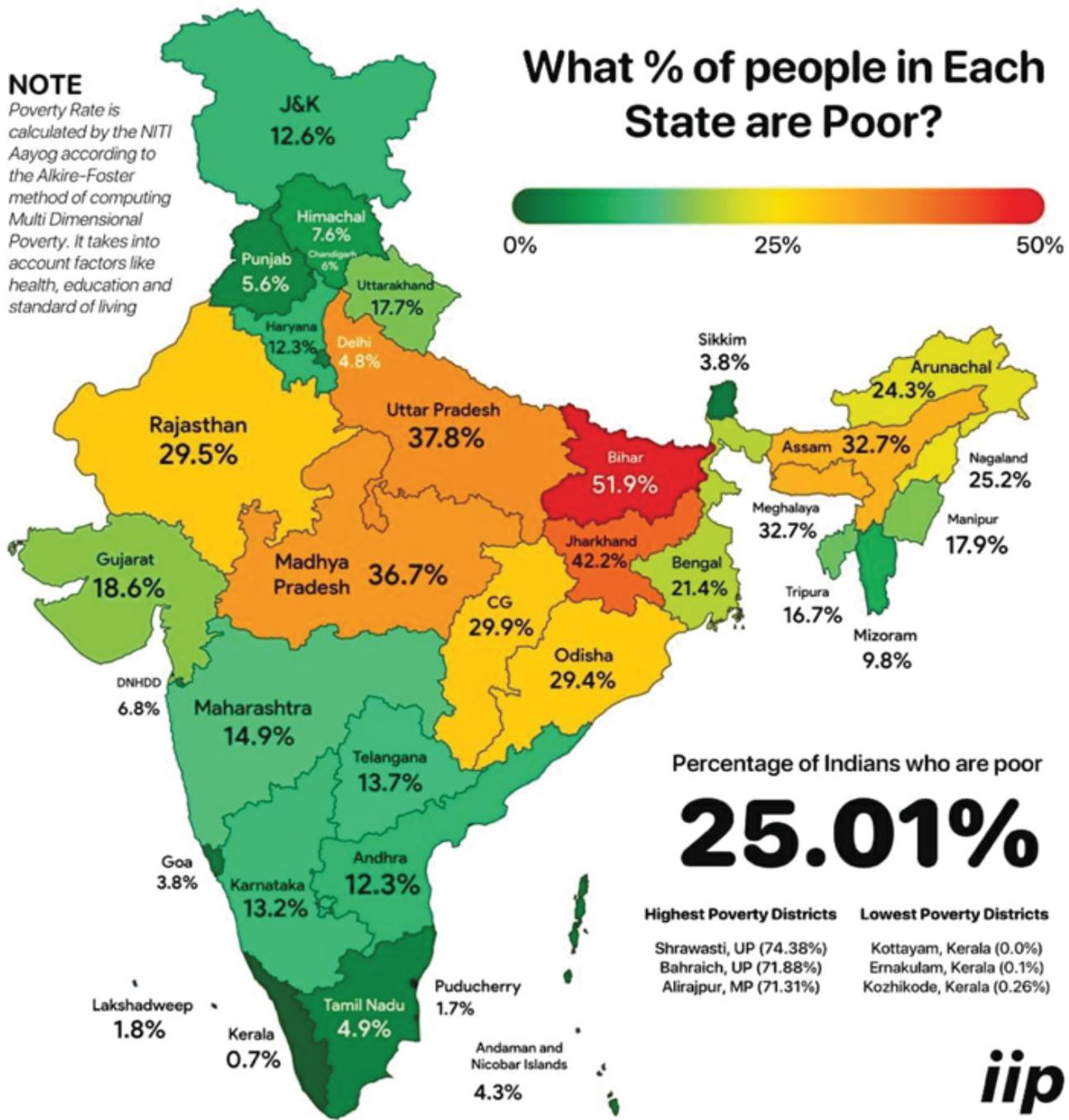


Fig 8: National multidimensional poverty index baseline 2021. Source: NITI Aayog

Education

Education will be key to maintaining a productive workforce when the population declines. Data conclusively shows the number of school children is stagnating and will possibly reduce substantially by 2030. There will be a greater reduction of government school enrolment against private school enrolment, based on the reductions analysed above. This being the case, the phenomena of children gravitating to private schools will further accelerate. This is driven by parents' desires to get their children a good education, provide their children the best shot they can for succeeding in life and for them to master English, the world's business language.

While public schools provide adequate education, resources must be put into increasing the brand equity of public schools and ensure it is on par with private schools. Quality parameters must be given priority; currently, the percentage of students in class 8 achieving a minimum proficiency level in nationally defined learning outcomes to be attained by pupils is 83.5% versus a target of 100%, as tracked in SDG4 under Quality Education. Adequate infrastructure has already been built up and the focus must now shift to quality by strategically reorienting the school department. At the same time, the private sector must be allowed to grow so parents have the choice. Government must guarantee

education for all up to Class XII; currently, Karnataka's GER in Classes XI and XII is only 44.4%, as tracked in SDG4 under Quality Education. This must be available across all districts; a comprehensive study must be undertaken of schools in every district to ensure all districts are on par by 2025.

Government has three mutually exclusive roles to play in education. First, that of a policymaker to ensure quality, access and affordability. Second, that of instituting a competent accreditation agency and regulator independent of government to regularly accredit schools and ensure their quality is elevated continuously and poor-performing schools are given the resources to deliver better results. An independent accreditation agency must place the same standards on public and private schools. The National Education Policy 2020 also provides for such a structure. Third, the education department can be restructured to deliver higher quality—independent of the policymaker and accreditation agency. In FY 20, 56.6% of all school children in Karnataka were enrolled in private schools, up from 48% in FY 13. The education department must be held to the same standard as private schools and colleges, with no compromise since the government spends an enormous quantum every year on the school sector.

Higher Education

Higher education to nurture specialization and human capital development is exceedingly important in the knowledge economy. Karnataka's GER in FY 20 was 32, with women's GER at 32.7, having overtaken men's at 31.2 for the first time. While this is 5 points above the all-India average of 27.1, Karnataka is lagging other southern states, who are all above 35. Tamil Nadu (51.4) leads and is the only state with GER over 50, followed by Kerala (38.8), Telangana (35.6) and Andhra Pradesh (35.2) (**Table 37**).

The goal is to target a GER of at least 50 by 2030, but Karnataka could aim for 60. With the current enrollment 8-year CAGR of 2.75%, projected enrollment in FY 30 is 28.7 lakhs. The 18-23-year-old population projects to 64.1 lakhs in FY 30 at a CAGR of -0.8% (**Table 38**). With these two projected values, GER currently projects to 44.4 by 2030. Increasing it to 60 implies enrolment will have to reach 28.7 lakh in FY 30 with a CAGR of 5.8%. This effort will require active state facilitation.

In particular, the focus must be on all districts having high quality institutions, either private or public. In FY 20, 70.3% of the 3,971 colleges in Karnataka were private unaided, while 11.9% were private aided and the balance 17.8% were government (**Table 39**). Since a majority of Karnataka's colleges are private, the state can start a comprehensive scholarship program to ensure no student is denied access because of a lack of means. The number of colleges

State	GER	State	GER
West Bengal	19.9	Karnataka	32.0
Gujarat	21.3	Maharashtra	32.2
Rajasthan	24.1	Andhra Pradesh	35.2
Madhya Pradesh	24.2	Telangana	35.6
Uttar Pradesh	25.3	Kerala	38.8
All India	27.1	Tamil Nadu	51.4

Table 37: Gross Enrolment Ratio (GER) in higher education for India and major Indian states in 2019-20.
Source: AISHE

and quality can be driven up by strengthening the Higher Education Council (HEC) which has done seminal work in ensuring a common academic calendar across the state and improving access.

Care must also be taken that all social groups are included in this growth driver. The social composition studied in **Table 32** shows the Muslim community has the lowest enrolment (6.3%) compared to the population composition (13%), because of reported greater poverty in the community. A large-scale program for enrolling Muslim youth in college supported by scholarships is required so they can also satisfy their aspiration of a college education, as demonstrated by the community having the fastest growing enrollment rate among all groups at 7.75% compared to the 2.35% average. The elevated growth rate shows the hunger and needs to be supported. Other sections have done well, and this trend is expected to strengthen. By 2030, if this trend continues and with help from the Muslim community, all groups will reflect their share of population in colleges. Access must be ensured through capacity and quality expansion.

In FY 20, Karnataka had 14,988 PhD scholars enrolled—7.4% of India’s total, and 2.4 lakh post-graduate scholars enrolled—5.5% of India’s total. The state must focus on driving these numbers higher and increasing its share by promoting institutes in STEM and social sciences subjects. More Institutes of National Importance and other eminent institutions must be started and supported, building deep specialization and subject focus. The state must also provide more scholarships for Master’s and PhD scholars to incentivize its brightest, and others around the country, to study here rather than going abroad. A tenfold increase by 2030 must be targeted as this will drive research, knowledge creation and dissemination—valuable growth drivers in the knowledge economy. A dedicated corpus for research is also important; the budget shows the state only spends INR 30-60 crore a year on this, which is inadequate to build a comprehensive research portfolio. Karnataka must enhance this to INR 250 crore in FY 23 and possibly INR 500 crore by 2025 and, thereafter, INR 1,000 crore a year by 2030.

Parameter	2011-12	2019-20	8-year CAGR	Projected 2029-30
Enrollment	17,60,964	21,87,892	2.75%	28,69,922
18-23 population	74,01,674	69,42,880	-0.80%	64,09,170
GER	23.8	32	-	44.8

Table 38: Projections of higher education enrolment, GER, and 18-23-year-old population in Karnataka, based on current growth rates. Source: AISHE (projected by authors based on AISHE data)

Colleges and universities, public and private, can apply to this corpus for grants on a competitive basis for STEM and social sciences research. This corpus will serve as an important machine to foster a research and innovation ecosystem, which is the single largest driver for human capital growth. Top universities in the state must all be provided adequate funding. Possibly, the system of block grants can be done away with, and a new system based on number of students and quality can be inducted. Students can be empowered to attend the college of their choice, and universities will have to become student-centric and be subject to critical appraisal every year rather than get a block grant without appraisal.

The HEC must improve accreditation and develop frameworks relevant to the industry and future-oriented research. It can pick ten institutes of eminence and robust quality like IISc, Manipal, and UVCE and work with them to enhance the quality of education and achieve a GER of 60 by 2030. With declining numbers in the 18-23 age group, the state must ensure access to high-quality education, make it globally competitive, and train a workforce that can work across multiple industries and districts in Karnataka. The startup and IT industries combined will possibly need 15-20 lakh more skilled employees over the next 5 years itself, and Karnataka must train and position its young population to capture these opportunities.

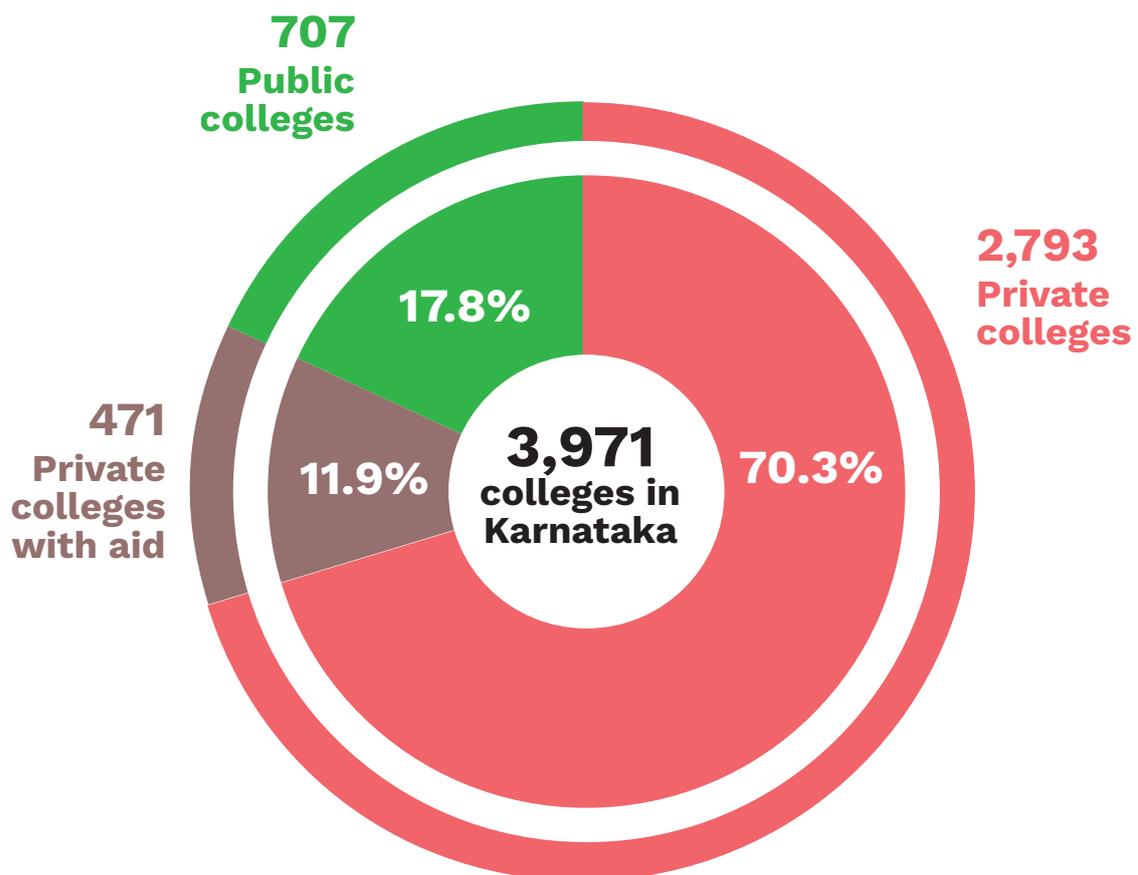


Table 39: Karnataka college composition in 2019-20. Source: AISHE .

Health

Regarding health, Karnataka currently scores 78/100 in SDG3 on “Good health and well-being” and ranks fifth in the country by state, behind Goa (86), Maharashtra (83) and Tamil Nadu (81). India’s score is 74. The target for trained medical personnel (physicians, nurses and midwives) per 10,000 population is 45 while Karnataka has built adequate capacity at 70. India is below target at 37. Maternal mortality ratio (per 1 lakh live births) is 92 versus a target of 70 set in SDG3, while the under-5 mortality rate (per 1,000 live births) is 28 against a target of 25. India’s numbers are at 113 and 36, respectively. 94% of children in the 9–11-month age group are fully immunized in the state against a target of 100 and 99.9% of deliveries are institutional deliveries—India is at 91% and 94.4%, respectively. Karnataka is well on its way to securing its citizens’ health and wellbeing.

The state needs more infrastructure, particularly in the rural areas, with adequate access to primary, secondary and tertiary facilities. Of the 30 districts, many may require a large 500-bed multidisciplinary hospital that can cater to the needs of the community. These hi-tech facilities will also attract doctors and medical staff to work in small towns instead of moving to large cities in search of good hospitals. The state also needs primary health centres in every taluk/tehsil. The district hospitals and primary centres can be attached to medical colleges in the surrounding areas so medical students can rotate through the hospital and provide the required services. Today, rural citizens travel needlessly for tens of kilometres to access basic healthcare. Primary facilities can cater to the basic needs while the district hospital can attend to the more significant cases. Attaching an ambulance service to each hospital will ensure citizens needing immediate attention can receive it. Alongside infrastructure capacity, comprehensive enrolment in the Ayushman Bharat insurance program is required so everyone can access secondary and tertiary care.



Chennakeshava Temple, Somanathapura

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ECONOMIC STRATEGIES



World Trade Center, Bengaluru
Photo by Neeraj Nabar on Unsplash

Re-evaluate, Rebalance, Release

The economic needs of the hour are to rebalance the workforce, provide the population with high-growth and high-income opportunities, and improve the infrastructure and ease of doing business. Over the last twenty years, roughly 1% of the agricultural workforce shifted to industry or services every year in India – reducing from 60% in 1999 to 43% in 2019, per World Bank. India must accelerate this to at least 2% per year amounting to around 15% more Indians shifting to industry or services by 2030.

A study of the Gross Value Output (GVO) by agriculture sub-sector presented in **Table 6** clearly demonstrates that the contribution of cereals, and crops in general, to the GVO has reduced from 39.5% in FY 12 to 33.8% in FY 19. The crops sub-sector is growing at 7.6% CAGR while other sub-sectors like livestock, fruits & vegetables, and fishing & aquaculture are growing at higher CAGRs of 11.2%, 9.8% and 9.2%. Government must ensure that these farmers and agriculture producers, who are not supported by Minimum Support Price (MSP), accrue higher value-add for their products thereby increasing their incomes. Karnataka's economic profile indicates only 20% of the workforce in agriculture maybe sufficient—with strategies to improve their value-add and incomes. The remaining agriculture workforce can be shifted to industry and services. Agricultural production can manage and streamline with a lot fewer people, as China's example has shown.

While shifting workforce, the following factors can be considered:



High value-add to the state economy comes from services sectors like IT and financial services, and high-value-added manufacturing like hardware chip systems design, pharmaceutical manufacturing, automobile engineering, electronics manufacturing, and others.



Harnessing high value-add growth requires a skilled workforce for which states must focus on human capital development.



The low-skilled or semi-skilled population is most effectively employed in labour-intensive manufacturing areas like garments, automobile and electronics assembly, and others. These industries can drive per-capita income, economic growth, and volume-export capabilities of the state. Construction and infrastructure development is another sector which can absorb a large workforce.

It is clear that investments by the GoK in each of these three strategies – services, manufacturing, and construction – will yield highly. It is clear that investments by the GoK in each of these three strategies – services, manufacturing, and construction – will yield beneficial second and third order consequences in jobs and earnings potential. This is further fuel for the urgency with which the GOK must aggressively pursue large-scale investments that will directly benefit its most vulnerable citizens.

While framing strategies here, it is useful to examine the best-in-class models in each of the major sectors. In these studies, only CAGRs between FY 15 and FY 18 of larger states have been presented with models that can be replicated in Karnataka. While several small states like in the North-East are showing high growth in some sectors, their context is very different.

1. Services: Karnataka’s services sector CAGR is 14.3%. India’s top services states based on CAGR are Telangana at 14.9%, Karnataka at 14.3% and Andhra Pradesh at 14.2%. The average of these three states is 14.5%. Karnataka is already a Top 3 state in this sector.

The services sector includes (1) Trade, repair, hotels & restaurants, (2)

Railways, (3) Transport (exc. railways), (4) Communication and broadcasting, (5) Storage, (6) Financial services like banking and insurance, (7) Real estate, ownership of dwellings & professional Services – which includes IT services, (8) Public administration, and (9) Other services.

The MOSPI CSO report indicates that the value-add for the sub-sector ‘Real estate, ownership of dwellings & professional Services’ is 70.6. IT services is subsumed under this head, and is largely responsible for the elevated value-add of 70.6 – indicating that investment in growing IT services will pay off tremendously as value-add to the economy. This is because IT services has the advantage of mass employment of specialized workers with high pay. There is urgent need to track IT services separately given its contribution to the nation’s GDP and potential for growth.

Share of Karnataka’s IT services exports to India’s IT exports is 38%. This is the reason Karnataka and Telangana have impressive CAGRs in services – because of the IT services sectors, and other technological drivers, centred in Bengaluru and Hyderabad.

Financial services like banking and insurance is another major growth driver for Karnataka. Banking and insurance is tracked separately, and growth in the sub-sector can be studied in detail.

Sectoral Gross State Domestic Product - Services (INR lakh)			YoY Growth
States	2014-15	2017-18	3-year CAGR
Andhra Pradesh	2,15,23,018	3,20,37,984	14.2%
Karnataka	5,17,91,812	7,73,44,374	14.3%
Telangana	2,86,01,072	4,34,66,868	14.9%

Table 40(a): Top 3 states in Services sector CAGR. Source: RBI

Sectoral Gross State Domestic Product - Banking & Insurance (INR lakh)			YoY Growth
States	2014-15	2017-18	3-year CAGR
Gujarat	44,81,687	60,38,097	10.5%
Karnataka	41,93,233	58,10,671	11.5%
Rajasthan	19,07,759	26,68,125	11.8%

Table 40(b): Top 3 states in Banking & Insurance sector CAGR. Source: RBI

2. Banking & Insurance: Under services, banking and insurance (or financial services in general) has large scope in Karnataka. The state's banking and insurance sector CAGR is 11.5%. India's top states based on CAGR are Rajasthan at 11.83%, Karnataka at 11.49% and Gujarat at 10.45%. Karnataka is already a Top 3 state in this sub-sector.

Given Bengaluru's growing position in the world's innovation and technology development ecosystems, with increasing incoming investment, this sub-sector has immense growth potential. The value-add for financial services, per MOSPI CSO data, is a substantial 72. Karnataka can harness this to boost GSDP.

Sectoral Gross State Domestic Product - Industry (INR lakh)			YoY Growth
States	2014-15	2017-18	3-year CAGR
Karnataka	2,04,43,889	2,67,34,007	9.4%
Telangana	1,04,36,581	1,49,37,116	12.7%
Gujarat	3,87,49,839	5,63,27,116	13.3%
West Bengal	1,47,76,587	2,16,53,765	13.6%

Table 40(c): Top 3 states in Industry sector CAGR. Source: RBI

3. Industry: Karnataka's industry sector CAGR is 9.4%. India's top states based on CAGR are West Bengal at 13.58%, Gujarat at 13.28% and Telangana at 12.69%. The average of these three states is 13.2%.

The industry sector includes sub-industries like Mining and quarrying, Utilities (electricity, gas, water supply, others), Manufacturing, and Construction. Of these, manufacturing and construction have large potential to grow and boost the industry sector.

Sectoral Gross State Domestic Product - Manufacturing (INR lakh)			YoY Growth
States	2014-15	2017-18	3-year CAGR
Karnataka	1,20,08,490	1,76,14,475	13.6%
West Bengal	71,62,103	1,13,17,504	16.5%
Uttar Pradesh	1,05,12,538	1,67,02,625	16.7%
Telangana	54,53,348	89,48,830	17.9%

Table 40(d): Top 3 states in Manufacturing sector CAGR. Source: RBI

4. Manufacturing: Karnataka's manufacturing sector CAGR is 13.6%. India's top states based on CAGR are Telangana at 17.95%, Uttar Pradesh at 16.7% and West Bengal at 16.5%. The average of these three states is 17%.

Sectoral Gross State Domestic Product - Construction (INR lakh)			YoY Growth
States	2014-15	2017-18	3-year CAGR
Karnataka	61,37,487	64,52,670	1.7%
Maharashtra	1,01,15,122	1,18,31,838	5.4%
Andhra Pradesh	45,32,380	56,07,400	7.4%
West Bengal	53,68,490	74,40,023	11.5%

Table 40(e): Top 3 states in Construction sector CAGR. Source: RBI

5. Construction: Overall, India's construction sector is growing slowly due to the lack of urbanization and infrastructure development. MOSPI data indicates that the value-add of the construction sector in India is only 37.5. Karnataka's construction sector CAGR is only 1.7%. India's top states based on CAGR are West Bengal at 11.5%, Andhra Pradesh at 7.35% and Maharashtra, at 5.36%. The average of these three states is 8%.

Looking for better construction sector models elsewhere, China is a great case study. China rapidly urbanized from 26.4% in 1990 to 59.2% today. Urbanization significantly boosted the construction industry which grew at an average annual growth rate of 16.6%.²

² "China's construction industry on rapid growth since 1978", The State Council, PRC, Accessed on August 3, 2022.

- The value-added output of the industry reached 5.57 trillion yuan (about \$816.6 billion) in 2017, compared with only about 13.9 billion yuan in 1978.
- The value-added output of the industry accounted for 3.8 percent of the country's GDP in 1978, while the proportion rose to 6.7 percent in 2017
- In 1978, China only had 52,000 km of railways in operation. The length increased to 127,000 km by the end of 2017, including 25,000 km of high-speed railways.
- China has 130,000km of highways, the largest in the world, exceeding even the United States. It has been steadily adding 10,000km every year since 2011.

Karnataka can follow China's construction model to great benefit. It has great scope to boost GDP. The construction industry has the highest backward-linkages in terms of metal consumption, mass employment, and generation of taxes. Focusing on the construction industry will feed-forward into other sectors, like manufacturing and production, exports and trade.

6. Agriculture: Karnataka's agriculture sector CAGR is 11%. India's top states based on CAGR are Madhya Pradesh at 20.6%, Andhra Pradesh at 13.4%, and West Bengal at 12.6%. The average of these three states is 15.5%.

Sectoral Gross State Domestic Product - Agriculture (INR lakh)			YoY Growth
States	2014-15	2017-18	3-year CAGR
Karnataka	1,08,95,900	1,49,19,900	11.0%
West Bengal	1,01,71,379	1,45,20,957	12.6%
Andhra Pradesh	78,89,822	1,15,11,734	13.4%
Madhya Pradesh	1,30,94,566	2,29,68,000	20.6%

Table 40(f): Top 3 states in Agriculture sector CAGR. Source: RBI

Based on the best-in-class models, the following strategies can be applied in Karnataka's context to drive economic growth across all three major sectors:



Amplify agriculture sector value-add via tech, branding, marketing and exports.



Expand manufacturing and exports via labour-intensive industries.



Boost construction sector value-add via increased infrastructure spending.



Systematic urbanization across the whole state.



Implement an Aspirational districts program to drive the growth of the poorest districts.



Specialized hi-tech industries to drive high value-add manufacturing and exports.



Invest in Bengaluru to consolidate its position as a Global Hi-Tech city.



Invest in and expand the IT services sector.



Invest in the state's start-up ecosystem.



Amplify Agriculture Sector Value-Add Via Tech, Branding, Marketing And Exports

While farmers growing cereals accrue 80-90% of the market price due to the government's MSP program, producers of non-cereal, non-MSP segments accrue much less of the value-add—reportedly only 30-35%. This is because of the poor market linkages available to the farmer. If farmer realization in these non-MSP segments increases even by 20%, then one can estimate a significant improvement in their turnover, and consequently, their livelihoods.

Exports are another major expansion area for farmers. To put this in context, in 2021, the world economy totalled USD 94.8 trillion whereas India totalled USD 2.95 trillion. By orienting our agriculture sector towards exports, farmers have the opportunity to capture the world market—leading to a significant 32x expansion opportunity compared to the domestic economy of USD 3 trillion. Agricultural exports from India today are around USD 50 billion.

Karnataka's export of flowers through the auction centre and KIAL airport has grown well. Karnataka must create a brand for fruits, vegetables and other products in global markets and create the necessary supply chains. This requires backend investment to train farmers in aggregation, grading, sorting, packaging, creating the required trust mark, and finally linking the products to the export market. These linkages include certification agencies to ensure organic produce which obtains a higher

price globally is accepted and trusted by overseas consumer markets. The export orientation effort can also involve agri-tech platforms, which have proven their ability to multiply farmer earnings. Karnataka needs a comprehensive Agriculture Export Strategy that accounts for all these factors.

Technology offers great solutions to increase market linkages, and in branding and marketing to (a) increase the overall visibility and market reach of the sector as well as the value-add of agricultural products, and (b) connect the farmers and producers directly to the consumer market so they can accrue a higher value-add.

Some technology-enabled strategies are:

- 1. Invest in Agri-tech to connect farmers directly to markets:** Over the last 5-7 years in Bengaluru and other cities, 500+ agri-tech companies have formulated and validated tech-enabled strategies for farmer empowerment. These platforms encompass real-time market intelligence, post-harvest intervention and storage capabilities, price forecasting, D2C offerings, competitive financing and insurance, and market linkages. Their use has resulted in 20%-25% more income for farmers, instant payment via COD and UPI, low wastage, and other

significant benefits. GOK can consider an INR 1,000 crore fund to invest in 500+ agri-tech companies that develop platforms and tech-enabled strategies to connect farmers all across the state to domestic and global markets and supply chains.

2. Use of technology platforms to deploy strategies at scale: Apart from agri-tech platforms, the government can deploy technology stacks to improve the growth and value-add of the agriculture sector. Export-orientation will require grading, sorting, quality control, efficient harvesting, access to markets and supply chains, and the ability to realise competitive prices. Here, technology and real-time information platforms are foremost enablers to train farmers and give them the tools to perform these functions effectively. Further, with the agriculture profile rapidly changing, farmers can diversify their products to increase income, mitigate risk, and access export markets. This will require training on multiple crop inputs, growth cycles, supply chains, farm management, quality assessment, and other crucial factors. It is no longer viable to have one agri-policy for a whole state or even a district. Each taluk must have a differentiated plan based on climate and crop conditions, storage facilities, and market linkages, and every farmer must be empowered to pursue a differentiated strategy driven by technology.

3. Specific export strategies like Flower Market in Bangalore: Just like the successful Flower Market export vertical, Karnataka needs to create 100-500 more specialized export strategies driven by its agriculture produce profile.

4. Create a global brand for Karnataka Agriculture to improve realization: Karnataka needs a massive, recognizable brand makeover that capitalizes on existing food trends all over the globe. For example, Thailand has a well-known national brand. Thai restaurants all over the world subscribe to this brand and procure unique spices, vegetables and rice from the motherland exclusively. Likewise, Karnataka can build a cohesive brand that can fuel its exports and increase its standing as an exporter of unique Indian products.

5. Food processing for higher value-add: Top Agri-export economies like the USA, European countries like Germany and the UK, and China balance their exports of natural produce with processed products that are higher value-add. These products are efficient to make at scale, are less perishable than fresh produce and fetch higher prices. Karnataka needs more investment in food processing to capture local and global markets. The Mega Food Parks initiative in India based on a cluster approach aims at maximizing value and minimizing waste. More investment is required to enhance the capabilities of currently operational food parks and to build more in Karnataka.

Expand Manufacturing and Exports Via Labour-Intensive Industries

Labour-intensive industries (LIIs) are the best way to provide gainful employment to a large population transitioning away from agriculture in the rural areas. With focused skilling programs, LIIs will offer excellent income opportunities to the transitioning population. Even a lower wage than in cities will go a long way towards quality of life, especially since living costs are lower in towns. Women, who are not as mobile as men, can also now find employment near their villages and towns, commute and earn a living. Karnataka's manufacturing employment as a percentage of total employment is only 11.74% and can be

increased rapidly with a suitable LII mission.

China has successfully used LIIs to boost its economy and exports while providing mass employment to its large population. Reports indicate China shipped USD 3.026 trillion worth of exports in 2021 to various markets around the world.³ This translates to per-capita export of USD 2,150 for each of China's citizens in its large population of 1.4 billion. A majority of these exports come from LIIs, where China has successfully provided mass employment to its large population.

An analysis of China's top ten exports in 2021 valued at USD 2.07 trillion (68.4% of total exports) gives us an indication of which industries to set up in order to cater to global demand, and capture market share.³

China's Top 10 export segments in 2021 in USD (% of total exports):

1.	Electrical machinery & equipment	USD 804.5 billion	(26.6%)
2.	Machinery including computers	USD 492.3 billion	(16.3%)
3.	Furniture, bedding, lighting, signs, prefab buildings	USD 126.3 billion	(4.2%)
4.	Plastics, plastic articles	USD 118.1 billion	(3.9%)
5.	Vehicles	USD 108.9 billion	(3.6%)
6.	Toys, games	USD 94 billion	(3.1%)
7.	Optical, technical, medical apparatus	USD 88.8 billion	(2.9%)
8.	Articles of iron or steel	USD 85.4 billion	(2.8%)
9.	Knit or crochet clothing, accessories	USD 78.2 billion	(2.6%)
10.	Organic chemicals	USD 73 billion	(2.4%)

³ Daniel Workman, "China's Top 10 Exports" World's Top Exports, Accessed August 3, 2022

Since China's living costs are skyrocketing, so are the labour costs. LIIs like garments are slowly starting to shift elsewhere in Asia. Currently economies in South and Southeast Asia like Bangladesh, Vietnam and Indonesia are capturing this shift. Karnataka must build excess capacity and boost exports to capture the markets vacated by China.

Karnataka possesses the geographical trade advantage here as well. Its proximity to the Suez Canal, and access to high-volume markets like Europe and the East Coast of the USA – compared to Southeast Asia – means with excess capacity, it can easily capture these markets. The Mangalore port is the deepest inner water harbor on the west coast and can be developed to handle large trade volumes to complement the growing industry ecosystem. The Karwar port can be developed to supplement capacity.

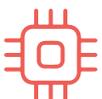
By focusing on the right type of industries, this move will boost Karnataka's manufacturing sector GVA and export capabilities:



Garments



Fabrication



Electronics assembly



Automobile assembly



Electrical machinery & equipment



Machinery including computers

Industry clusters can be developed throughout the state, and connected to Bengaluru and the coastal ports via high-speed railways and road transport facilities. The clusters can be centred largely in North Karnataka to provide the populations there with high-growth mass employment opportunities and facilitate the workforce shift from agriculture to industry. The state already has a strong MSME base of 70,000 registered companies with a 17,000-strong factory and heavy engineering base.

Karnataka was the first state to produce a Labour-Intensive Industry policy, which must now be backed with implementation heft and targeted objectives to reach the 2032 goals. The Invest Karnataka group can be activated and developed to deploy resources, much like the Economic Development Board of Singapore has to great effect.



Boost Construction Sector Value-Add Via Increased Infrastructure Spending

The construction industry in Karnataka was INR 96,354 crore in FY 22, contributing only 4.7% to GSDP. Even in the pre-pandemic year of FY 20, the construction industry merely contributed 5.1% to GSDP. It is a highly underutilized growth driver, not just in the state but all over the country, and has great scope to boost economic growth. The construction industry has the highest backward-linkages in terms of metal consumption, mass employment, and generation of taxes. Focusing on the construction industry will feed-forward into other sectors as well, like manufacturing and production, export and trade. The China model highlighted above can be deployed in Karnataka.

Karnataka's infrastructure spending must increase massively. This could include:

- a. **Suvarna Karnataka 8-lane expressway:** A state-of-the-art 8-lane expressway from Bidar to Bengaluru, with access to the Mangalore and Karwar ports, with a high-speed railway line in the middle will transform Karnataka's economy. It will increase the speed of passengers and goods, connect all industrial clusters to Bengaluru and the ports, and massively improve Karnataka's EoDB.
- b. **Rural road connectivity:** Central funding and loans from large-scale development banks can be utilized to a greater extent for connecting all of Karnataka with high-quality roads. This will boost urbanization, industrialization and exports by connecting the hinterland with markets.
- c. **Railways and freight corridors:** Building a solid railway network with increased carriage speed will improve efficiency of movement across the state.
- d. **Public transportation like Metro and bus services:** Metro and other public transportation can be a significant infrastructure spend with the highest return-on-investment. Apart from increasing the Metro footprint in already crowded cities like Bengaluru, the key is to get ahead of the game in smaller towns all over Karnataka and start building the Metro there right now since more and more people are heading to urban areas in search for opportunities. Transit systems comprising a combination of Metro and bus services, preferably EV, can be designed in small towns.
- e. **Ports:** Karnataka has 320km of coastline. The Mangalore port is the deepest inner water harbor on the west coast and can be developed to handle large trade volumes to complement the growing industry ecosystem. The Karwar port is

also functional and can be developed further, along with other ports like Tadadi and Kundapura, to help Karnataka amplify its trade capabilities. Its proximity to the Suez Canal, and access to high-volume markets like Europe and the East Coast of the USA, can be used to better position the state as a global trading hub.

f. Seaside living spaces: Many coastal stretches of Karnataka are empty. Building attractive and accessible seaside living spaces with parks, public spaces, cultural venues, housing complexes, and so on, will transform the local economies. Shanghai has done this successfully with its riverfront spaces on both the Shanghai and Pudong banks.

g. Tourism Infrastructure: Karnataka has many historical and cultural sites that can be developed as tourist magnets – Hampi, Belur, Halebeedu, Mysuru, and several locations along the coast. Developing a structured tourism network around these sites, and networking them with roads, railways and airports will boost the tourism industry and the local economies.

h. Airports: The Bengaluru airport, KIAL, is processing record numbers of both passengers and cargo. While the second terminal is under construction, it would be prudent to plan another expansion soon with multiple terminals and runways. The air traffic to Bengaluru will only rise, and facilities must keep pace. Development of

smaller airports around the state, like Mangaluru, Belagavi and Kalaburgi will help divert traffic from Bengaluru and assist in the expansion of the state's capacity for passengers and cargo. Again, looking at China, many major airports have received the go-ahead to build a third runway and increase seating capacity by forecasting the demand to 2030. In parallel, new airports are being commissioned all over China to provide additional capacity using forecasting beyond 2030. Major US airports have at least 3-4 runways, with Chicago and Dallas at 7 runways each.

i. Low-cost housing: Housing is one of the biggest spend areas under infrastructure. It can have the highest multiplier effect – economically, socially, and culturally. There is huge scope for growth in this area.

Increasing infrastructure spending and commissioning projects all over the state also has the advantage of providing mass employment in the construction sector in the state. Karnataka can avail 20-30-year long-term loans from global development banks and capital surplus regions like Japan to undertake these projects.



Systematic Urbanization

Urbanization aggregates human activity—aggregation leads to specialization, specialization to increased productivity; enabling greater availability of goods, delivery of services, increased wages, and job opportunities. Karnataka, at 38% urbanization, is above the 31.1% average urbanization in India (on the basis of 2011 census); other states are ahead like Tamil Nadu at 48.5%, Kerala at 47.7%, Gujarat at 43% and Maharashtra at 45.2%. Today in 2022, it is possible the state is 43-45% urbanized. The world on average is at 55.3% while India lags at 34%, as shown in **Fig 9**. Karnataka could harness its potential by systematic urbanization and development of these urban areas into engines of growth.

Let’s examine India’s development model. India has been slow to urbanize because of its fixation on being a village-based society. Most planners still look to Gandhiji's sentiments on this topic – 'The future of India lies in its villages', he said in

1947. This is no longer true - complexity has increased, people's economic needs and aspirations have grown, and it is impossible to supply adequate resources to India's six lakh villages. Leaving India's population in villages

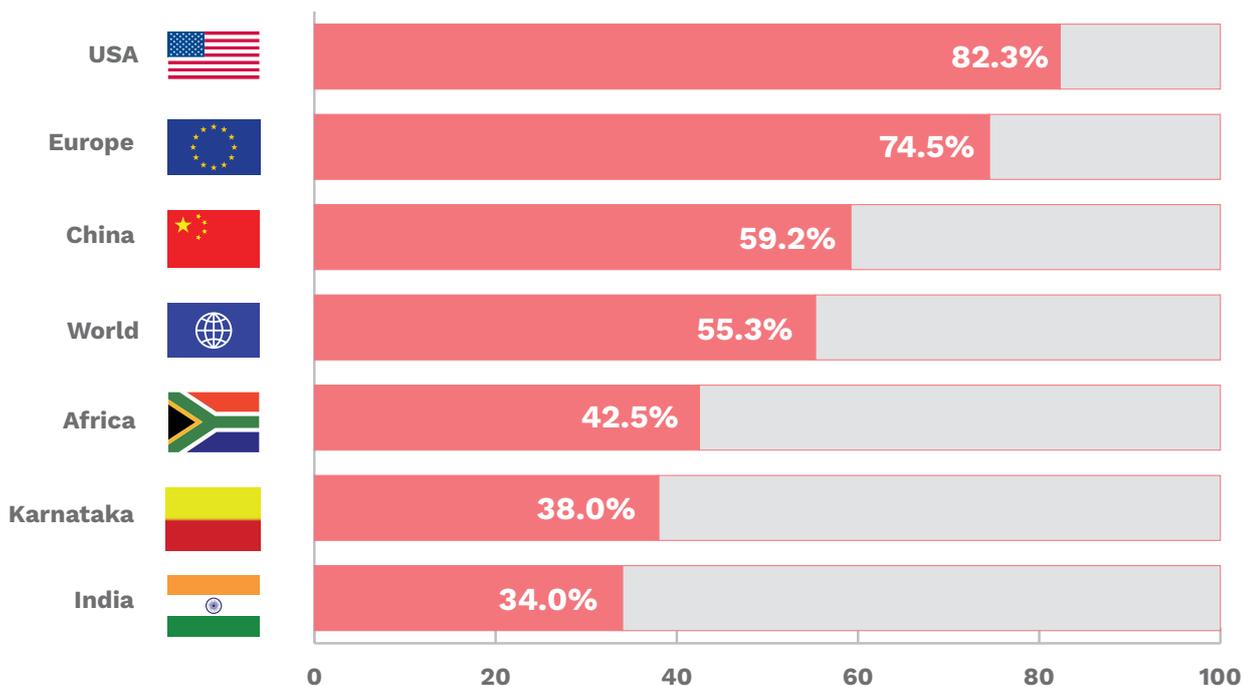


Fig 9: Percentage of urban population from regions around the world. Source: World Bank

while being unable to meet their economic needs has resulted in high inequity.

As analyzed in **Table 10**, the income differential in India is very high, the ratio being 1:2.6:3.7 for the average wages of dependents on agriculture to industry to services. Karnataka's skew is even higher, at 1:2.7:5.1. Left unaddressed, this large group of agricultural dependents will always be condemned to a sub-aspirational existence - with increasing distress and perpetual dependence on subsidies from the Government. The income differential is also causing large-scale migration towards India's few engines of growth, like Bengaluru.

Though Karnataka is ahead of the curve here—2011 census indicates there are 29,390 total villages in Karnataka out of which 27,028 villages are inhabited. 2,362 villages are abandoned, presumably due to migration towards Bengaluru and other areas of heightened growth and employment. Moreover, it is unsustainable to provide adequate resources to 27,000 villages. Instead, Karnataka could benefit from systematically and sustainably shifting more people from rural to urban areas.

In Karnataka, the 2011 census indicates there are 281 towns/cities housing 38% of the population. Of these, 22 towns have a population over one lakh and only 1 city of over ten lakhs. On subtracting these, the remaining 258 towns must have significantly lesser populations than the average. The upcoming 16th Indian Census will shed light on the current situation.

Census town data must be used to suitably identify around 200 smaller towns all over Karnataka and develop them to sustainably absorb the rural-to-urban shift. Gol's Smart Cities

initiative has identified 7 cities in Karnataka so far, focusing on roads, solar, water, and control centres. Development of towns in poorer districts can be connected to a dedicated Aspirational Districts Program as discussed next. Both Central and State funding must focus on expanding to 200 towns, while incorporating four critical aspects:

- a. **Infrastructure and connectivity:** While developing the 200 towns, it is essential to prioritize providing infrastructure like roads and airport access, internet connectivity, and other amenities, right from the planning stage. Not only is state-of-the-art infrastructure crucial for quality of life, it also provides the logistical backbone for a productive industrial environment. Infrastructure development has been discussed above.
- b. **Labour-intensive industry (LII) clusters:** Creating many LIIs in and around the 200 towns is the best way to provide gainful employment to the transitioning rural population. It is more competitive to have industries near smaller towns than in large cities where capital and skilling costs are very high. LII development has been discussed above.
- c. **New sustainable technologies:** While urbanization improves delivery of services, it poses several challenges like congestion, restricted mobility, high waste production, and pollution. These are solved problems, however, in many parts of the world. Karnataka must invest in a specialized workforce to study state-of-the-art technologies and implement them. The newly developed towns will have the advantage of getting sustainable infrastructure - renewables like solar panels and wind turbines, planned tree cover, water treatment facilities based on plant-based technologies, integrated recycling, EV infrastructure, and public transportation with last-mile connectivity - integrated

from the planning stage itself. Older cities will need careful planning to incorporate new technologies into unwieldy city plans.

d. Planning for capacity: Karnataka already attracts significant incoming population – of both specialized and blue-collar workers. The state has a large internal population already. It is necessary to plan projects for sewage treatment, airports, roads, and so on with at least a 20-30-year forecast with provisions for future expansion. Again,

China paves the way. For example, many major airports have received the go-ahead to build a third runway and increase seating capacity by forecasting the demand to 2030. In parallel, new airports are being commissioned all over the country to provide additional capacity using forecasting beyond 2030.

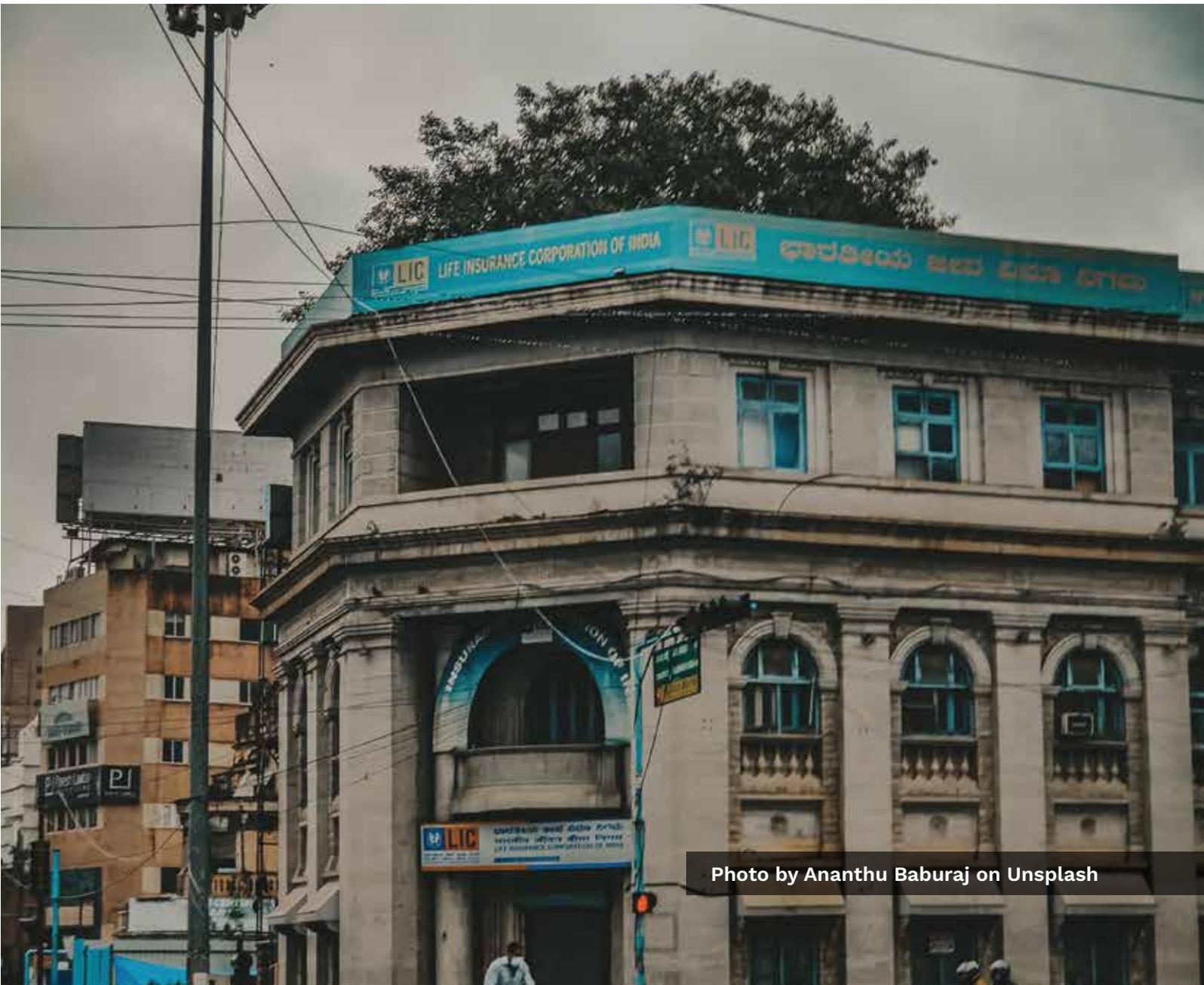


Photo by Ananthu Baburaj on Unsplash

Aspirational Districts Program

There is significant variation between the incomes of Karnataka's districts, as discussed earlier. By accelerating growth of the weaker districts with special programs, their drag on the economy can be reduced. In this manner, overall growth will accelerate because these districts can grow faster than the rest of the state and contribute more. NITI-Aayog's Aspirational Districts program (NAADP) is a great model to implement in the state. NAADP is already tracking significant progress in 17 districts.

The NAADP has picked 115 economically weaker districts across the country and has developed a system to track 49 key performance indicators across five broad sectors - health and nutrition, education, agriculture and water resources, financial inclusion and skill development, and basic infrastructure. The districts are allocated across NITI Aayog, the Home Ministry, and 12 other ministries, highlighting the importance of inter-ministry collaboration for development. Another highlight of the program is the collaboration of private, non-profit, and philanthropic program partners to provide ground level support. Examples include the Tata Trust, Piramal Foundation, ITC, and L&T. The Bill & Melinda Gates Foundation and IDinsight have been roped in to help conduct surveys.

Karnataka can launch a CM Aspirational District program based on NITI-Aayog's winning strategy. Since Karnataka is one of the most prosperous states in India, only 2 of 115 districts in NAADP are from Karnataka – Raichur and Yadagiri.

With Karnataka's CM Aspirational Districts Program, the strategy can be as follows:

- a. Set up the program focusing on the 10-15 poorest districts.
- b. Ensure inter-department collaboration so each department can contribute according to their strengths.
- c. Use the NAADP structure to track progress.
- d. Collaborate with partners on the ground by encouraging participation from partners in the private sector, academia, non-profit sphere, and the larger public policy ecosystem.
- e. Migrate useful learnings to develop the next 10 districts. Accelerate infrastructure development, connectivity, and creation of labour-intensive industries to provide mass employment in these districts.



Vidhana Soudha, Bengaluru

Specialized Hi-Tech Industries To Drive High Value-Add Manufacturing And Exports

Labour-intensive industries are valuable for providing mass employment, catering to the domestic markets, and developing volume export markets. This must be complemented with specialized hi-tech industries that have the advantage of higher value-add. These include a significant innovation and R&D component, which Karnataka already has a commendable install base of. Focusing on innovation spending like the US and China have, will feed-forward into growing new manufacturing capabilities, and expanding into domestic and export markets.

Some industries worth investing in are:



Electronics component design



3D printing



Hardware design and manufacturing



Robotics



Chip design and semiconductor fabrication



Medical devices



Renewable energy innovation, development and infrastructure



Defence parts manufacturing



New materials innovation that can feed into construction, 3D printing, renewables, semiconductors, and other sectors.



Genomics, biotechnology and bio-manufacturing

A large corpus for research and productization of the same is required. Karnataka must create a giant Fund-of-Funds (FoF) to incentivize research and start-ups in specialized industries. An INR 2,000 crore FoF per year over ten years will amount to a corpus of INR 20,000 crore. This is not large considering that technology drives at least 25% of GSDP. This investment will support building research laboratories and other auxiliary facilities with state-of-the-art infrastructure and equipment. Centres of Excellence (CoEs) for each of these industries can act as nodal centres. Finally, manufacturing facilities to make such hi-tech products have to be built. The value of the investment will multiply thousand-fold in terms of accelerated economic growth, favourable trade, technological leadership, and the provision of millions of specialized jobs.



Bengaluru: Global Hi-Tech City

Bengaluru is the jewel in the crown of Karnataka, making up a significant component of GSDP, paying the majority of the taxes, and with the highest per-capita income amongst India's cities. The ecosystem ranks as one of the Top 5 in the world for innovation, technology development, research and development, and human capital. The city is India's IT capital, biotechnology capital, science capital, avionics capital, space capital and, in essence, the Hi-Tech and Innovation capital of India. It is imperative to develop the city and allocate the necessary resources for Bengaluru to consolidate its potential as a global hi-tech city.

Currently, there are 2 lakh+ overseas citizens in Bengaluru, attracted by the opportunities the city provides. Bengaluru is home to 450+ research laboratories. 400+ of the Fortune 500 global companies have a presence in the city. It has an estimated 1 lakh+ PhDs across many specializations, attracted by the research and specialization opportunities. 3 lakh+ chip designers and testers work in 250+ companies, providing a human capital concentration for India's semiconductor initiative like no other Indian region or city. It also houses 30,000+ automotive software engineers and 15,000+ aeronautical engineers. At least 2,500 companies in Bengaluru utilize artificial intelligence and machine learning to build indigenous platforms. Bengaluru is also a globally recognized biotechnology hub with world-class biotech accelerators. Additionally, as a global IT hub, it houses some of the world's largest IT companies. The city has built an exciting concentration of frontier technologists and engineers and has played a seminal role in India's development into the world's third-largest startup ecosystem.

Increasing prosperity, however, has led to severe infrastructure challenges. Due to high-income employment opportunities, Bengaluru experiences significant immigration, and the population is now 1.1 crore—the fourth largest in the country. The infrastructure development has not kept pace with the population explosion, and this is visibly stunting Bengaluru's potential as a global hi-tech hub.

The government must focus on improving Bengaluru's infrastructure with:

1. Improvement of the current road network.
2. Incorporation of a fleet of 10,000 electric buses for public transport.
3. Development of 120 km of elevated roads to relieve traffic.
4. Building of 100km of peripheral ring roads.
5. Route enhancement of the Metro to a total of 250km to increase the capacity to 30 lakh people per day.
6. Enmeshing a strong suburban rail network to complement existing public transport modes.

7. Investment and improved facilitation to expand research hubs.

This investment will pay off a thousand times when the productivity of Bengaluru's workforce accelerates as a result. With this, Bengaluru can produce

15 lakh high quality jobs over the next five years, increase its software exports to USD 100 billion by 2027, and overtake Silicon Valley as the world's largest pool of software talent amongst other specializations.



Accelerate IT Services

IT services is a sector with one of the highest value-adds, which MOSPI data indicates is around 70. IT services is another lever with massive feedforward effect. India today exports USD 170 billion worth of software.

Karnataka already has a leading IT services sector, that can be carefully expanded to improve value-add to GDP as well as contribute more to the India's IT export capabilities. Today, Karnataka contributes a substantial 38% to India's IT exports of USD 170 billion, amounting to USD 65 billion, growing at 10-12% p.y. It has created 21 lakh jobs in Bengaluru alone as of date. Over the next five years, the industry combined with the startup ecosystem can create 2.5-3.5 lakh high-skilled jobs.

While building a robust formal education pipeline, Karnataka can bring focus to IT-related education streams. By following training models laid out by Infosys and other IT giants, the students in these courses can be trained to global standards. Inviting industry participation here is crucial.

In addition, the world of IT is changing rapidly with advancements in multiple interdisciplinary fields. Karnataka could take the lead here in building CoEs in all these areas, with state-of-the-art laboratories, resources and top talent. Some fields where CoEs will change the landscape of the state's IT services capabilities are:



Artificial
intelligence



Machine
learning



Blockchain



Cybersecurity



Internet-of
-Things



Enterprise
automation



Agri-tech

This will ensure the state's success in IT for decades to come. China and US are both great models here – both countries have invested a significant amount to ensure they dominate the research pipeline in all these areas. This investment is adding to their intellectual property portfolios as well as attracting top talent from around the world. Karnataka would do well to take leaves out of their books.



Infosys Campus, Bengaluru

Invest In Start-Up Ecosystem

The future is in the innovation-driven knowledge economy, led by start-ups. India is witnessing the meteoric rise of a robust start-up ecosystem. The country is home to the third largest start-up base in the world. Today, India has 75,000+ start-ups, having raised a cumulative USD 120 billion between 2014 and 2021—of which USD 42 billion was raised in 2021 alone. The ecosystem has a collective value of USD 450 billion today. India has the third-largest number of unicorns (companies with over USD 1 billion in valuation) in the world—106, of which 46 reached that valuation in FY 21, and 16 more in FY 22 till date, indicating a rapid acceleration.

It is estimated that by 2025 or 2026, India will have 100,000 start-ups and employ 3.5 million people. With these numbers, India will stand at number 2 after the US. These start-ups have the potential to reach a market value closer to USD 1.5 trillion by 2025 and the ecosystem is on track to yield 100-150 more unicorns by then.

India already has a robust private investment ecosystem with 250+ accelerators and incubators, 500+ institutional investors, and 2,000+ active investors. However, Indian capital is a small percentage of the total investment, with foreign giants increasingly coming in to capitalize on India's exponential growth. Merely 10% of the total inbound capital is estimated to be domestic. With foreign players owning most of Indian data and platforms, there is an urgent need for more domestic capital to be infused into the system. This is where governments like Karnataka's can change the game.

Karnataka is already the leading state in the ecosystem. With its strengths in finance, IT services and other high value-add areas, start-ups in these areas are quickly growing into market leaders in the state and country. They are even making their mark globally.

Bengaluru constitutes a substantial 40% of the Indian startup ecosystem. It is a top destination for seed stage funding, for growth stage funding and for the largest number of unicorns, at around 50 (of India's total of 106). In FY 21, the city processed 551 deals raising a cumulative USD 21.3 billion (nearly half of India's USD 42 billion). It also houses the largest number of Venture Capital funds, beating both the national capital Delhi and the financial capital Mumbai to become the indisputable Innovation Capital of India.

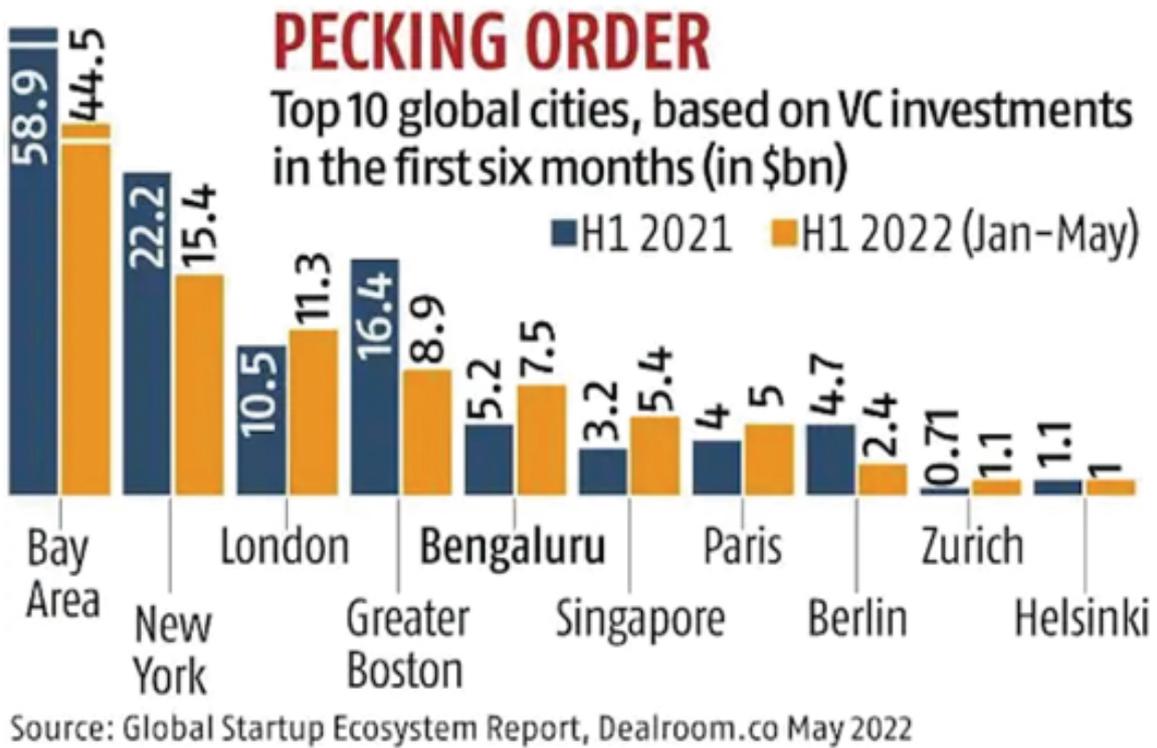


Fig 10: Bengaluru is a Top 5 global destination for innovation and startups. Source: Business Standard

Karnataka must create a FoF to invest in and grow start-ups. An INR 5,000 crore FoF will provide a solid foundation for Indian start-ups to grow.

Some focus areas for the FoF can be:

- a. FinTech start-ups
- b. IT start-ups
- c. Enterprise Tech start-ups
- d. Deep science start-ups in health, water, agriculture, semiconductors, etc.
- e. Logistics and supply chain start-ups

Karnataka has a rich history of supporting entrepreneurship. The Karnataka State Financial Corporation (KSFC) has assisted in the growth of global giants like Infosys, Biocon, MTR Foods, and more. Infosys, for example, received much-needed capital in the form of an INR 24 lakh loan from KSFC and Karnataka State Small Industries Development Corporation in 1983 that allowed the IT giant to “pioneer and

perfect its Global Delivery Model (GDM), and change the traditional business model of the industry”.⁴ The state must now revamp this model to provide greater assistance in the form of both, interest free or low-interest loans as well as FoF grants, to assist in the acceleration of its startup ecosystem.

⁴ Infosys Press Release: Infosys to lead the evolution of Global Delivery Model to the next level. April, 2004.

Conclusion

Karnataka is one of India's foremost states and can decisively lead the nation towards its vision of USD 10 trillion in the 2030-32 timeframe. It is a resource-rich state, and has a robust revenue base, prudent fiscal management, and political stability. Bengaluru is the leading technology hub in the country and among the Top 5 in the world. Karnataka has certainly done exceptionally well in the past.

Karnataka now requires a focused strategy based on its unprecedented demographic changes. It must invest in developing a skilled citizenry required for the oncoming technology-led knowledge economy-driven growth over this decade and beyond. The state must deploy strategies and investments to enhance the income of its farmers, drive the socio-economic development of its poorest districts, and ensure every citizen has a good quality of life with adequate access to social security. Karnataka must build state-of-the-art infrastructure for the future, centred around innovation and research and development, which are the fundamental blocks for the next fifty years of robust growth.

Bengaluru is the jewel in the crown of Karnataka. It has the highest number of technologically trained people as a percentage of its population in India. To consolidate its position as a global hi-tech city, Bengaluru requires massive investment to improve the quality of life of its denizens and their productivity and to take its rightful place as a leading tech and research centre in the world.

The state is also amid a significant urbanization shift that needs to be accelerated with investment in smaller cities. Karnataka must reorient and reimagine itself to reach the USD 1 trillion economy vision by 2032. With the accelerated socio-economic growth trajectory, the dream should be that every citizen has a reasonable quality of life, sufficient income, and timely access to jobs, and every young person has access to quality education so they may seek suitable employment.



Lotus Mahal, Hampi

Notes

Abbreviations:

AE	Advance Estimates
AISHE	All India Statistics of Higher Education (GoI)
BE	Budget Estimates
CAG	Comptroller and Auditor General (of India)
CAGR	Compound Annual Growth Rate
CoE	Centre of Excellence
CRS	Civil Registration System
EoDB	Ease of Doing Business
EPF	Employee Provident Fund
EWS	Economically Weaker Section
FDI	Foreign Direct Investment
FoF	Fund-of-Funds
FPO	Farmer Producer Organization
FY	Fiscal Year
GER	Gross Enrollment Ratio
GDDP	Gross District Domestic Product
GDP	Gross Domestic Product
GSDP	Gross State Domestic Product
GVA	Gross State Value Added
GVA	Gross Value Added
GVO	Gross Value Output
HEC	Higher Education Council
INR	Indian National Rupee
IT	Information Technology
KSFC	Karnataka State Financial Corporation
LII	Labour Intensive Industry
MGNREGA	Mahatma Gandhi National Rural Employment Guarantee Act
MOSPI	Ministry of Statistics and Programme Implementation (GoI)
MSME	Micro, Small and Medium Enterprise
MSP	Minimum Support Price
NFHS	National Family Health Survey
NSSO	National Sample Survey Office
PE	Provisional Estimates
PLFS	Periodic Labour Force Survey
RBI	Reserve Bank of India
RE	Revised Estimates
SDG	Sustainable Development Goal
STEM	Science, Technology, Engineering, and Math
TFR	Total Fertility Rate
USD	United States Dollar

3one4 Capital is an early-stage venture capital firm based in Bangalore, India.

The firm works in select market categories and in the intersection of adjacencies that are large, growing, and ready for unique products and services. The themes pursued are SaaS, Enterprise & SMB Automation, Fintech, Consumer Internet, and Digital Health, with a focus on areas such as machine-driven actionable intelligence services, digital media, ambient intelligence technologies, logistics and distribution, and climate tech.

At 3one4, the team has intentionally built a long-term alignment to Responsible Investing and to support the evolution of an ecosystem conducive to RI. This active commitment has helped the firm secure the signatory status to the UN PRI, making 3one4 Capital the first Venture Capital signatory from India and the fifth overall asset management firm approved from India.

3one4 Capital has been ranked by Preqin, a global reference database for asset management, as India's top performer for two of its funds in the recent Alternative Assets report. The seed and early-stage funds managed by the firm have been recognized for their performance amongst the India-focused venture capital funds in this Asia Pacific-focused report published in 2021. With industry-leading Net IRRs, 3one4 Capital's Rising I & Fund II are the top two amongst the best performing India-focused VC funds between the vintage years, 2010-2018.

The firm manages INR 2,300Cr (USD 310M) of committed capital and a portfolio of over 75 investments across the early stage.



Focus Areas

-  Consumer Internet
-  FinTech
-  Digital Health
-  SaaS
-  Enterprise & SMB Automation

Portfolio





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