

Population Growth and Trends in Consumption Pattern in Karnataka: Implications to Agricultural Development

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Abstract

The paper discusses implications of population growth on consumption and agricultural development with reference to the state of Karnataka. Data have been culled out from several authenticated sources. Definite trends have been noticed in Karnataka Agriculture. While population has increased during the last four decades, noticeable change in the same tract has been uneven. The share of Agriculture to GSDP has declined consistently followed by low productivity. Three domain areas of drivers have been identified for policy and action frame work: 1. Natural Source 2. Human Development and 3. Technology. Intensifying area under irrigation by resource use is recommended.

Key Words and Phrases: *Trends in Population, Action Drivers and Yield Gap.*

1. The Theme Addressed

It is the major premise of this paper that trends in population growth and in consumption pattern have far reaching implications to agricultural development than what is commonly understood and what is commonly brushed aside. Hence the present paper addresses the following issues:

- What would the decadal trends in major components of demographic profile of Karnataka be suggestive of growth pattern of Karnataka Agriculture?
- How are the broad trends in consumption of food articles in the State, and what are the implications to cropping pattern?
- How have been the trends in the share of agriculture, industry and service sector in Gross State Domestic Product (GSDP) during the last four decades and what do these trends suggest about the future of agriculture in Karnataka?
- What changes have taken place in land resource base of the State and in patterns of land holdings?

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- How are the trends in gross irrigated area, in sources of irrigation and in cropping intensity?
- Where does Karnataka stand with respect to yields of some major crops compared to India and of world yield levels, and of major producing countries of these crops?
- What could be the possible indicative of agricultural development path for Karnataka given the context and complexity of agriculture in the State?

2. Trends in Population Profile

Population growth in any region could put a pressure on the resource base: natural and economic resource, comprising of many things like social infrastructure, physical infrastructure, and at the end quality of life itself. In this study, the focus of population profile is on total population for more than half a century, composition in terms of male and female population, urban and rural population, density of population and literacy rate. It is observed from Table 1:

Table 1: Decadal Trends in Demographic Profile of Karnataka Population:

Particulars	Decade						
	1951	1961	1971	1981	1991	2001	2011
Total Population (crore)	1.94	2.36	2.93	3.71	4.50	5.29	6.11
• Male (crore)	0.99	1.21	1.50	1.89	2.30	2.69	3.10
• Female (crore)	0.95	1.15	1.43	1.82	2.20	2.60	3.01
Population Growth (%)	-	21.58	24.22	26.75	21.11	17.51	15.60
• Share of Urban Population (%)	22.96	22.33	24.30	28.89	30.92	33.99	38.70
• Share of Rural Population (%)	77.04	77.67	75.70	71.11	69.08	66.01	61.30
Density (sq. km.)	-	123	153	194	235	276	319
Literacy Rate (%)	19.26b	29.80b	36.83b	46.21c	56.04c	66.60c	75.40c

Notes: 1.b = Population aged 5 years and above.

2.c = Population aged 7 years and above.

3.Source: Many Publications of Indian Census-1951-2011.

- Between 1951 and 2011, the population of the State had increased from 1.94 crore in 1951 to 6.11 crore, and decadal population growth from 21.58% in 1961 to 15.60% in 2011, registering a slowdown in population growth.
- The share of urban population in total population had increased from 22.96% in 1951 to 38.7% in 2011, and the corresponding rural population from 77.04% to 61.3%. This rural-urban population composition puts a pressure on the need for producing food for urban sector.
- Density of population per sq. km had increased from

123 in 1961 to 319 in 2011, with implications for man-land ratio.

- Yet another trend is increase in literacy rate from 19.2% in 1951 to 75.4%, with implications to changing food consumption composition.

Temporal Trends in Consumption Pattern of Food Articles

Population profiles like population growth, rural and urban population, and literacy rate-all will have a bearing on consumption pattern of food and non-food articles. It is observed from Table 2:

**Table 2: Temporal Trends in Consumption Pattern of Food Articles in Karnataka:
Percentage of Monthly Per-Capita Consumer Expenditure:**

Broad Groups of Consumption Items	Rural			Urban		
	1993-94	2004-05	2011-12	1993-94	2004-05	2011-12
I Food Items:						
Cereals	22.8	16.48	9.61	16.40	11.11	6.13
Pulses and Pulse Products	4.30	3.53	3.14	3.50	2.24	1.95
Fruits and Nuts	3.20	3.26	4.31	3.20	2.61	4.12
Vegetables	4.90	4.61	5.26	4.20	3.12	3.38
Egg, Fish and Meat	3.30	3.50	5.42	3.40	2.91	3.64
Other Items	23.50	24.29	13.14	21.00	21.22	20.86
Total Food Items	62.00	55.67	51.35	51.70	43.21	40.08
II Total Non-Food Items:	38.00	44.33	48.65	44.30	56.79	59.92
Total	100.00	100.00	100.00	100.00	100.00	100.00

Source: Various issues of National Sample Survey Reports on Level and Pattern of Consumer Expenditure.

Notes: 1. Other items include milk and milk products, edible oil, spices, beverages, refreshments etc, fruits and nuts and so on.

2. Total non-food articles include medical, education, durable goods, clothing and bedding, fuel and light and so on.

- In percentage of monthly expenditure by both rural and urban population on food items, there was a drastic decline between 1993/94 and 2011/12, much more so in case of urban population. Obviously there has been a considerable increase in total non-food items like medicare, education, clothing, fuel, light, and other durable goods. This kind of shifts in consumption pattern is much more so in case of urban population.
- Among food articles, decline in percentage of

expenditure on cereals and pulses is considerable, whereas percentage of expenditure on fruits, nuts, vegetables, egg, fish and meat has increased. This kind of change in consumption pattern will have a bearing on prices and production in farm sector.

4. Following the changing consumption pattern, broad trends in cropping pattern have come to be registered as shown in table 3:

- In percentage to gross cropped area, the share of cereals had declined from about 60% in 1962-63 to 40% in 2017-18, and that of pulses had increased. However the percentage area had declined in total food grains during the same period.
- But the percentage area under fruits and vegetables had increased considerably during the same period, following changing consumption pattern.

Table 3: Change in Cropping Pattern: Some Broad Trends – Percentage to Gross Cropped Area Triennium Ending

Indicators	1962-63	1982-83	2002-03	2017-18
Total Cereals	59.72	52.41	45.07	39.96
Total Pulses	11.92	13.22	16.91	24.67
Total Food Grains	71.92	66.59	61.98	61.63
Fruits and Vegetables	-	1.86	5.33	5.10 (2014-15)

Source: Many Publications of Ministry of Agriculture, Government of Karnataka.

5. Population growth, composition of rural and urban population, shifts in consumption patterns of food and non-food items-all these have a bearing, among others, on the percentage share of three broad sectors viz agriculture, industry, and service sector in Gross State Domestic Product (GSDP). The bearing is reflected in the results shown in Table 4:

- In about four decades, the percentage share of agriculture sector had declined from 43.13% to 11.10%, share of industry had marginally declined, whereas the share of service sector had doubled from 33.56% to 66.63%. This implies that GSDP in Karnataka is service sector-led, and agriculture sector has to bear the burden of producing food for the people in industry and service sector. Over 60% of the State population parked mainly in rural areas get a share of about 11% of income produced in the State. This explains vividly rural-urban development divide, and over 80% of the poor parked in rural areas. How long can this go on, without social unrest is a question of great concern? What is the choice of growth-development path? This will be examined in the last section of the paper.

Table 4: Sectoral Share in Gross State Domestic Product (GSDP):

Year	Sectoral Share (%)		
	Agriculture	Industry	Service
1980-81	43.13	23.31	33.56
1990-91	34.19	25.72	40.09
2000-01	30.33	22.99	46.68
2010-11	17.96	28.66	53.38
2016-17	11.53	22.94	65.53
2017-18	11.10	22.27	66.63

Source: Publications of Central Statistical Organization (CSO), Government of Karnataka.

Land Resource Base & Land Holding Pattern

Land resource base and land holding pattern will have a far reaching implications for meeting the growing and changing foods needs of population. Table 5.A and

5.B provide dynamics of this resource base and of land holding pattern of different dimensions:

Table 5.A: Land Resource Base and Pattern of Land Holdings:

Indicators	1970-71	1980-81	2000-01	2010-11
1. Total Cropped Area (in lakhs)	108.87	106.60	122.84	130.62
2. No of Operational Holdings (in lakhs):				
Marginal	10.81	14.89	35.52	38.49
Small	8.40	10.57	19.09	21.38
Semi-Medium	7.88	9.18	12.59	12.67
Medium	6.23	6.62	5.69	5.11
Large	2.19	1.83	0.90	0.68
Total Holdings	35.51	43.09	70.79	78.32
3. Share (%) of different sizes of holdings in total holdings:				
Marginal	30.44	34.56	45.94	49.14
Small	23.66	24.53	26.97	27.30
Semi-Medium	22.19	21.30	17.78	16.18
Medium	17.54	15.36	8.04	6.52
Large	6.17	4.25	1.27	0.87
Total	100.00	100.00	100.00	100.00
4. Area share of holdings (%):				
Marginal	4.83	6.24	12.12	15.22
Small	10.74	13.14	22.28	24.83
Semi-Medium	19.40	21.90	27.86	27.90
Medium	33.36	34.21	26.95	23.88
Large	31.68	24.52	10.70	8.17
Total	100.00	100.00	100.00	100.00

Notes: Marginal holdings: Below 1ha. Small: 1 to 2ha. Semi-Medium: 2 to 4ha. Medium: 4 to 10ha. Large: Above 10ha.

Source: Many Publications of Ministry of Indian Agriculture, Government of Karnataka.

Table 5.B: Average of Different Size Holdings (in ha):

Indicators	1970-71	1980-81	2000-01	2010-11
Marginal	0.51	0.49	0.46	0.48
Small	1.45	1.46	1.44	1.41
Semi-Medium	2.80	2.80	2.72	2.68
Medium	6.09	6.07	5.83	5.68
Large	16.44	15.74	14.74	14.62
Average of Total Holdings	3.20	2.73	1.74	1.55

Source: Many Publications of Ministry of Indian Agriculture, Government of Karnataka.

- Number of operational holdings had more than doubled from 35.51 lakh holdings in 1970-71 to 78.32 lakh holdings. Of these total holdings, the number of marginal and small holdings increased from about 19 lakh in 1970-71 to about 60 lakh in 2010-11. Whereas in the case of semi-medium, there was some increase in the number of holdings, but medium and large holdings experienced quite a decrease in the number.
- With respect to the share of different holdings in total holdings, there was quite an increase from 54% in 1970-71 to about 76% in 2010-11 in case of marginal and small holdings. The state has become a region of marginal and small holdings. Whereas in the case of all other three size groups, the percentage share had declined during the same period, much more so in case of medium and large holdings.
- An examination of the issue from the angle of area share of different size holdings, both marginal and small holdings as well semi-medium holdings had increased their percentage share in area during the period of 40 years. But in case of medium and large holdings, there was a considerable decline in their area share, much more so in case of large holdings. Which had experienced a decline from 31.68% in 1970-71 to 8.17% in 2010-11.
- As could be seen from Table 5.B, during 40 years of study period, there was a decline in the average size of holdings, measured in terms of area owned.

If could be inferred from the above analysis that (1) The number of operational holdings had more than doubled, the share of marginal and small holdings had increased three fold, and in case of other three holding groups there was a decline in their share. (2) With respect to percentage share in total holdings, there was a considerable increase in the share of small and marginal holdings, and decrease in the share of other groups: (3) An increase in area share was registered in case of marginal and small holdings as well as semi-medium holdings, whereas in case other two groups there was a considerable decline in the area share. (4) The average size of holdings had declined in all group sizes. All these inferences are suggestive of pressure of population growth on land resource base. However, this does not account for declining fertility of land resource base. This also will have bearing on productivity of land resource base.

7. Irrigation Resource Base

The irrigation resource base for supporting Karnataka agriculture is displayed in Table 6:

- The percentage of gross irrigation area had increased from 9.22% in 1960-61 to 34.18% in 2014-15. This implies that about two-thirds of cropped area in the State is still rain-fed. Hence Karnataka is a land of dryland agriculture.
- During the period of less than 60 years, cropping intensity increased from 103.52% to 120.85%.
- With respect to sources of irrigation, tube-well irrigation had increased its dominance from almost zero percentage in 1960-61 to 38.54% in 2014-15, followed by canal irrigation with a share of 34.24% in 2014-15. Tanks which were dominant source of irrigation in 1960-61 had registered a considerable decline from about 40% to about 4% during the study period. Other two sources had experienced a decline in their share. It is to be remembered that depletion of water resource in the State is a great concern with its impact on productivity (yield) of land in the State.

Table 6: Total Cropped Area, Gross Irrigated Area and Cropping Intensity

Indicators	1960-61	1980-81	2000-01	2014-15
1. Total Cropped Area (in lakh ha.)	105.88	106.60	122.84	122.47
2. Gross Irrigated Area (in lakh ha.)	9.76	16.76	32.71	41.86
3. Percentage of Gross Irrigated Area	9.22	15.72	26.63	34.18
4. Share of Irrigation Sources (%):				
Tube Wells	0.00	0.04	20.39	38.54
Wells	15.47	26.72	18.12	10.52
Canal	27.50	40.19	36.55	34.24
Tanks	40.05	22.31	9.88	4.32
Other	16.98	10.74	15.02	12.38
5. Cropping Intensity (%)	103.52	107.69	118.00	120.85

Source: Many Publications of Ministry of Indian Agriculture, Govt. of Karnataka.

8. Yield Gap Analysis

Where does Karnataka stand with respect to yield, of some major crops compared to India, world and major producing countries globally? The results are displayed in Table 7, with three year average yield data. Yield ratios are computed with Karnataka yield as the base. In case of comparison between Karnataka and India, yield levels are better in Karnataka with respect to sugarcane, maize and sorghum, but with respect to world average yield, Karnataka is better in case of yield of Rice and Sugarcane. With respect to wheat, maize and sorghum the world average yields are higher. When comparison is drawn between Karnataka and major producing countries in the world, yield levels are lower in Karnataka compared to U.S.A in case of maize and sorghum, compared to U.K in case of wheat, compared to China in case of rice, and compared to Columbia in case of sugarcane. The yield levels of other countries in case of five crops covered in this study set the benchmark for Karnataka. In fact, Karnataka agriculture

is trapped in median level without sliding down in growth hierarchy and unable to climb up the ladder.

Table 7: Yield Gap in some Major Crops of Karnataka vis-à-vis India and Major Producing Countries:

Crop	Yield Ratio			
	Karnataka	India	World	Major Producing Country in the World
Wheat	1.00	2.64	2.95	7.47 (U.K)
Rice	1.00	1.21	0.87	2.30 (China)
Sugar Cane	1.00	0.84	0.83	1.06 (Columbia)
Maize	1.00	0.89	1.93	3.70 (U.S.A)
Sorghum	1.00	0.91	1.58	4.83 (U.S.A)

Sources: FAO and Economic Survey of Karnataka: 2017-18.

9. Analysis Of Indicative Development Path For Karnataka Agriculture

The discussions on population growth and changing consumption pattern of food and non-food articles are suggestive of the directions which need to be piloted for agricultural development in Karnataka. Analysis of resource base in case of land and water suggest the depletion and degradation of natural resource base in Karnataka, and the need for addressing these issues. An examination of pattern of land holdings suggests that Karnataka is a state of small and marginal holdings due to population pressure, and fragmentation and subdivision of holdings due to law of inheritance:

- Only about one-third of the cropped area is irrigated. Hence the State is a region of dominantly dryland agriculture.
- Yield gap analysis indicates the low productivity of Karnataka agriculture with respect to dominant crops.
- Added to the concerns of Karnataka agriculture derived from the empirical analysis performed in this later, there are other complexities and

the context in which the State agricultural sector is placed-falling public investment in the sector, polarized growth pattern instead of broad-based virtuous growth, transition to high value crops mainly thanks to entry of corporate sector, failure of governance, and agrarian crisis reflected in persistent farmers' suicide syndrome and so on. Added to all is the transition of the sector from protective sector through trade policy to competitive environment under WTO of globalization era.

- Then what are the search areas for revitalizing Karnataka agriculture:
 - There are three search areas as possible drivers and directions of agricultural development in the State: Natural resource domain to provide physical and biological foundation for agriculture, human development domain for farmers' capacity building, technology-cum-institutional domain (like credit and marketing institutions).
- It is not the objective of this paper to elaborate all these: But to cite a few of them:
 - Farmers' capacity building through development education and development associations to address the issues of natural resource management, marketing, and for availing institutional development credit.
 - "Build on the Rest" strategy in addition to "Build on the Best", so as to bring laggards into the orbit of high growth path.
- Gradual reduction in subsidies to plough back resources for public investment in irrigation development and management.
- Reduction in number of operational holdings through amendment to Land Reforms Act so as to facilitate leasing in and leasing out land.
- Shift labour force in agriculture by promoting labour intensive industries in rural and semi-urban areas so as to diversify rural economy, as done in China.
- Adoption of new technologies like biotechnology with bio safety.
- Any of the failure to support agriculture and rural population would lead to strong surfacing of third and fourth level state of psychological behavior of human beings viz vocal and violence. The first two stages viz silent tolerance and silent resentment are over, and the agrarian crisis is already on. It is realized that many new initiatives such as distribution of quality seeds and bio-pesticides, sub-mission on agricultural mechanization, schemes under National Food Security Mission, Rashtriya Krishi Vikas Yojana, National Mission of Oil Seeds, Soil Health Mission, National Mission for Sustainable Agriculture, Rainfed Area Development, Bhoochetana and so on for supporting agriculture are on. But it is too early to be conclusive about the extent of their positive impact on the sector. It is not known whether the outcome of these new initiatives would match the budget outlay. At the end it becomes a management problem.