

Commercialization of agriculture in north Karnataka: A case study

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Abstract: Commercial agriculture focuses on cultivating crops primarily for market purposes rather than subsistence. The present study estimates the extent of crop commercialization in North Karnataka. The study classifies the districts into two clusters: cluster I (Dharwad and Gadag) and cluster II (Belagavi and Bagalkot). Primary data were collected from 240 farm households from the two categories using pre-tested and well-structured schedule. The study evaluated key metrics including cropping patterns, cropping intensity and the Crop Commercialization Index (CCI). The results of the study revealed disparity in commercialization between the two clusters. Cluster II demonstrates a higher degree of commercialization, largely due to its focus on cash crops like sugarcane, which have strong market demand and profitability. In contrast, cluster I is characterized by the predominance of staple crops such as maize and wheat, which limits its market engagement. Notably, the study finds that cropping intensity is higher in cluster I at 147.58 per cent, attributed to its diverse crop rotations that allow for optimal land use. In comparison, cluster-II, with a cropping intensity of 128.62 per cent, is hindered by the singular focus on sugarcane. The CCI analysis indicates that a substantial majority (94.58%) of farm households in both clusters fall within the upper echelon of the commercialization spectrum (76 to 100 per cent range), signalling robust market participation among these farming communities. These findings illuminate the critical role that crop selection, market proximity and irrigation access play in shaping the landscape of agricultural commercialization. To sustain and enhance this commercialization process, it is imperative for policymakers to focus on strengthening market linkages, improving infrastructure and supporting the adoption of modern agricultural practices. Additionally, a balanced approach that encourages the cultivation of both high value commercial crops and essential food crops is vital for fostering sustainable agricultural development.

Key words: Agricultural Commercialization, Cropping Pattern, Crop Commercialization Index (CCI), Farm households

Introduction

Commercialization in agriculture is marked by a gradual increase in farmers' participation in both input and output markets, shifting from self-sustaining systems to focused production for profit (Pingali and Rosegrant, 1995). In India, this shift is evident in the marketed surplus ratios of key crops. For example, the marketed surplus of rice has grown from about 60 per cent in the mid-1990's to 80 per cent in 2020. Similarly, the surplus for wheat increased from around 55 per cent to 75 per cent in the same period. However, while national trends are encouraging, there remain significant regional disparities in commercialization levels. Areas that benefited from the Green Revolution have made notable progress, while regions with high agro-climatic risks continue to rely on semi-commercial farming systems with lower marketable surpluses. For full-scale commercialization, farmers need access to factor markets for credit, modern agricultural inputs such as seeds and fertilizers and advanced technologies (Pingali *et al.*, 2019).

In recent years, Indian agriculture has seen remarkable changes, characterized by increased commercialization and diversification. These changes include the cultivation of new crop varieties, the shift toward cash crops and the growth of livestock and fisheries. Moreover, there has been an expansion into high-tech agriculture fields such as aquaculture, biotechnology and horticulture (Parihar, 2023).

Commercialization has far-reaching effects on both economic growth and the well-being of farmers. It enables households, especially those with limited resources, to participate more actively in both local and international trade. This increased participation, in turn, can lead to higher average farm incomes and help reduce income inequality among farming communities. The additional income generated through commercialization can be utilized to meet basic needs or improve living conditions. In this study, commercialization is measured as the ratio of the gross value of crops sold to the total value of all crops produced, capturing the household's marketing behaviour comprehensively.

The roots of agricultural commercialization in India trace back to British colonial policies, which introduced capitalist practices. The shift gained momentum in the late 19th century with the advent of a money-based economy. While trade and monetary systems existed during the Mughal period, it was the territorial expansion of the East India Company that introduced a cash-based land revenue system. Farmers were required to pay land taxes in cash, compelling them to sell a portion of their produce. A merchant class also emerged, exploiting the indebtedness of farmers.

Although the commercialization of Indian agriculture during British rule aimed primarily at supplying raw materials for British

industries, it was limited to a few crops like cotton, indigo, jute, tea and coffee. While this shift led to increased market responsiveness, it did not bring substantial agricultural development due to the lack of investment in land and technology. Moreover, the focus on cash crops often came at the expense of food crops, contributing to food shortages and famines, such as the 1866 famine in Odisha and Bengal. The construction of railways and the opening of the Suez Canal in 1869 facilitated the transport of agricultural goods, boosting exports and expanding markets for Indian produce.

In recent period, the level of commercialization among Indian farmers varies depending on factors such as land size, irrigation availability and access to modern technology. Larger farms with better irrigation facilities are more likely to engage in commercial agriculture (Deshpande and Prabhu, 2005), making commercialization a viable strategy for increasing farm profits

Material and methods

The present study relied on primary data to meet its objective. This data was collected from farm households using a pre-tested and well-structured schedule. Four districts in North Karnataka namely, Dharwad, Gadag, Belagavi and Bagalkot were purposively chosen for the study based on the gross irrigated area. Dharwad and Gadag were categorized as Cluster-I (smaller gross irrigated area), while Belagavi and Bagalkot as Cluster-II (higher gross irrigated area). In each district, two talukas were purposively selected based on their gross irrigated area and from each taluka, three villages were randomly chosen. From each village, 10 farm households were selected, with six small, three medium and one large farmer, reflecting the average proportion of farmer categories in the study area. In total, the sample included 240 respondents, representing 24 villages across eight talukas in four districts of North Karnataka.

The data collected were presented in tabular form to facilitate easy comparison. Descriptive statistics are brief descriptive coefficients that summarize a given data set, which can be either a representation of the entire population or a sample of it. Descriptive statistics were used to study and document the cropping pattern and classification of farm households based on Crop Commercialization Index (CCI) in the study area.

In the present study, cropping intensity was determined to evaluate the cropping pattern of the sample respondents. The formula used to calculate cropping intensity is as follows:

$$\text{Cropping Intensity (CI)} = \frac{(\text{Gross Cropped Area})}{(\text{Net Cropped Area})} \times 100 \quad (1)$$

Where,

Gross Cropped Area = The total area sown with crops, including multiple cropping on the same land during a year (if the land is used for more than one crop in a season or year)

Net Cropped Area = The area of land that is sown with crops only once in a year

In the present study, household Crop Commercialization Index (CCI) was used to estimate the extent of commercialization. The CCI is an important metric used to assess the degree to

which crops produced by farmers are sold in the market rather than consumed by the household. This index is crucial for understanding agricultural commercialization and its impact on rural economies and household welfare. CCI is defined as the proportion of the output which has been sold (Braun and Kennedy, 1994 and Muriithi and Matz, 2015).

The most commonly used formula for the CCI is:

$$\text{CCI} = \frac{\text{Gross value of crop sales hhi}}{\text{Gross value of all crop production hhi}} \times 100 \quad (2)$$

CCI = Household Crop Commercialization Index

hhi = i^{th} household

The value of zero indicates that the farmer is totally subsistence and the value closer to hundred depicts that the farmer is highly commercialized.

Results and discussion

Table 1 provides the cropping pattern for both cluster-I and cluster-II within the study area. During the *kharif* season, in cluster-I, maize emerged as the dominant crop, covering 0.58 ha (28.43% of the total area). Groundnut and green gram followed, with 0.48 ha (23.53%) and 0.46 ha (22.55%), respectively. Other crops like bengal gram, soybean, horse gram and chilli had smaller shares. The total *kharif* cultivated area in cluster-I was 2.04 ha. In contrast, maize also dominated in cluster-II, occupying 0.29 ha (29.90%). Soybean followed with 0.21 ha (21.65%) and other crops such as jowar, red gram and onion covered smaller portions of the total area. The *kharif* cultivated area in cluster-II totalled 0.97 ha. The prominence of maize in both clusters can be attributed to its high market demand, profitability and the crop's suitability to the region's climate and soil.

The *rabi*-Summer season exhibited significant differences between the two clusters. In cluster-I, wheat was the leading crop, covering 0.49 ha (27.53%), followed by sunflower with 0.39 ha (21.91%) and jowar with 0.35 ha (19.66%). The total *rabi*-Summer cultivated area in cluster-I was 1.78 ha. In cluster-II, jowar was the dominant crop during this season, occupying 0.27 ha (32.53%), followed by wheat at 0.23 ha (27.71%). Bengal gram and groundnut also had moderate shares. The total *rabi*-Summer cultivated area in cluster-II was 0.83 ha. The preference for wheat and jowar in cluster-I can be linked to their importance as staple food crops, while sunflower's significant share is due to its profitability. Meanwhile, jowar's prominence in cluster-II is associated with its role in ensuring food security for households.

In the perennial season, the cropping patterns were distinct in both clusters. Cluster-I relied solely on cotton, which covered 1.05 ha. Cotton's dominance can be explained by its convenience, profitability, low water requirements and compatibility with the local soil. On the other hand, sugarcane dominated in cluster-II, covering 1.87 ha (97.40% of the total area). Cotton was also grown but had a much smaller share (2.60%). Sugarcane's prevalence can be attributed to its status as a commercial crop with a consistent market, proximity to sugar factories and access to irrigation. The result aligns with previous studies (Shabnum *et al.*, 2022; Gunadal *et al.*, 2024).

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Table 1. Cropping pattern of cluster-I and cluster-II farm households in the study area

Particulars	Overall (n=240)			
	Cluster-I (n=120)		Cluster-II(n=120)	
	Average Area (ha)	Per cent	Average Area (ha)	Per cent
I. <i>kharif</i> season				
Maize	0.58	28.43	0.29	29.90
Groundnut	0.48	23.53	0.05	5.15
Green Gram	0.46	22.55	0.01	1.03
Bengal Gram	0.16	7.84	0.05	5.15
Soybean	0.14	6.86	0.21	21.65
Horse Gram	0.08	3.92	0.00	0.00
Chilli	0.08	3.92	0.03	3.09
Jowar	0.05	2.45	0.08	8.25
Red Gram	0.00	0.00	0.08	8.25
Onion	0.00	0.00	0.06	6.19
Black Gram	0.01	0.49	0.05	5.15
Pearl Millet	0.00	0.00	0.04	4.12
Sunflower	0.00	0.00	0.01	1.03
Total	2.04	100.00	0.97	100.00
II. <i>rabi</i>-summer season				
Wheat	0.49	27.53	0.23	27.71
Sunflower	0.39	21.91	0.02	2.41
Jowar	0.35	19.66	0.27	32.53
Bengal Gram	0.33	18.54	0.15	18.07
Maize	0.12	6.74	0.01	1.20
Groundnut	0.04	2.25	0.07	8.43
Black Gram	0.03	1.69	0.00	0.00
Chilli	0.01	0.56	0.00	0.00
Cowpea	0.01	0.56	0.01	1.20
Safflower	0.01	0.56	0.00	0.00
Soybean	0.00	0.00	0.04	4.82
Red Gram	0.00	0.00	0.03	3.61
Total	1.78	100.00	0.83	100.00
III. Perennial crops				
Sugarcane	0.00	0.00	1.87	97.40
Cotton	1.05	100.00	0.05	2.60
Total	1.05	100.00	1.92	100.00
IV. Gross cropped area	4.87	100.00	3.73	100.00
V. Net cropped area	3.30	-	2.90	-
VI. Cropping intensity(%)	-	147.58	-	128.62

The study found a higher cropping intensity in cluster-I at 147.58 per cent, compared to 128.62 per cent in cluster-II. This difference can be attributed to the dominance of sugarcane in cluster-II, a perennial crop that occupies a significant portion of the gross cropped area and limits the possibility of multiple cropping within the year. In contrast, the presence of crops like wheat, jowar and sunflower in cluster-I allows for more flexibility

Table 2. Commercialization index between Cluster-I and Cluster-II farm households in the study area

Variable	Cluster-I (n=120)		Cluster-II (n=120)	
	Dharwad (n=60)	Gadag (n=60)	Belagavi (n=60)	Bagalkote (n=60)
Crop commercialization Index (CCI) (%)	88.71	90.36	96.89	95.15
		89.54		96.02

in crop rotations and multiple cropping, contributing to a higher cropping intensity.

Table 2 represents the Crop Commercialization Index (CCI) between farm households in cluster-I and cluster-II. Results show a clear difference in commercialization levels between the two clusters. In cluster-I, CCI values varied between districts. Dharwad recorded a CCI of 88.71 per cent, while Gadag exhibited a slightly higher CCI of 90.36 per cent. The overall CCI for cluster-I was 89.54 per cent. Conversely, cluster-II showed a higher level of commercialization. Belagavi recorded a CCI of 96.89 per cent, while Bagalkot exhibited a CCI of 95.15 per cent, with an overall CCI of 96.02 per cent. The relatively lower level of commercialization in cluster-I compared to cluster-II aligns with the cropping pattern, where staple crops like maize, groundnut and wheat dominate, rather than high-value commercial crops. This higher CCI in cluster-II reflects greater engagement in commercial agriculture, particularly with crops like sugarcane, which has a strong market presence and higher profitability.

The focus on sugarcane as a commercial crop significantly contributes to the elevated level of agricultural commercialization in the cluster-II. The prevalence of sugarcane in cluster-II has likely benefited from favourable conditions such as proximity to sugar factories and accessible irrigation, as mentioned in the cropping pattern discussion. This aligns with previous study by Zantsi and Nkunjana (2018), who reported CCI values of 0.66 for maize, 0.83 for potatoes and 0.73 for cabbage, highlighting the variations in commercialization across different crops and regions.

Table 3 presents the classification of farm households based on the Crop Commercialization Index (CCI) across two clusters and four districts. In cluster-I, for the Dharwad district, 55 households (91.67%) fall within the 76 to 100 per cent CCI range, while a smaller proportion of five households (8.33%) were in the 51 to 75 per cent range. No households in Dharwad were found in the lower CCI ranges (0-50%). A similar trend was observed in Gadag, where 55 households (91.67%) also belong to the 76 to 100 per cent range, with three households (5.00%) in the 51 to 75 per cent range and two households (3.33%) in

Table 3. Classification of farm households based on crop commercialization index (CCI) value in the study area

CCI (%)	Cluster-I (n=120)		Cluster-II (n=120)		Overall (n=240)
	Dharwad (n=60)	Gadag(n=60)	Belagavi(n=60)	Bagalkote(n=60)	
0-25	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)
26-50	0 (0.00)	2(3.33)	0 (0.00)	1(1.67)	3 (1.25)
51-75	5 (8.33)	3 (5.00)	1(1.67)	1(1.67)	10 (4.17)
76-100	55 (91.67)	55(91.67)	59 (98.33)	58 (96.67)	227(94.58)
Total	60 (100.00)	60 (100.00)	60 (100.00)	60 (100.00)	240 (100.00)

Note: Figures in the parentheses indicate percentages to the respective totals.

the 26 to 50 per cent range. There were no households in the 0 to 25 per cent range in Gadag.

In cluster-II, 59 households (98.33%) in Belagavi were within the 76 to 100 per cent CCI range, with just one household (1.67%) in the 51 to 75 per cent range. Again, no households fell below the 50 per cent mark. Similarly, in Bagalkot, 58 households (96.67%) were in the 76 to 100 per cent CCI range, with one household each (1.67%) in the 51 to 75 per cent and 26 to 50 per cent ranges. No households were found in the 0 to 25 per cent range in either district.

Overall, the analysis showed that the majority of farm households in the study area exhibit a high level of commercialization, with 227 households (94.58%) classified in the 76 to 100 per cent CCI range. Only 10 households (4.17%) are in the 51 to 75 per cent range and just three households (1.25%) fall within the 26 to 50 per cent range. Notably, no households had a CCI below 26 per cent. These results indicate a highly commercialized agricultural sector, with most farm households concentrated in the upper CCI ranges. The finding of the study highlights the significant market orientation of farm households in the study area, as shown in Table 2.

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Conclusion

The study analyzed the extent of agricultural commercialization between two clusters in North Karnataka, emphasizing differences in cropping patterns and commercialization levels. The findings demonstrate that cluster-II, with a higher reliance on commercial crops such as sugarcane, exhibited greater agricultural commercialization than cluster-I, where staple crops like maize and wheat are more prevalent. The higher cropping intensity in cluster-I is attributed to the flexibility of crop rotations, while cluster-II's lower cropping intensity results from the dominance of sugarcane as a perennial crop. The results also show that most farm households in both clusters fall within the 76 to 100 per cent range of the Crop Commercialization Index (CCI), indicating a significant degree of market participation. These findings provide insight into the role of crop choice, market proximity and irrigation access in shaping commercialization levels. Policy interventions would focus on improving market access, technology adoption and support for diversification to promote sustainable commercialization across regions.