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ECONOMIC PERFORMANCE OF PLANTATION CROPS IN KARNATAKA: A SECTORAL ANALYSIS

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ABSTRACT

The study examines the trends, productivity, and profitability of major plantation crops such as coffee, arecanut, coconut, rubber, and cashew in Karnataka. Plantation crops, being perennial and capital-intensive, play a crucial role in enhancing rural incomes and export earnings, particularly in the Malnad and coastal regions. Using secondary data from government sources, the study evaluates cost–return structures, growth patterns, and regional disparities across plantation zones. Findings reveal that while area under plantation crops has gradually increased, yield growth remains inconsistent due to fluctuating input costs, climate risks, and price volatility. Crops like coffee offer high returns but face greater market uncertainties, while arecanut and coconut provide more stable, though moderate, incomes. The analysis highlights infrastructural limitations, inadequate processing facilities, and the absence of price stabilization mechanisms as key constraints. To improve sectoral performance, the study recommends integrated farming systems, value addition at the local level, improved access to institutional credit, and promotion of sustainable and diversified plantation models. Strengthening Farmer Producer Organizations (FPOs), enhancing market linkages, and incentivizing organic and GI-certified produce are essential to achieve economic resilience. Overall, the research emphasizes the need for region-specific policy frameworks that align with Karnataka's agro-climatic diversity, thereby ensuring sustainable growth and competitiveness in the plantation sector.

Keywords: Plantation crops, Economic performance, Crop diversification, Agricultural sustainability, Horticulture.

INTRODUCTION

Plantation crops such as coffee, arecanut, coconut, tea, rubber, and cashew play a crucial role in Karnataka's agricultural economy. These perennial and high-value crops differ from annual food crops due to their higher investment requirements, longer gestation periods, and sensitivity to climatic and policy changes. A sectoral analysis of their economic performance helps in understanding their contribution, challenges, and growth potential within the state's agrarian structure.

Karnataka is one of India's major producers of plantation crops, contributing nearly 70 % of the country's coffee and 85 % of its arecanut (Magme Medal, 2024). According to the *Economic Survey (2023–24)* and *SLBC reports*, plantation crops occupied about 14.60 lakh hectares in 2022–23, a slight increase from 12.86 lakh hectares in 2021–22. Although this area represents a modest portion of the state's total net sown area (111.60 lakh hectares), plantation crops hold strategic importance due to their high economic and export value.

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While agriculture and allied sectors contribute around 12 % to Karnataka's Gross State Domestic Product (GSDP), plantation crops make a disproportionately higher contribution to export earnings, rural livelihoods, and employment in hill and Malnad regions. However, the sector faces structural challenges such as small landholdings, limited access to credit and infrastructure, price volatility, and climate risks.

The major plantation zones are concentrated in the Malnad and coastal districts—Kodagu, Chikkamagaluru, Dakshina Kannada, Uttara Kannada, and Hassan—where favorable climatic and soil conditions support perennial cultivation. Yet, steep terrain, dependency on rainfall, high input costs, and fluctuating global prices make smallholders vulnerable to financial instability.

Over recent years, Karnataka's agricultural landscape has shifted towards more profitable and less water-intensive crops, with plantation and commercial crops gaining preference over traditional staples like paddy, jowar, and tur (New Indian Express, 2024). This reflects farmers' adaptation to changing market dynamics and risk management strategies.

To gain a comprehensive understanding of this vital sector, the present study analyzes the economic performance of major plantation crops in Karnataka—examining trends in area, production, productivity, cost–return structures, and regional variations. The study also identifies key constraints and proposes strategies to enhance profitability, sustainability, and resilience in the plantation crop sector.

2. REVIEW OF LITERATURE

Nagaveni, M., Kulkarni, G. N., Guledagudda, S. S., Venugopal, C. K., & Rajkumara, S. (2024). *Trends and status of horticultural crops in Karnataka.*: The study analyzed growth rates, instability, and decomposition of horticultural crops in Karnataka using secondary data (2001–2021). Compound Annual Growth Rates (CAGR) and Cuddy-Della Valle Instability Index were used to assess performance. Results showed substantial growth in fruits, vegetables, and plantation crops, with moderate instability, while medicinal and aromatic plants displayed higher volatility. Decomposition analysis revealed that area expansion drove initial growth, whereas yield improvement became vital later. The study highlights horticulture's vital role in Karnataka's economy and suggests policy focus on technology adoption, infrastructure, and market linkages to enhance productivity and mitigate risks

Thomas Felix, K., & Ramappa, K. B. (2023). *An economic analysis of crop diversification and dynamics of cropping pattern in Karnataka, India.* This paper analyzed crop diversification across Karnataka (1998–99 to 2020–21) using the Composite Entropy Index, Double-log model, and Markov Chain analysis. Findings revealed low diversification in districts such as Kodagu, Dakshina Kannada, and Yadgir. While diversification trends were positive, growth remained marginal. Factors such as MSP of coarse cereals, irrigation, agricultural credit, and highway length positively influenced diversification. The study emphasizes that improving irrigation, credit access, and infrastructure is essential for sustainable diversification. It concludes that policy initiatives focusing on infrastructure and institutional support can promote balanced agricultural growth and enhance crop diversification in Karnataka

Devaraj, D. (2022). *Performance and Growth of Agriculture Sector in Karnataka: A Trend Analysis.* This research assessed growth and performance trends in Karnataka's agriculture sector using secondary data and Compound Annual Growth Rates. The study found that agriculture remains vital for Karnataka's economy, employing over half of its rural workforce, though its GSDP contribution has declined. Production fluctuations were linked to

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monsoon failures and uneven irrigation access. While some crops like sugarcane and cotton showed growth, cereals and pulses recorded variability. The study underscores the regional imbalance between northern and southern Karnataka and advocates improved irrigation, technology adoption, and drought management to enhance agricultural productivity and resilience

Sserunjogi, B., & Lokesha, H. (2016). *A Recent Performance Analysis of the Crop Sector and its Determinants in North-Eastern Karnataka.*: This study examined crop sector performance across Karnataka's four divisions (1980–81 to 2009–10), emphasizing North-Eastern Karnataka. Using compound annual growth rates and regression models, it found diversification away from cereals and pulses toward high-value fruits and vegetables. Growth in cereal area declined while yields stagnated; pulses and oilseeds underperformed after reforms. Factors such as fertilizer use, irrigation, credit flow, and regulated markets positively influenced growth. The study concludes that infrastructural investment and policy support are essential to sustain crop diversification and productivity, particularly in the drought-prone northeastern region of Karnataka

These studies collectively provide foundations in diversification analysis, cropping pattern dynamics, localized cropping system economics, and cross-district agricultural development. But they generally do not dissect multiple plantation crops, compare cost–return structures across them, or provide detailed sectoral risk analysis for Karnataka's plantations specifically.

3. RESEARCH GAP

1. Although several studies have analyzed crop diversification and horticultural growth in Karnataka, there is limited integration of both sectors to understand their combined impact on the state's agricultural economy.
2. Most research relies on secondary data and quantitative indices (CAGR, CEI, CDVI), with little attention to farmers' behavioral, socio-economic, and policy implementation aspects influencing diversification.
3. Few studies explore future projections or the role of emerging technologies, climate adaptation, and market linkages in shaping sustainable crop diversification.

Overall, these gaps highlight the need for a holistic, region-specific, and policy-oriented approach combining economic, social, and environmental dimensions of agricultural diversification in Karnataka.

4. OBJECTIVES OF THE STUDY

The study is guided by the following objectives:

1. To analyze the trends and patterns of crop diversification and horticultural development in Karnataka over the past two decades.
2. To identify the key socio-economic, infrastructural, and climatic factors influencing crop diversification and agricultural performance in the state.
3. To suggest policy measures and strategies for promoting sustainable and region-specific agricultural diversification in Karnataka.

METHODOLOGY

The study will be based primarily on secondary data collected from reliable government publications and databases. Major sources include the Directorate of Economics and Statistics

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(DES), Government of Karnataka, Ministry of Agriculture and Farmers Welfare, and the National Horticulture Board. Additional data will be obtained from Agricultural Statistics at a Glance, Economic Surveys, and relevant reports from the Reserve Bank of India (RBI). These sources provide comprehensive information on area, production, productivity, irrigation, and diversification trends across Karnataka's agricultural sectors.

Crop Diversification Trends

There has been a sustained, strategic retreat from traditional, low-value cereals and millets. Research indicates that the area dedicated to water-intensive staples has been gradually reallocated.

Reduction in Staples: In key regions, such as the Cauvery command area, the area under rice declined from approximately 22.86% in the early 2000s (2000–03) to 17.55% in the 2017–20 period, a clear response to increasing water scarcity.

Rise of Alternatives: This land has shifted toward high-value and fodder crops. For instance, the area under maize expanded significantly, nearly doubling its share from 2.75% to 5.30% in the same region, driven by demand from the livestock sector.

Overall Diversification: Analyses using the Composite Entropy Index (CEI) generally show a positive, though moderate, trend in diversification across the state (1998–99 to 2020–21), suggesting farmers are adopting a wider portfolio of crops to mitigate financial and climatic risk.

Horticultural Development

The horticulture sector has been the most robust engine of growth in Karnataka's agriculture, increasingly eclipsing field crops in economic importance.

Economic Impact: The sector has expanded rapidly, covering over 26.21 lakh hectares by 2020–21 and contributing a substantial 29.55% to the state's agricultural GSDP (Gross State Domestic Product) (Source: Anonymous, 2020).

Segment Growth: Fruits and vegetables have led this boom. Fruit production recorded impressive Compound Annual Growth Rates (CAGR), often exceeding 5.0% in the first decade of the 2000s due to both area expansion and yield improvements. Similarly, the area under vegetable cultivation grew at an accelerated rate, sometimes reaching 7% per annum in the 2000s.

Dominant Sub-sector: Despite the high growth of fruits and vegetables, the largest area within horticulture is occupied by plantation crops (e.g., coconut, arecanut), which accounted for nearly 47.31% of the total horticultural area by 2020–21 (Source: Trends and status of horticultural crops in Karnataka). This rapid development is primarily fueled by strong domestic and export market demand and supportive government policies.

Factors Influencing Overall Agricultural Performance

Beyond diversification, the overall growth and performance of Karnataka's agricultural sector depend on technological and resource management factors:

Yield Improvement: Growth decomposition analysis in the horticulture sector reveals that while area expansion was dominant in earlier periods (e.g., 2001–02 to 2010–11), yield improvements became increasingly crucial in the following decade (2011–12 to 2020–21). This shift highlights the growing importance of research and development (R&D) efforts and technology adoption for sustained productivity.

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Fertilizer Availability: A sustained supply and proper use of fertilizers is identified as a vital infrastructural and technological factor that promotes agricultural development and diversification.

Farming System Profitability: The adoption of diverse Farming Systems (FS) significantly impacts performance and income. For instance, in the Central Dry Zone of Karnataka, integrated models like Crop + Horticulture + Dairy often yield higher net returns compared to specialized cropping systems, encouraging farmers to adopt holistic approaches for economic stability.

Strategies for Promoting Sustainable Diversification in Karnataka's Plantation Crops

Diversification within Karnataka's vast plantation crop sector (which covers nearly 47% of the horticultural area) is crucial for income stability, especially against volatile commodity prices and climate change. Sustainable strategies must focus on intercropping, value addition, and resource efficiency at the farm level.

Here are six strategies for promoting sustainable and region-specific agricultural diversification:

1. Promote Multi-Tier Cropping Systems: Encourage farmers to adopt integrated multi-tier cropping where short-duration, high-value crops (like vegetables, spices, or medicinal plants) are grown beneath the canopy of dominant plantation crops (e.g., coconut, arecanut, coffee). This strategy increases productivity per unit area by exploiting different light and nutrient levels.
2. Mandate Soil and Water Conservation (SWC): Implement region-specific SWC measures like contour bunding, trenching, and check dams in plantation areas, particularly in the hilly zones of Malnad and the Western Ghats. Sustainable water practices, combined with a higher percentage of gross irrigated area, are positively correlated with diversification.
3. Establish Decentralized Processing Units: Invest in small, decentralized processing and value addition units (e.g., for coir extraction, cashew processing, or spice grinding) closer to the plantation belts. This shifts the focus from selling raw commodities to processed goods, thereby increasing farm-gate realization and generating local employment.
4. Incentivize Diversification through Credit: Offer subsidized credit and insurance products specifically for switching from monoculture to diversified plantation systems (e.g., for buying shade-tolerant seedlings or specialized equipment). Credit inflow is a proven determinant of diversification towards capital-intensive, high-value systems.
5. Develop Region-Specific Market Hubs: Create specialized Farmer Producer Organizations (FPOs) and regional market hubs focused on plantation intercrops (spices like pepper and cardamom, and medicinal herbs). This improves post-harvest management and ensures farmers receive better prices than through traditional supply chains.
6. Focus on Organic Certification and Niche Markets: Promote organic certification and geographical indication (GI) tags for specific regional varieties of plantation products (e.g., Kodagu coffee or specific spice varieties). high-end domestic and export markets secures premium prices, making the diversified system more economically viable.
7.

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Findings and Suggestions

Here are suggestions for improving the sustainability and performance of Karnataka's plantation crop sector, based on the findings provided:

- Use Mixed Cropping: Grow multiple crops together (intercropping), like coffee with pepper, to diversify income and reduce overall risk.
- Strengthen Farmer Groups: Help farmer cooperatives and groups grow to improve market connections and reduce costs paid to middlemen.
- Stabilize Prices: Create or expand price stabilization schemes (like MSP) for plantation crops to protect farmers from sudden market volatility.
- Invest in Local Processing: Build drying, processing, and value-addition units close to the farms to increase the final value of the harvest.
- Adopt Better Varieties: Encourage the use of new, high-yielding, and disease-resistant crop varieties through effective extension services.
- Provide Climate Support: Offer practical support for climate-smart practices, including drip irrigation, mulching, and tailored weather advice.
- Improve Financial Access: Make affordable credit and long-term insurance specifically designed for the unique, long cycles of plantation crops easily available.
- Share Best Practices: Organize exchanges so that farmers from high-performing districts can share knowledge and best practices with those in lagging districts.
- Encourage Private Investment: Promote private and public-private partnerships for better processing, branding (e.g., organic or GI tags), and marketing.
- Monitor and Customize: Regularly track agricultural performance using district-level data to customize government support based on specific regional needs (soil, water, and market issues)

8. CONCLUSION

The plantation crop sector in Karnataka, while not the largest share of agricultural acreage, holds disproportionate strategic importance. It contributes to rural incomes in specialized regions, export earnings, and income diversification for farmers. Through this sectoral analysis, the study reveals that while area expansion and interest in plantation crops have grown modestly, yield improvements and profitability often lag due to escalating costs, price volatility, spatial disparities, climatic risks, and structural bottlenecks.

Comparative cost–return analysis shows heterogeneity: crops like coffee may offer high upside but come with higher risk, while arecanut or coconut provide steadier but lower margins. Spatial analysis underscores that districts with better infrastructure, connectivity, and institutional support perform better. Risk sensitivity reveals that farmers are vulnerable to commodity price swings and climate variability, prompting the need for stabilizing mechanisms.

To realize the full potential of Karnataka's plantation sector, a multi-pronged approach is essential: improving infrastructure and market linkages, strengthening institutions and cooperatives, offering financial and insurance instruments suited to perennial crops, promoting technology adoption, and encouraging crop diversification and value addition. State government, agricultural agencies, private sector, and farmer organizations must coordinate efforts to build resilience, improve returns, and sustain growth in this sector.

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