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Paddy Cultivation in Kerala: Trends in Area, Production, and Productivity

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ABSTRACT

Agriculture, with a legacy spanning over 5,000 years, remains central to India's economy, though its contribution to the national income has fallen below 15%, even as it supports nearly 60% of the workforce. This disparity underscores the persistent challenges of rural poverty, compounded by limited financial assistance, inadequate infrastructure, traditional farming practices, and the neglect of small and marginal farmers.

In Kerala, paddy cultivation plays a vital role in food security and the agrarian economy. The focus of this paper is to examine the trends in the area, production, and productivity of paddy in Kerala over recent decades, using secondary data from government sources and research studies. Special attention is given to "decadal growth" trends, which measure the percentage change in these parameters over a 10-year period. Findings reveal a consistent decline in the area under paddy cultivation, driven by urbanization, land conversion, and labour shortages. The present study also emphasises the need for targeted interventions such as collective farming, expanded irrigation, and better support for farmers to ensure sustainable growth in paddy cultivation and address challenges like water scarcity and declining soil fertility.

Keywords: paddy, Kerala, trend, production, productivity, area

Introduction

India's agricultural sector plays a critical role in the country's development, despite facing numerous challenges such as inconsistent monsoons, inadequate irrigation facilities, and shifting market dynamics. Over 45% of India's workforce is engaged in agriculture and related sectors, reflecting the sector's deep-rooted significance in the economy. Although agriculture's contribution to the national Gross Value Added (GVA) has been gradually declining, its importance remains substantial, particularly when compared to its 6% global contribution. This

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sector is vital for ensuring food security, as it provides essential staples like cereals, fruits, vegetables, and milk to support the growing population. Additionally, agriculture generates employment, sustains rural livelihoods, and supplies raw materials, which are essential for the broader economy. However, the shift toward cash crops, coupled with the pressures of urbanization and industrialization, has reduced the land allocated to food grain production, including paddy, contributing to challenges in sustaining agricultural growth. This evolving landscape calls for a deeper examination of trends in paddy cultivation to develop strategies that can ensure both food security and long-term agricultural sustainability.

Statement of the Problem

Kerala's agricultural sector has witnessed significant structural transformations, leading to a decline in its contribution to the Gross State Domestic Product (GSDP) and a shift from an agrarian-based economy to one dominated by the service sector. Amidst this transition, paddy remains a vital food crop, with India being the second-largest producer globally. However, in Kerala, paddy cultivation has been on a steady decline since the mid-1970s. The expansion of cash crops, along with various socio-economic factors, has exacerbated food insecurity in the state. The continuous reduction in the area under paddy cultivation, production levels, and productivity highlights the urgent need for a comprehensive analysis of these trends. This study seeks to examine the patterns of decline in paddy cultivation in Kerala, explore the underlying causes, and identify strategies to sustain paddy farming and enhance food security in the state.

Significance of the study

Paddy is a vital food crop in Kerala, occupying 7.69% of the state's total cropped area and contributing nearly 95% of its total food grain production. This underscores its central role in the state's food security. However, despite various government initiatives aimed at boosting paddy production, the area devoted to rice cultivation has been steadily declining since the 1970s. From 8.82 lakh hectares in 1974-75, it has fallen to just 1.17 lakh hectares by 2023-24. Similarly, production has dropped from a peak of 13.76 lakh metric tons in 1972-73 to 5.96 lakh metric tons in 2023-24. Although Kerala's paddy productivity stands at 3108 kg/ha—surpassing the national average of 2800 kg/ha—it remains relatively low compared to its potential. This study is significant as it provides an in-depth analysis of trends in the area, production, and productivity of paddy at both the state and district levels. With Kerala facing a 90% deficit in food production, the on-going decline in paddy cultivation exacerbates these challenges, making this research crucial for developing strategies to address the state's agricultural and food security issues.

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Objectives of the study

1. To study the trends in area, production and productivity of paddy in Kerala for the period 1970-2024

2. To examine the cumulative growth rate of area, production and productivity of paddy in Kerala for the period 1970-2024

Methodology

The present study is primarily based on the secondary data only which was collected from various issues of Kerala Economic Review of Kerala State Planning Board, Thiruvananthapuram; Agricultural Statistics of Department of Economics and Statistics, Government of Kerala etc. for estimating changing trends in area, production and productivity of paddy for the period from 1970-2024. Simple statistical tools are used to find out the values like averages, percentages,, growth rate etc

Compound Annual Growth Rate (CAGR)

The compound annual growth rate analysis was carried out to ascertain the growth in area, production and productivity. It was estimated using the exponential growth function of the form:

$Y = ab^t$ Where, t = Dependent variable for which growth rate was estimated a = Intercept b = Regression coefficient t = Time trend (Years which take values 1, 2... n) The CAGR values were calculated using the LOGEST function in MS Excel.

Review of Literature

Raveendran (2012) analysed the long-term trends in paddy cultivation in Kerala, emphasizing the consistent decline in the area under paddy cultivation due to urbanization and land conversion. The study highlighted a shift toward cash crops, which offered higher returns, adversely affecting paddy production and self-sufficiency in food grains.

Suresh and Lekshmi (2015) examined paddy productivity in Kerala using time-series data from 1980 to 2010. The findings revealed a decrease in productivity growth rates caused by labour shortages, high input costs, and inefficient irrigation facilities. The study called for technological interventions and policy reforms to reverse the declining trend.

Manoharan et al. (2017) conducted a trend analysis of paddy cultivation in Kerala, identifying climatic variability and rainfall patterns as critical factors influencing production trends. The study underscored the need for improved irrigation infrastructure and climate-resilient paddy varieties to stabilize production.

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Nair et al. (2019) studied the socio-economic factors affecting paddy cultivation in Kerala, focusing on farmers' perceptions and policy impacts. The research found that despite government support through subsidies and price support schemes, farmers faced challenges such as low profitability and limited market access, leading to a decline in paddy farming.

Kumar and Rajan (2021) explored the impact of government policies on paddy cultivation trends in Kerala from 1990 to 2020. The study highlighted the positive effects of initiatives like the Paddy Land and Wetland Act, which aimed to preserve paddy fields. However, it also noted the need for more effective implementation and farmer-friendly programs to revive paddy cultivation.

Muralidharan.et.al (2023): This research examines current trends in paddy cultivation in Kerala, revealing a decade-long variability in the cultivation area. It emphasizes the need for strategic interventions to stabilize and enhance paddy production in the state.

Kerala's Agricultural Economy

Kerala State is situated between 8°18' and 12°48' N latitude and 74°52' and 77°22' E longitude with a geographical area of 38,864 km2. Kerala has witnessed two significant shifts in land use patterns due to economic development and urbanization. These include the structural transformation of the agricultural sector, leading to a shift from food crop cultivation to cash crop cultivation, and the conversion of agricultural land for non-agricultural purposes.

During the period from 1970-71 to 2023-24, significant changes were observed in land use patterns in Kerala. The land allocated for non-agricultural purposes witnessed a significant expansion, increasing from 2, 75,000 hectares in 1970-71 to 460917 hectares in 2020-21, marking a 67.61% rise. Cultivable waste also increased during this period, from 79,000 hectares to 93974 hectares. Fallow land, excluding current fallow, grew substantially from 22,000 hectares to 42752 hectares, recording a 94.33 % increase.

Current fallow land saw an even sharper rise, from 24,000 hectares to 54255 hectares, reflecting a 126.06 % growth. On the contrary, the net sown area declined from 21, 72,000 hectares to 203518 hectares, showing a reduction of 6.30 %. Similarly, the area sown more than once decreased from 7, 61,000 hectares to 533831 hectares, a decline of -29.85%. Consequently, the total cropped area dropped from 29, 33,000 hectares to 2568960 hectares, indicating a 12.41% decrease. These changes underscore the structural transformation occurring in Kerala's agricultural landscape.

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Table-1
Classification of area under land utilisation: 1970-71 to 2020-21

Classification (Area in hectares)	1970-71	1980-81	1990-91	2000-01	2011-12	2020-21	% change from 1970-71 to 2020-21
Total Geographical Area	3885497	3885497	3885497	3885497	3885497	3886287	**0.02**
Forest	1055000	1081509	1081509	1081509	1081509	1081509	**2.51**
Land put to non-agricultural use	275000	269824	297381	381873	513480	460917	**67.61**
Cultivable waste	79000	129032	94608	59257	95437	93974	**18.95**
Fallow other than current fallow	22000	26886	26466	33988	57670	42752	**94.33**
Current fallow	24000	43579	44164	77853	77056	54255	**126.06**
Net area sown	2172000	2179590	2246774	2206126	2040132	2035128	**-6.30**
Area sown more than once	761000	705250	773206	815556	621625	533831	**-29.85**
Total cropped area	**2933000**	**2884840**	**3019980**	**3021682**	**2661757**	**2568960**	**-12.41**

Source: Kerala Economic Review –various issues

Trends in area, production and productivity of Paddy cultivation in Kerala

Kerala faces a significant challenge in ensuring food security due to its low base in food production. Despite already being deficient in paddy production, the state has witnessed a steep and alarming decline in the area under paddy cultivation over the past few decades.

The actual data on area, production and productivity of paddy from 1970-1990 and 1991-2024 are given in the following tables.

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Table- 2

Area, Production and Productivity of paddy in Kerala from 1970-71 to 1989-90

No.	Year	Area (Lakh Hectares)	Production (Lakh tonnes)	Productivity Kg/Hectare
1	1970-71	8.74	12.92	1483
2	1971-72	8.75	13.52	1544
3	1972-73	8.74	13.76	1575
4	1973-74	8.75	12.58	1437
5	1974-75	8.81	13.33	1513
6	1975-76	8.76	13.31	1520
7	1976-77	8.54	12.54	1468
8	1977-78	8.40	12.95	1541
9	1978-79	7.79	12.73	1592
10	1979-80	7.93	13.00	1638
11	1980-81	8.02	12.72	1587
12	1981-82	8.07	13.40	1660
13	1982-83	7.98	13.08	1639
14	1983-84	7.40	12.08	1632
15	1984-85	7.30	12.56	1720
16	1985-86	6.78	11.73	1729
17	1986-87	6.63	11.34	1708
18	1987-88	6.04	10.33	1709
19	1988-89	5.77	10.13	1754
20	1989-90	5.83	11.41	1956

Source: Kerala Agricultural Statistics

From Table-2, it is evident that during the period 1970-1990, the area under cultivation peaked in 1974-75 at 8.81 lakh hectares, with the lowest point recorded in 1988-89 at 5.77 lakh hectares. In terms of production, the highest level was reached in 1972-73 at 13.76 lakh tonnes, while the lowest was in 1988-89 at 10.13 lakh tonnes. Regarding productivity, the highest value was recorded in 1989-90 at 1956 kg/ha, and the lowest in 1973-74 at 1437 kg/ha.

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Table- 3

Area, Production and Productivity of paddy in Kerala from 1990-91 to 2009-10

No.	Year	Area (Lakh Hectares)	Production (Lakh tonnes)	Productivity Kg/Hectare
1	1990-91	5.59	10.87	1942
2	1991-92	5.41	10.60	1959
3	1992-93	5.37	10.85	2018
4	1993-94	5.07	10.04	1977
5	1994-95	5.03	9.75	1937
6	1995-96	4.71	9.53	2023
7	1996-97	4.31	8.71	2023
8	1997-98	3.87	7.65	1975
9	1998-99	3.53	7.27	2061
10	1999-00	3.50	7.71	2203
11	2000-01	3.47	7.51	2162
12	2001-02	3.22	7.04	2182
13	2002-03	3.11	6.89	2218
14	2003-04	2.87	5.70	1984
15	2004-05	2.90	6.67	2301
16	2005-06	2.76	6.30	2285
17	2006-07	2.64	6.42	2435
18	2007-08	2.29	5.28	2308
19	2008-09	2.34	5.90	2520
20	2009-10	2.13	5.98	2557

Source: Kerala Agricultural Statistics

From Table-3, it is evident that during the 1990s, the area under cultivation consistently declined, with the highest area recorded in 1990-91 at 5.59 lakh hectares and the lowest in 2009-10 at 2.13 lakh hectares. In terms of production, the highest was in 1990-91 at 10.86 lakh tonnes, while the lowest occurred in 2007-08 at 5.28 lakh tonnes. Regarding productivity, the highest value was recorded in 2009-10 at 2557 kg/ha, and the lowest in 1994-95 at 1937 kg/ha.

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Table- 4

Area, Production and Productivity of paddy in Kerala from 2010-11 to 2023-24

No.	Year	Area (Lakh Hectares)	Production (Lakh tonnes)	Productivity Kg/Hectare
1	2010-11	2.13	5.23	2452
2	2011-12	2.08	5.69	2733
3	2012-13	1.97	5.08	2577
4	2013-14	2.00	5.64	2827
5	2014-15	1.93	5.62	2837
6	2015-16	1.97	5.49	2790
7	2016-17	1.71	4.36	2547
8	2017-18	1.94	5.21	2684
9	2018-19	2.03	5.78	2920
10	2019-20	1.98	5.87	3073
11	2020-21	2.01	6.34	3091
12	2021-22	1.95	5.62	2872
13	2022-23	1.90	5.62	2731
14	2023-34	1.17	5.96	3108

Source: Kerala Agricultural Statistics

From Table-4, it is clear that for the period, 2010-11 to 2023-24, the highest area under cultivation was in 2010-11, i.e. 2.13 lakh hectares. The lowest figure was noted in the year 2023-24, i.e. 1.17 lakh hectares. Production during the period achieved the highest level in 2020-21, i.e. 6.34 lakh tonnes and the lowest level in 2016-17, i.e. 4.36 lakh tonnes. Productivity, during the period, achieved the highest and lowest values in 2023-24 (3108 kg/ha.) and 2010-11 (2452 kg/ha.) respectively.

Paddy cultivation in Kerala is experiencing a sharp decline, largely due to rising production costs and inefficiencies in procurement. Despite on-going government support through financial assistance and marketing initiatives, several factors have contributed to the steady reduction in paddy cultivation, including high production costs, changing farmer attitudes, land conversion for construction, and urbanization. However, the recent rise in paddy productivity can be attributed to advancements in agricultural technologies, the adoption of high-yield seed varieties,

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and various government programs. While these efforts have fostered growth in the agricultural sector, paddy productivity remains uneven across different regions of the state.

Table- 5

Cumulative growth rate of area, production and productivity of paddy

PERIOD	AREA	PRODUCTION	PRODUCTIVITY
1970-1980	-1.18	-0.41	0.65
1980-1990	-4.16	-2.62	1.6
1990-2000	-5.54	-4.69	0.91
2000-2010	-4.99	-2.58	2.04
2010-2024	-1.80	0.79	1.24
CGR for entire period 1970-2024	**-3.68**	**-2.12**	**1.47**

Source: Estimated by the author using published data from Directorate of Economics and Statistics, 2023; Kerala Economic Review various issues

The cumulative growth rates of area, production and productivity of paddy for the period 1970-71 to 2023-24 are presented in table 5. The different phases are Period I (1970-1980), Period II (1980-1990), Period III (1990-2000), Period IV (2000-2010) and Period V (2010-2024).

During Period I (1970-1980), paddy experienced a negative growth rate of 1.18 per cent in area and 0.41per cent in production. Although productivity showed a positive growth rate of 0.65per cent , it could not compensate for the decline in area, leading to an overall reduction in paddy production. The decrease in the area under paddy cultivation during this phase was primarily driven by factors such as land conversion for non-agricultural uses and shifts in agricultural practices. The highest area under cultivation was recorded in the mid-1970s, marking the peak before the decline set in.

The Period II (1980-1990), paddy experienced a negative growth rate of 4.16% in area and 2.62% in production. While productivity showed a modest positive growth rate of 1%, the

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overall decline in area and production was primarily attributed to the conversion of paddy land for non-agricultural purposes during this period.

The third phase, Period III (1990-2000), saw the most significant decline in both the area and production of paddy in Kerala. Despite a positive growth rate of 0.91% per annum in productivity, the sharp decrease in area and production can be attributed to the increased cultivation of more lucrative crops like arecanut, rubber, banana, and pepper. The other drivers of this shift away from paddy farming were low profitability, land conversion for cash crops and non-agricultural purposes like construction, rising labour costs, and changing consumer preferences.

In the fourth phase, Period IV (2000-2010), the negative growth rate in both the area and production of paddy was less severe compared to the previous phase. Paddy recorded a negative growth rate of 4.99% in area and 2.58% in production, while productivity showed a positive annual growth rate of 2.04%. The increase in yield can be attributed to the better adoption of high-yielding seed varieties by farmers, improved farming practices, the introduction of new rice varieties, and enhanced irrigation facilities in certain areas.

In Period V (2010-2024), both production (0.79%) and productivity (1.24%) of paddy showed positive annual growth rates, while the area under cultivation experienced a slight decline of 1.80%. This suggests that more land was being effectively utilized for paddy cultivation in Kerala. The government's focused efforts, including the implementation of paddy procurement through SUPPLYCO, played a key role in driving these positive outcomes and improving paddy cultivation in the state.

Over the entire period under consideration (1970-2024), paddy cultivation in Kerala reveals a negative growth rate in both area and production. Despite a positive growth rate of 1.47% in productivity, it was insufficient to compensate for the substantial decline in the area under paddy cultivation (3.68%), leading to an overall decline in production by 2.12% during this period.

Conclusion:

To address the challenges in Kerala’s agricultural sector, there is an urgent need to adopt advanced technologies, such as biotechnology and nanotechnology, while making agriculture economically rewarding to attract youth. Restructuring production and marketing, leveraging the cooperative sector, and building strong crop-specific value chains are essential to strengthen agriculture and boost farmers' incomes. The shift in land utilization patterns has led to severe ecological and environmental issues, exacerbating food insecurity and undermining agricultural sustainability. Given Kerala’s high population density and ecological fragility, a comprehensive land use development policy is critical to reversing the decline in agriculture and ensuring food

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security. Collaborative efforts by the government, local bodies, and social organizations are vital to implement innovative programs for the revival of paddy farming and sustainable land management in the state.

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