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CLIMATE CHANGE AND ADAPTIVE STRATEGIES IN PADDY CULTIVATION -WITH SPECIAL EMPHASIS ON KUTTANAD

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ABSTRACT

Climate change is a significant threat to sustainable development, affecting food security and agriculture livelihoods globally. South Asia has the highest proportion of vulnerable sectors. Climate change will negatively impact agricultural production and economics, with declining wheat yields and temperature inconsistencies causing significant yield declines. Adaptation and mitigation strategies are lacking, and South Asia faces challenges in doubling production by 2050. This paper examines the impact of climatic and non-climatic factors on agriculture, focusing on adaptation strategies like shifting planting dates, water-saving techniques, and strategic nutrient management. It highlights that many farmers are unaware of climate-resilient technologies. The study documented indigenous practices of paddy-growers in kuttanad, Kerala, India, to address the climate crisis using a cross-sectional and questionnaire-based survey, with 120 respondents selected for analysis using descriptive statistics. Data was analysed using descriptive statistics, and farmers were classified based on adoption scores using mean – S.D., mean ± S.D., and mean + S.D., using Microsoft Excel and SPSS Version 22.0. The main findings of the study includes that farmers in the study region are adopting different adaptation strategies due to their knowledge, expertise, resources, and lack of institutional frameworks. Interventions like improved technologies, training programs, research activities, and institutional frameworks can address these gaps. Education, outreach, and extension services can strengthen human capital and decision-making capacity. Paddy-growing farmers should adopt integrated farming systems for sustainable income and productivity. Crop insurance is crucial for coping with climate change. Data was analysed by making use of Garrett's conversion table.The result revealed that weed problem is the most important problem among the cultivators which are caused due to climatic variations.

KEYWORDS: *highly vulnerable, climatic variation,*

INTRODUCTION

Climate change is a significant threat to sustainable development, affecting food security and agriculture livelihoods globally. South Asia has the highest proportion of vulnerable sectors. Climate change will negatively impact agricultural production and economics, with declining wheat yields and temperature inconsistencies causing significant yield declines. Adaptation and mitigation strategies are lacking, and South Asia faces challenges in doubling production by 2050.The IPCC panel report 2007 postulates that South Asia is the region with the highest number of "highly vulnerable" sectors among the Asia sub-regions. Rao et al., 2014 and Prasad *et al.*, 2000; Teixeira *et al.*, 2013 in their study postulates that temperature inconsistency has led to a significant decrease in yields, particularly in primary food crops, as high temperatures can significantly reduce production. Eckstein et al., 2019 adheres that India faces additional stresses from climate change due to rapid urbanization, industrialization, and economic development, making it the fifth most vulnerable country to its effects.

Kerala is a unique state with mountains, valleys, forests, waterfalls, and palm-roofed lagoons. The state's unique climatic conditions are influenced by the Western Ghats and Arabian Sea, which create a unique wind system. The state experiences heavy rainfall on the windward side, influenced by altitude, current strength, and slope steepness. Summers last from April to June, with temperatures ranging from 33 degrees centigrade to 20 degrees centigrade. The South West Monsoon starts in June and continues until September, with maximum rainfall in the Vaithiri-Kuttiyadi range in Malabar and Peerumedu in Idukki. The North East Monsoon begins in October and ends in December. Winters in Kerala are enjoyable, lasting from November to January or February, with occasional very little rainfall in the northern region. Highest rainfall is received by Kottayam during this winter season.

India faces additional stresses from climate change due to rapid urbanization, industrialization, and economic development. It is the fifth most vulnerable country to climate change effects, with its poorest being most at risk. India's inadequate arable land, higher population, dependence on agriculture, and limited technological and financial development contribute to its vulnerability. Adaptation strategies involve farmers altering their farming practices to cope with climate change. These strategies include crop production, soil and water management, flood management, land use, labor use, livestock management, financial management, and family management. While most farmers are unfamiliar with climate-resilient production technologies, adopting these practices can reduce vulnerability and improve their socio-economic status and well-being. To effectively address climate change, it is crucial to document indigenous practices, quantify the capabilities of existing best practices, and develop a long-term strategic research plan. This study aims to document these practices in the kuttanad region.

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Kerala has experienced a decline in annual and monsoon rainfall and an increase in temperature over the past decades, with the mean annual maximum temperature rising by 0.8 degrees Celsius between 1961 and 2003. The warmest year was 1987. Kerala's climate is characterized by significant rainfall variations, with significant inter-annual variability in the onset, withdrawal, and activity of the monsoon. The region experiences dry spells during the monsoon season and heavy rains in summer, which are part of global climate changes.

OBJECTIVES OF THE STUDY

1. To study about the factors affecting climate change
2. To understand about the paddy cultivation in kerala
3. To analyse the impact caused by climatic change factor on paddy cultivation
4. To formulate suitable policies to overcome the problems caused by the climatic change factors in kerala

Hypothesis

1. The climate change has no impact on paddy cultivation in kuttanad
2. There occurs no significant impact of adaptive strategies on paddy cultivation in kuttanad

FACTORS AFFECTING CLIMATE CHANGE

India's climate change is influenced by various factors, both natural and human-induced.
Some key factors affecting climate change in India include:
Greenhouse Gas Emissions: The emission of greenhouse gases from human activities like burning fossil fuels, industrial processes, and deforestation contributes significantly to global warming and climate change.

Industrialization and Urbanization: Rapid industrial growth and urban development lead to increased emissions of pollutants, altering local climates and contributing to air and water pollution.

Deforestation and Land Use Change: Deforestation for agriculture, urban expansion, and infrastructure development reduces carbon sinks, disrupts ecosystems, and contributes to climate change by reducing the planet's ability to absorb CO2.

Agricultural Practices: Certain agricultural practices, such as methane emissions from livestock and rice paddies, use of fertilizers, and crop burning, release potent greenhouse gases, affecting the climate.

Water Resources: Changes in precipitation patterns, melting glaciers, and changes in river flows impact water availability and can lead to severe droughts or floods, impacting agriculture and livelihoods.

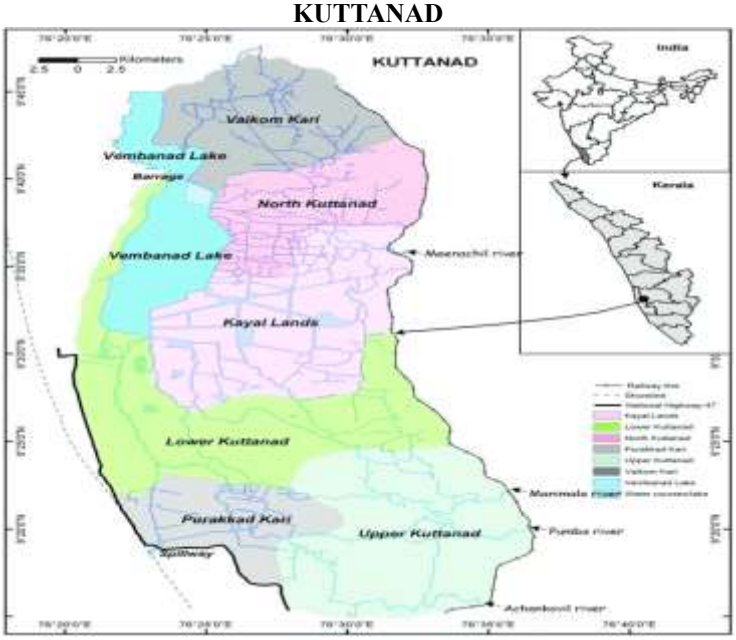
Global Climate Patterns: India's climate is also influenced by global phenomena like El Niño and La Niña, which can affect monsoon patterns and temperature variations.

Air Pollution: The presence of high levels of air pollutants, such as particulate matter and ozone, can impact climate change by altering atmospheric composition and influencing temperature patterns.

Geographical Factors: India's diverse geographical features like the Himalayas, coastline, and varied landscapes contribute to localized climate patterns, influencing regional climates differently.

Policy and Adaptation Measures: Government policies, initiatives, and adaptation measures play a significant role in mitigating or exacerbating the impacts of climate change. Efforts in renewable energy, afforestation, and sustainability practices can influence the trajectory of climate change.

KUTTANAD



MAP 1: https://lakesofindia.com/2022/02/12/kuttanad-the-rice-bowl-of-kerala/

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Kuttanad is a picturesque region located in the state of Kerala, India. Known as the "Rice Bowl of Kerala," it's characterized by its unique geographical features, being largely below sea level and surrounded by waterways, including rivers, canals, and lakes.
Here are some key points about Kuttanad:

Geography: It's one of the few places in the world where farming is carried out below sea level. The region is primarily made up of low-lying paddy fields, interspersed with backwaters and water bodies.

Agriculture: Rice cultivation is the primary occupation here, with paddy fields spread across the landscape. The method of cultivation involves cultivating below sea level, making it a unique and challenging agricultural practice.

Backwaters: Kuttanad is famous for its scenic backwaters, which are a network of interconnected canals, rivers, lakes, and lagoons. Houseboats are a popular attraction, offering tourists a chance to experience the serene beauty of the region while cruising along these backwaters.

Culture: The region has a rich cultural heritage, with a predominantly agrarian society. The lifestyle, cuisine, and traditions of the people in Kuttanad reflect the influence of its geographical setting and agricultural practices.

Challenges: While the unique geography of Kuttanad provides fertile land for farming, it also faces challenges such as flooding during heavy monsoons and issues related to land subsidence due to the continuous cultivation below sea level.

Kuttanad attracts tourists not only for its natural beauty but also for its distinct agricultural practices and cultural richness, offering visitors a glimpse into a lifestyle shaped by the coexistence of land and water.

REVIEW OF PADDY CULTIVATION IN KERALA

Kerala, with a population of 16.9 million in 1961, accounted for 3.85% of the country's total population. In 1960-61, the state contributed 2.5% of rice production. However, growth declined in the 1970s, with a decline in area under paddy and rice production. In 1991, Kerala's population increased to 29.1 million, but its share in total rice production dropped to 1.46 percent. In 1999, Kerala's population was projected at 31.98 million, but relative shares of rice production and area were 0.79 and 0.85 percent respectively.

The state of Kerala has a higher per hectare productivity of rice than the national average, with an average productivity of 1371 kg per hectare in 1960-61. However, this advantage has been gradually narrowing down, with the difference decreasing to 18.79% in 1980-81 and further decreasing to 6.79% by 1998-99. Despite being higher than the national average, Kerala still lags behind major rice-producing states like Punjab, Tamil Nadu, and West Bengal.

The area under the crop and its per hectare productivity can be considered as the two pure components of rice production. The post-formation era of Kerala can be divided into two distinct periods: the period before the mid-70s and the period after the mid-70s. During the first period, both the area and yield effects had been positive, leading to positive growth trends in rice production. However, the negative area effect became more prominent during the second period, causing negative growth rates in the state since the mid-70s.

Over the last four decades, per hectare rice productivity in Kerala has shown positive annual growth rates, with an overall increase of 68.55 percent between 1960-61 and 1999-2000. However, the annual growth rate in productivity is higher during the second period (1974-75 to 1999-2000), with the corresponding growth rate being 1.51 percent.

The Kuttanad region, consisting of ten taluks in the three districts of Alapuzha, Kottayam, and Pathanamthitta, has a fertile loamy soil suitable for paddy cultivation. The region has been the principal economic activity of the local population since early days, with 11.3 percent of the total workforce being paddy cultivators and 57.13 percent being agricultural laborers.

During 1986-87, the total area under paddy crop in the Kuttanad region was 112.43 thousand hectares, accounting for 16.58 percent of the total area under crop in Kerala. The region produced 210.17 thousand tonnes of rice production, helping the state retain its better position in rice productivity in all India levels.

The per hectare productivity of the crop in the Kuttanad region was 7.38 percent higher than the state level average productivity. However, both the area and production of paddy at the state level showed negative growth rates during the second half of the eighties. The Kuttanad region accounted for more than 18 percent of the paddy growing areas in 1990-91, but the average productivity of rice in the region had been significantly higher than the state level average.

The comparison analysis regarding the paddy farm sector of Kuttanad region and Kerala shows that the performance of the former had been comparatively better till the end of the eighties. However, since the beginning of the nineties, the performance of the region in terms of area and production of paddy has begun to deteriorate at unprecedented levels.

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TABLE 1: AREA AND PRODUCTIVITY OF RICE

Sl. No	year	Area of rice in Kerala (Hectare)	Area of rice in Tamil Nadu (hectare)	Productivity of rice in kerala (Kg/Ha)	Productivity of rice in Tamil Nadu (Kg/Ha)
1	2005-06	275742	2050455	2285	2541
2	2006-07	263529	1931397	2435	3423
3	2007-08	228938	1789170	2308	2817
4	2008-09	234265	1931603	2520	2682
5	2009-10	234013	1845553	2557	3070
6	2010-11	213187	1905728	2452	3039
7	2011-12	208160	1903772	2733	3918
8	2012-13	197277	1493276	2577	2712
9	2013-14	199611	1725730	2719	4123
10	2014-15	198159	2132521	2837	4381

Source: Department of Economics and Statistics, Kerala, Tamil Nadu

Source:[1]

The table depicted above reveals the area of rice in Kerala has declined from 275742 to 198159 where as in the case of Tamil Nadu it had increased from 2050455 to 2132521.However in case of productivity in rice4 cultivation both in Kerala and Tamil Nadu it had shown an increasing trend with positive signs for development.

METHODOLOGY

STUDY REGION

Kuttanad region of Kerala state, India covers the realm of 19,500 acres of kayal land, 12,000 acres were reclaimed between 1913 and 1920. Kuttanad, a region in Kerala, India, is known for its vast paddy fields and unique geography. With the lowest altitude in India, it is a major rice producer and has been declared a Globally Important Agricultural Heritage System by the Food and Agriculture Organization in 2013. The Kuttanad region is divided into Lower Kuttanad, Upper Kuttanad, and North Kuttanad. Lower Kuttanadu includes taluks in Alappuzha district, Upper Kuttanad includes villages in Karthikapally, Chennithala, Mannar, Chengannur, Pathanamthitta, and Vaikom, while North Kuttanad includes parts of Kottayam. Kuttanad, often referred to as the "Rice Bowl of Kerala," has a unique and distinct climate due to its geographical features.

Tropical Climate: Kuttanad experiences a tropical climate, typical of Kerala. It's characterized by high temperatures, abundant rainfall, and high humidity throughout the year.

Monsoons: The region receives heavy rainfall, primarily from the Southwest monsoon (June to September) and the Northeast monsoon (October to November). These monsoons contribute significantly to the agricultural fertility of Kuttanad but can also lead to occasional flooding.

Temperature: The temperatures in Kuttanad generally range from warm to hot throughout the year. The summer months (March to May) can be particularly hot and humid, with temperatures often exceeding 30°C (86°F). Winters (December to February) are relatively cooler, with temperatures averaging around 25°C (77°F).

Humidity: The region tends to have high humidity levels, especially during the monsoon seasons and the summer months. Humidity levels can sometimes make the heat feel more intense.

Agricultural Impact: The climate of Kuttanad is crucial for its agricultural significance, especially for rice cultivation. The regular rainfall and fertile soil make it ideal for paddy cultivation, and the traditional farming methods here are adapted to this climate.

Seasonal Variations: There are distinct wet and dry seasons in Kuttanad, primarily dictated by the monsoon patterns. These seasons significantly influence the farming practices and livelihoods of the local population. Overall, Kuttanad's climate is conducive to its predominant agricultural activities, but the region also faces challenges related to flooding during heavy monsoons, requiring appropriate infrastructure and management strategies to mitigate these issues.

1 A Comparative Study of Trend in Area, Production and Productivity of Rice in Kerala and Tamil Nadu
P. Maneesh, R. Sankaranarayanan

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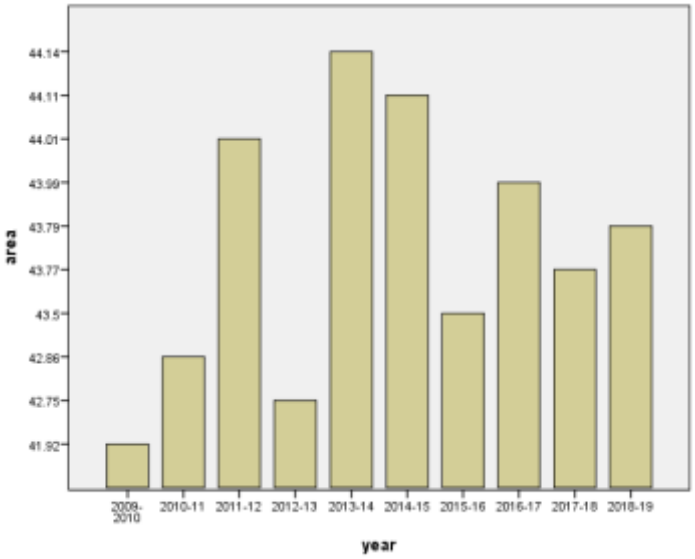
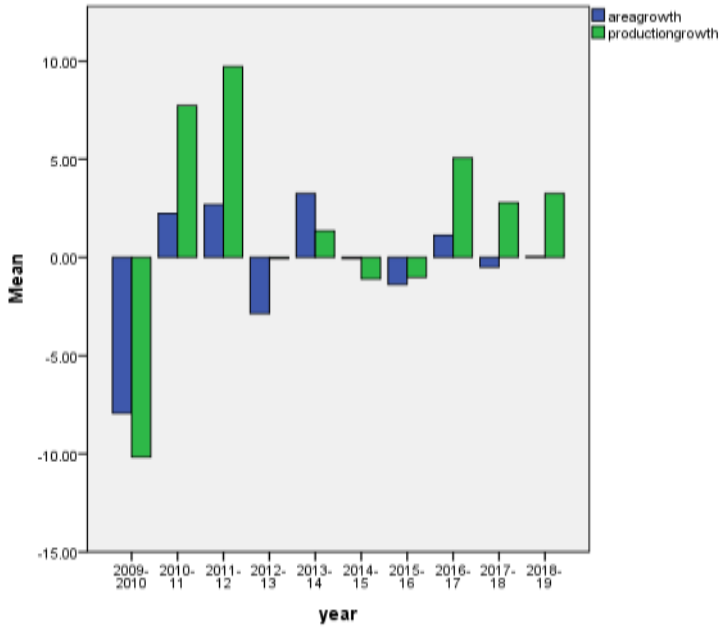
Year	Area	Area Growth	Production	Production Growth	Productivity	Productivity Growth
2009-2010	41.92	-7.94	89.09	-10.17	21.25	-2.43
2010-11	42.86	2.24	95.98	7.73	22.39	5.36
2011-12	44.01	2.68	105.3	9.71	23.93	6.88
2012-13	42.75	-2.86	105.23	-0.07	24.61	2.84
2013-14	44.14	3.25	106.65	1.35	24.16	-1.83
2014-15	44.11	-0.07	105.48	-1.1	23.91	-1.03
2015-16	43.5	-1.38	104.41	-1.01	24	0.38
2016-17	43.99	1.13	109.7	5.07	24.94	3.92
2017-18	43.77	-0.5	112.76	2.79	25.76	3.29
2018-19	43.79	0.05	116.42	3.25	26.59	3.22

TABLE 2: All India Area, Production and Productivity of Paddy over the years from 2009-10 to 2018-19





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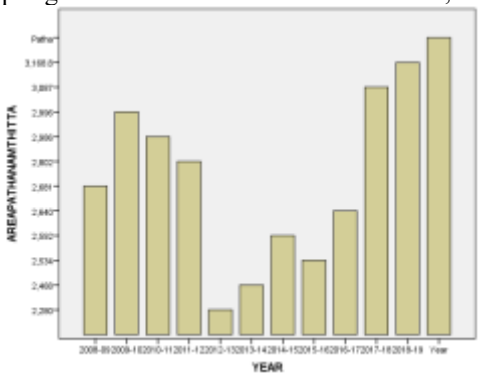
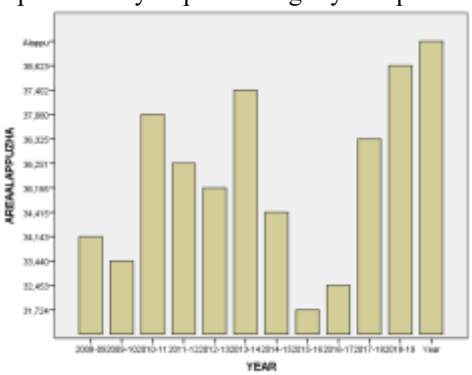
The annual growth of paddy production in Kerala has been declining since 2010-11, with significant declines in 2016-17. However, in 2017-18 and 2018-19, there was significant improvement in paddy production. The productivity of paddy in Kerala has improved over the last ten years, from 2557 kg. /ha in 2009-10 to 2920 kg. /ha in 2018-19. The productivity of paddy cultivation in Kerala is greater than the Indian average, but still lower than other states.

	Area (Hectares)			Production (Tonnes)			Productivity (Kg/ha)		
Year	Pathanamthitta	Alappuzha	Kottayam	Pathanamthitta	Alappuzha	Kottayam	Pathanamthitta	Alappuzha	Kottayam
2008-09	2681	34143	10951	7399	104250	32154	2760	3053	2936
2009-10	2996	33440	15474	7738	97976	39413	2583	2930	2547
2010-11	2986	37060	14775	6627	91325	40969	2219	2464	2773
2011-12	2802	36251	21410	8989	111980	63579	3208	3089	2970
2012-13	2280	36195	17571	6041	104593	51019	2650	2890	2904
2013-14	2468	37402	15746	7554	106866	50729	3061	2857	3222
2014-15	2592	34415	17295	7573	103095	49393	2922	2996	2856
2015-16	2534	31724	16272	8396	89335	49506	3313	2816	3042
2016-17	2640	32453	17216	8837	102439	48030	3347	3157	2790
2017-18	3087	36325	17426	8843	105676	49509	2865	2909	2841
2018-19	3168.77	38623.02	22172.05	11675.81	128560.20	61917.15	3685	3329	2793

TABLE 3:GROWTH OF PADDY CULTIVATION DISTRICTS BASED- YEAR WISE

Kuttanad is a unique deltaic region in India, divided into Upper Kuttanad, Lower Kuttand, and Kayal Lands. It comprises 31 villages spread over Kottayam, Pathanamthitta, and Alappuzha. The Kuttanad system consists of fragmented agricultural landscapes, including wetlands for paddy cultivation, garden lands for coconut, tubers, and food crops, and water areas for inland fishing and shells. The region faces challenges such as flooding, saline water intrusion, and monsoon flooding, making it a single punja crop region. The three districts of Kuttanad, Pathanamthitta, Alappuzha, and Kottayam, in Kerala, accounted for 32.30% of the total area under paddy cultivation in 2018-19, with their individual shares at 1.60%, 19%, and 11.20%, respectively. In 2018-19, the Kuttanad region recorded a record level of paddy production, with Pathanamthitta, Alappuzha, and Kottayam contributing 34.96% of the total. Palakkad district ranked first with 37.23% rice production, while Idukki district had the lowest at 0.27%. Paddy productivity improved slightly compared to 2017-18.





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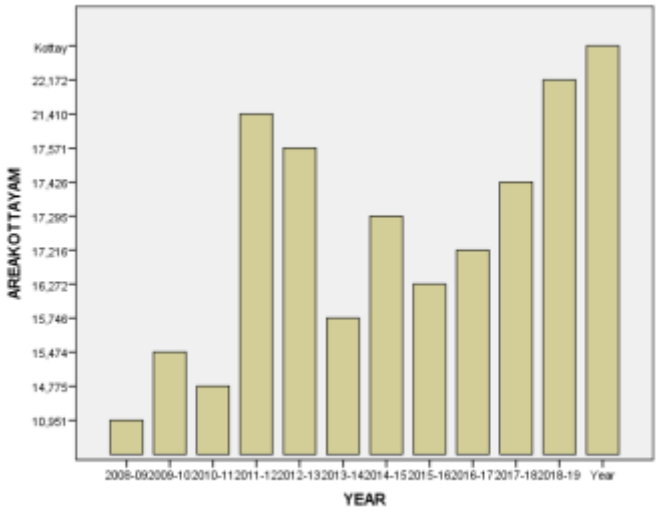
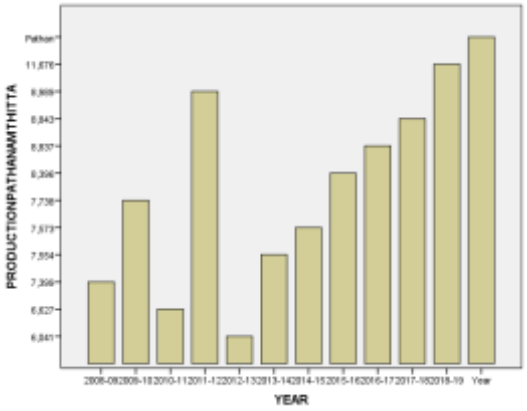
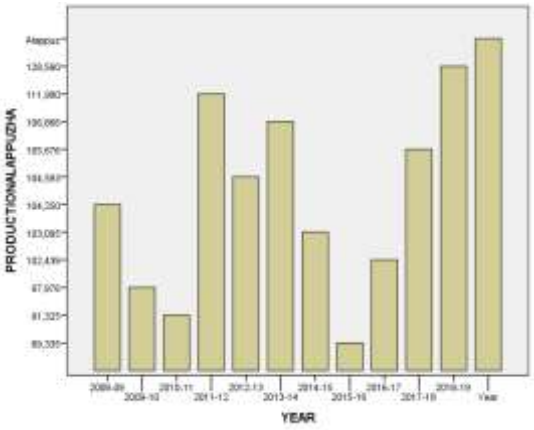
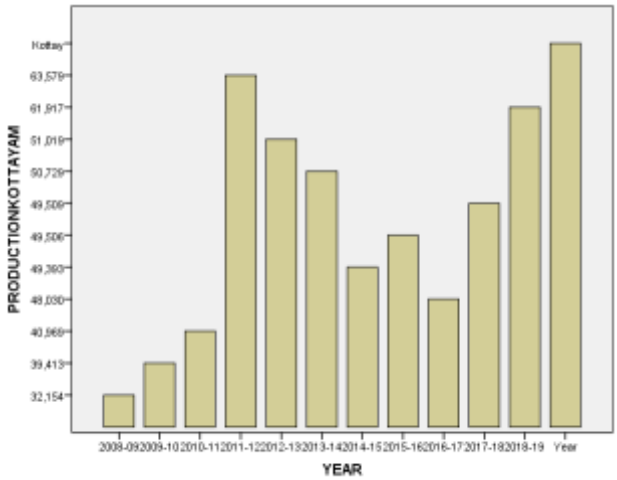


PRODUCTION OF PADDY CULTIVATION DISTRICTS BASED- YEAR WISE







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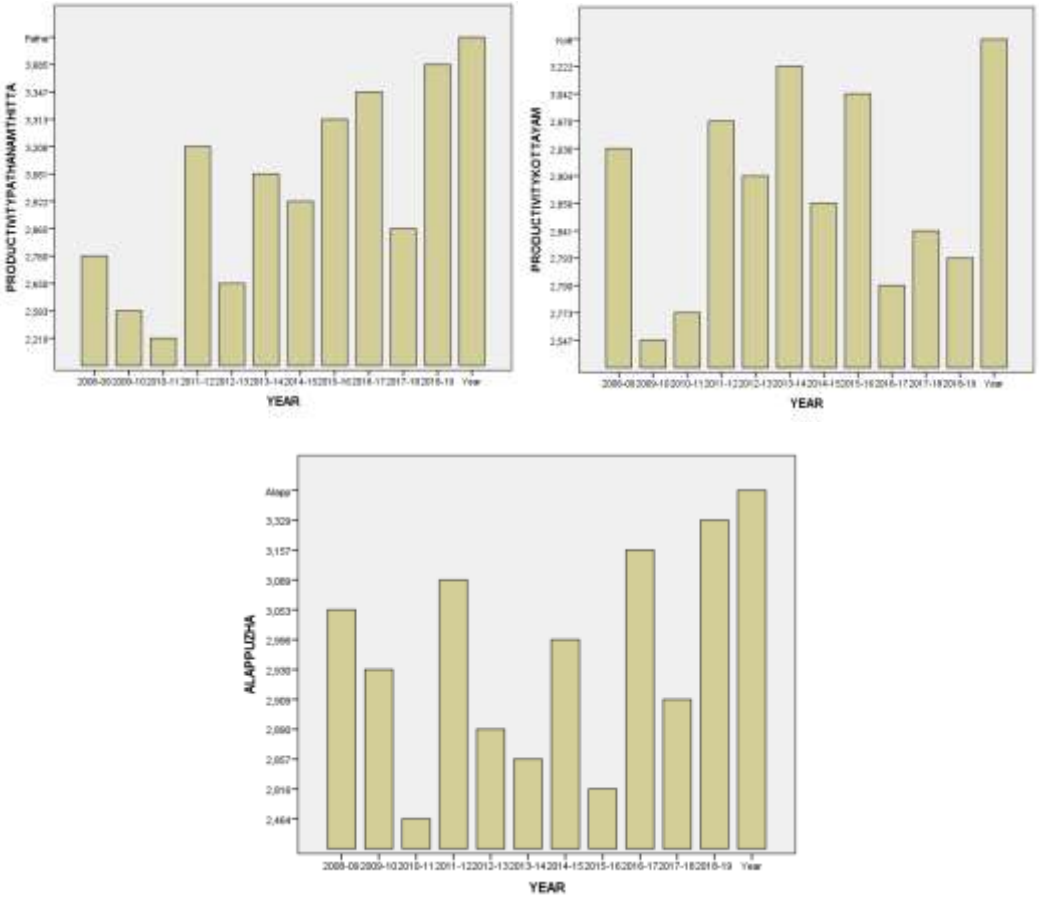
PRODUCTIVITY OF PADDY CULTIVATION DISTRICTS BASED- YEAR WISE



Several studies postulates that in 2009-10, Kottayam saw a 41.30 percent annual growth in paddy production area, while other districts reported negative growth. In 2012-13, all three districts experienced a decline in paddy area, with Pathanamthitta experiencing the highest decline at -18.63 percent. However, in 2016-17, 2017-18, and 2018-19, all three districts reported positive growth in paddy area. During 2012-13, all three districts experienced negative growth in paddy production, with Pathanamthitta experiencing the highest fall at -32.80 percent. The productivity of paddy fluctuated, with Pathanamthitta experiencing the highest growth at 44.57 percent in 2011-12 and 28.62 percent in 2018-19.

SAMPLE DESIGN

This research paper examines the challenges faced by paddy farmers in haripad village, Kuttanad, analyzing government policies, climate change, and flood impacts, and suggests improvements for cultivation. This study uses primary and secondary data from questionnaires, interviews, and various sources, analyzing them using percentages, graphs, and software like Excel and SPSS.

SAMPLE GROUP AND INTERVIEW

The sample study basically concentrates around the chempupuram hamlet in nedumudy village of kuttanad. It has a population of 14,601. Agriculture is the main occupation, with 5690 workers engaged in main work activities. The hamlet comes under Nedumudy Krishi Bhavan and has 3668 households. There are 6 registered padashekara samitis, which are associations of paddy farmers in each village. The village relies heavily on paddy farming, which depends on factors like climatic conditions, attitudes, irrigation, seeds, fertilizers, pesticides, and insecticides. Other activities include duck farming, livestock, and banana cultivation. Chempumpuram has a public health center, two schools, a Reverse Osmosis Plant for potable drinking water, and a rice research station near the village. The study focuses on 50 farmers in Chempumpuram, Kuttanad taluk, Alappuzha district. Interviews were conducted with 25 farmers in ward 15 and 25 in ward 16. Both primary and secondary data were used, with primary data collected through questionnaires and personal interviews, and secondary data from various sources. The study uses percentages, graphs, and software like Excel and spss to analyze the primary data.1014 is the total population of the agricultural farmers in the area and hence by applying Cochrane formula is 120.

$$n = \frac{n_0}{1 + \frac{(n_0 - 1)}{N}}$$

DATA ANALYSIS AND INTERPRETATION

A sample of 120 farmers was collected using questionnaire and personal interviews. Data processing involved editing, classification, and analysis using charts and graphs, with interpretation provided after graphical representation.

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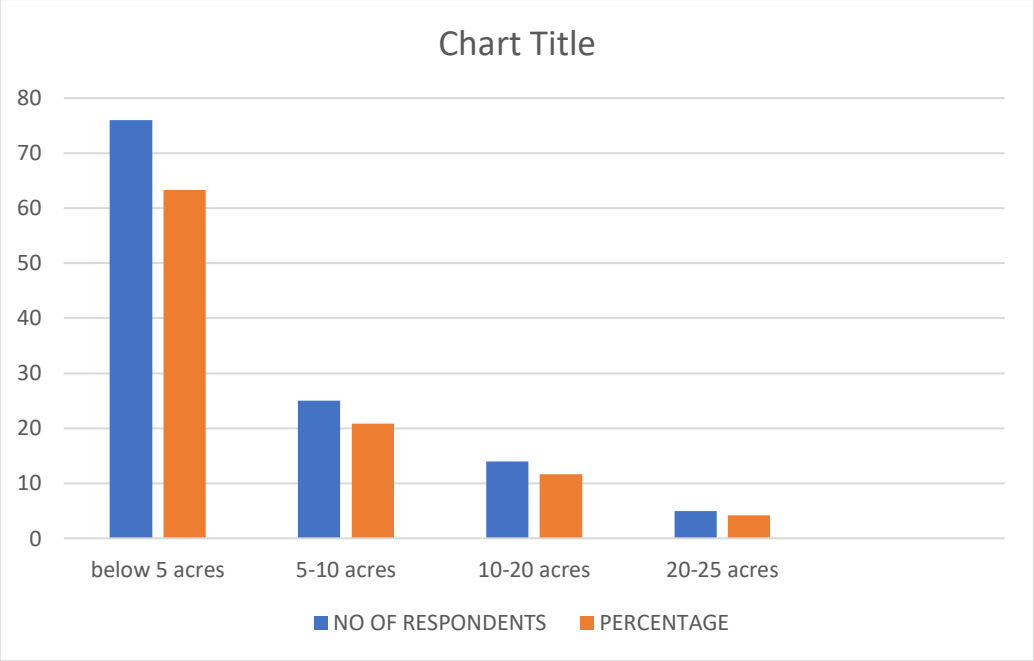
1.CULITVATION AREA OF FARMERS

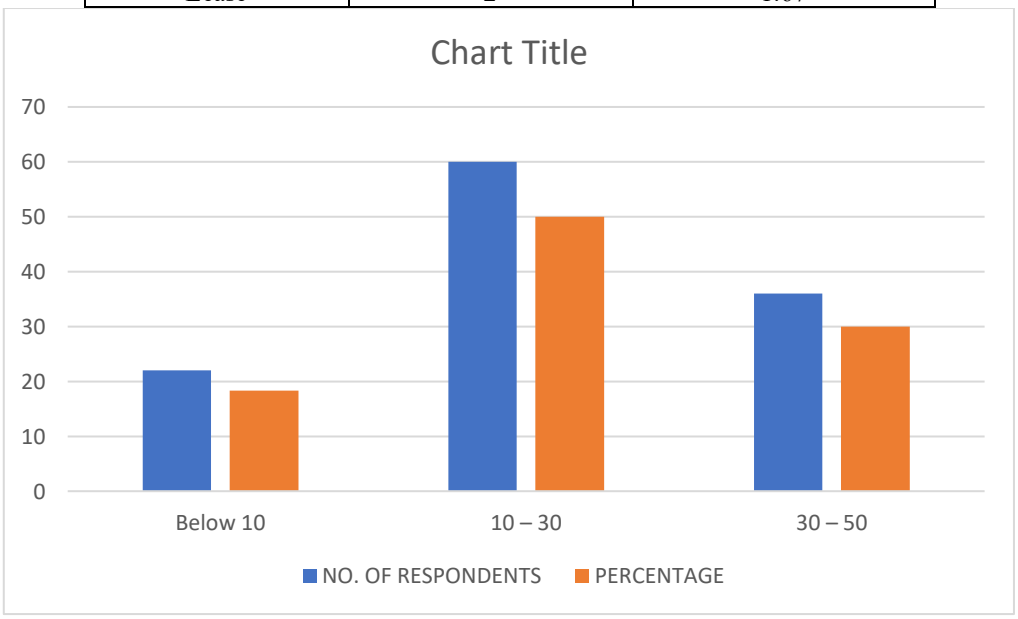
AREA	NO OF RESPONDENTS	PERCENTAGE
BELOW 5	76	63.33
5-10	25	20.84
10-20	14	11.67
20-25	5	4.16



The table shows that there are only 5 farmers who are cultivating paddy between 20 and 25 acres and there are only 14 farmers who having cultivating paddy between 10 to20 acres of land. 25 farmers are doing paddy farming in 5 to 10 acres. There are 76 farmers who having cultivating paddy below 5 acres.

2.NATURE OF OWNERSHIP

Own/ Lease	No. of Respondents	Percentage
Own	77	64.16
Own &lease	41	34.17
Lease	2	1.67



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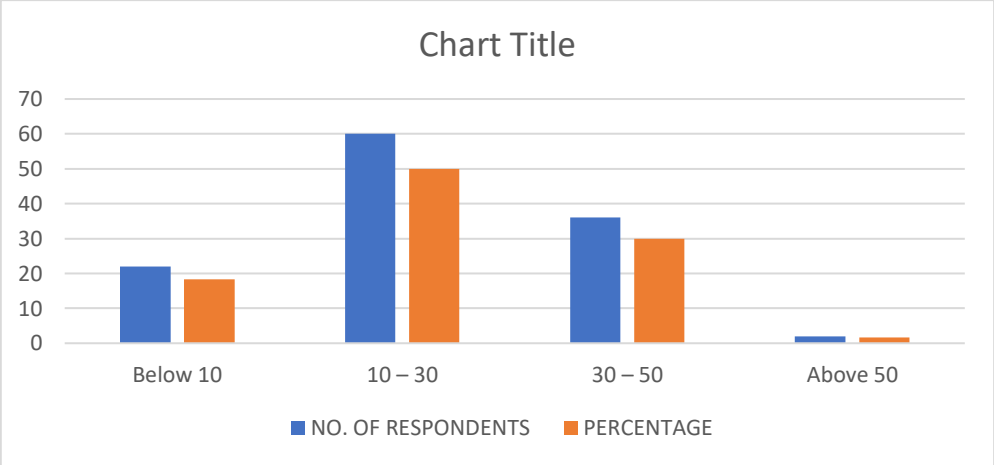
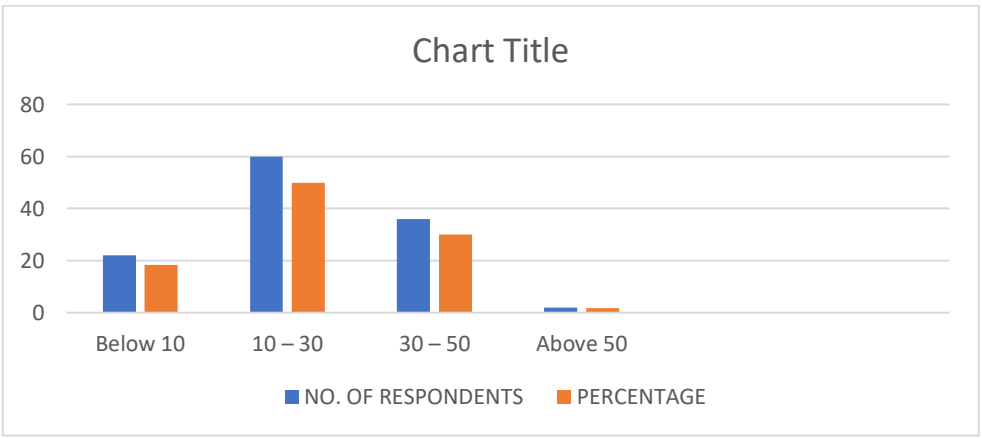
3. AGE

AGE	NO. OF RESPONDENTS	PERCENTAGE
35 – 50	35	29.17
50 – 65	46	38.33
65 – 80	27	22.5
80 – 95	12	10



4.EDUCATION

EDUCATION	NO. OF PARTICIPANTS	PERCENTAGE
Primary	22	18.34
Upper primary	18	15
High school	50	41.67
High secondary	18	15
Degree	0	0
Above degree	12	10



5. VARIETIES OF PADDY CULTIVATED

Varieties	No. of respondents	Percentage
Jyothi	0	0%
Uma	50	41.67
Jaya	40	33.33
Pokkali	30	25
Triveni	0	0%

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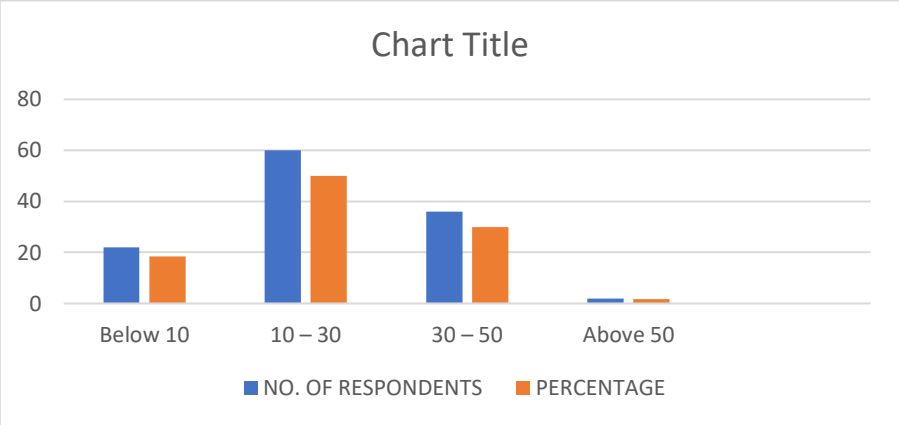
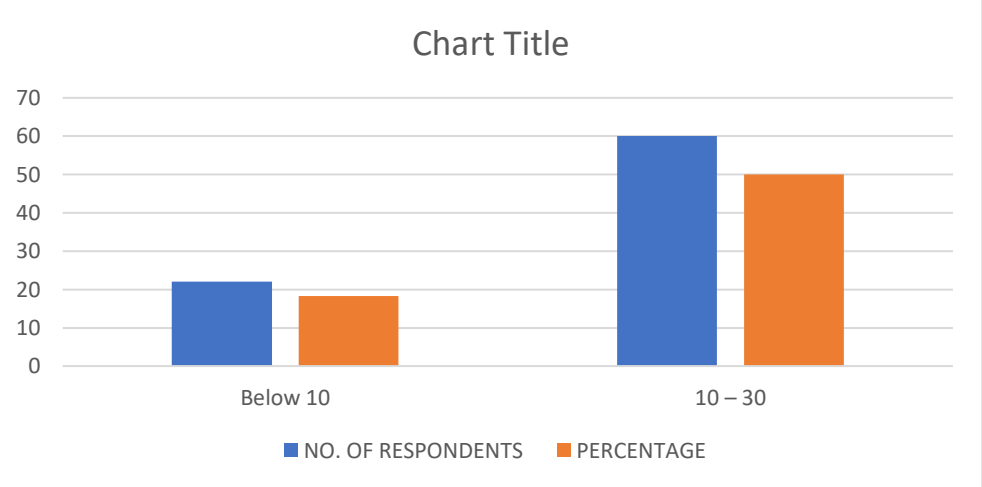


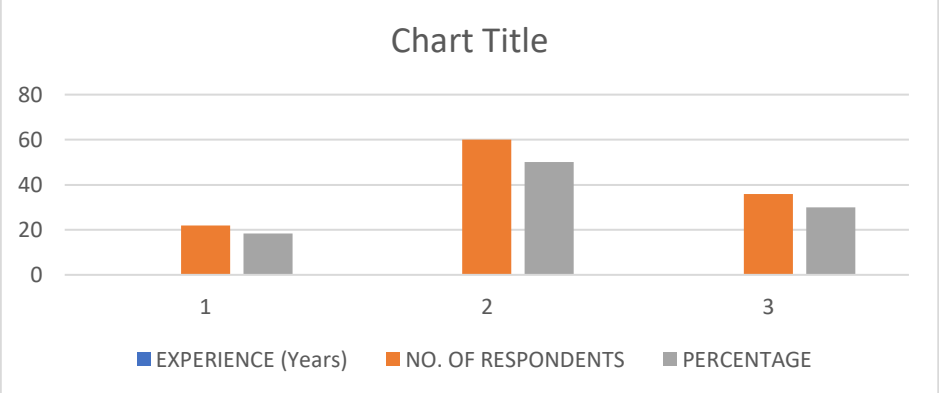
6. WHETHER FERTILIZERS USED

RESPONSE	NO. OF RESPONDENTS	PERCENTAGE
Yes	70	58.33
No	50	41.67



7. NUMBER OF HARVEST

No. Of Times Harvest	No. Of Respondents	Percentage
1	40	33.33
2	50	41.67
3	30	25



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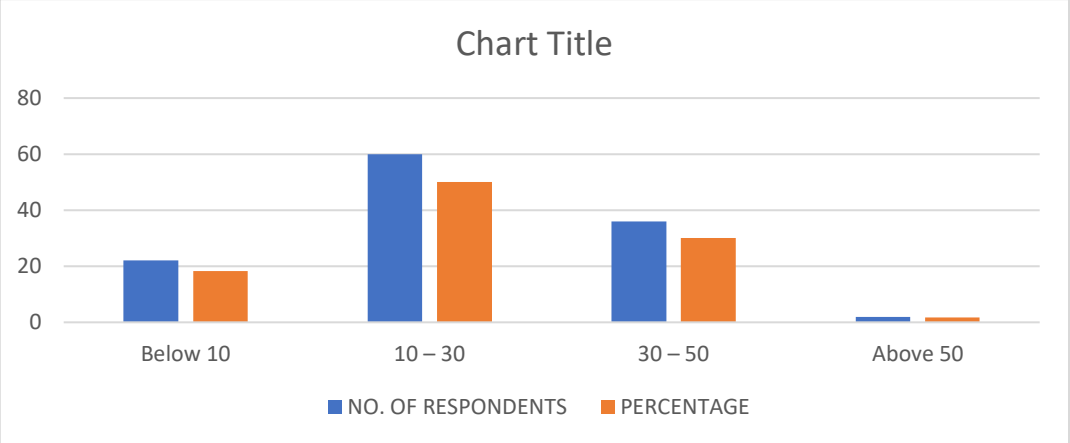
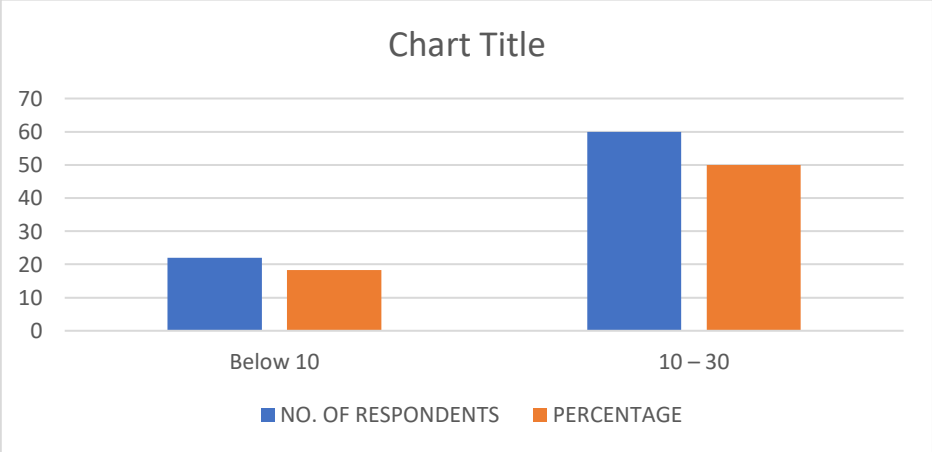
8. YIELD FROM A HARVEST

YEILD	NO. OF PARTICIPANTS	PERCENTAGE
Below 30	48	40
30 – 70	32	26.67
70 – 100	25	20.83
Above 100	15	12.5



9. BENEFITS OF GOVERNMENT

RESPONSE	NO. OF PARTICIPANTS	PERCENTAGE
Yes	75	62.5
No	45	37.5



10. EXPERIENCE OF FARMERS

EXPERIENCE (Years)	NO. OF RESPONDENTS	PERCENTAGE
Below 10	22	18.33
10 – 30	60	50
30 – 50	36	30
Above 50	2	1.67

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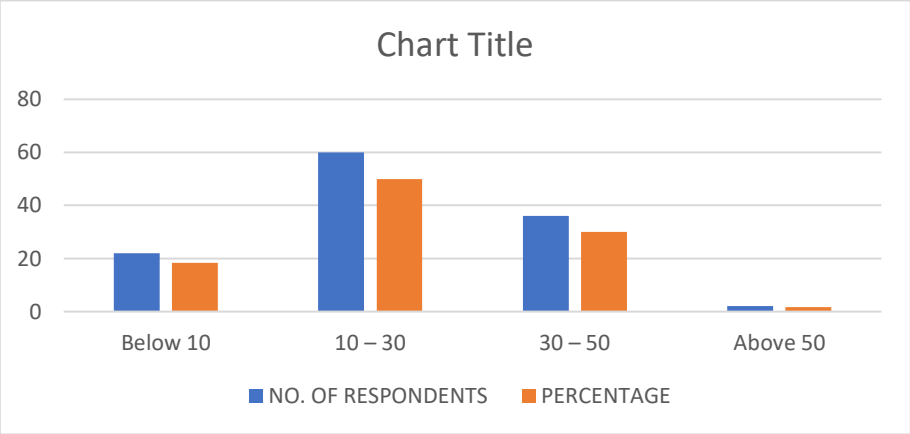

The study, conducted in chempupuram hamlet in nedumudy village of kuttanad, analyzed salt water intrusion in paddy fields. Data was collected from 120 farmers, focusing on their constraints and potential solutions to improve productivity and income, as well as policy implications. Henry Garrett's ranking technique was used to analyze constraints faced by paddy farmers in salt water affected areas. Constraints were ranked without bias, and their ranks were converted to percentages using a formula.

Per cent position = 100 ×(RIJ−0.5)/ Nj

Where, Rij = Rank given for the ith factor by jth person. Nj = No. of constraints ranked by the jth person. (Garrett and Woodworth, 1969)

Garrett's conversion table was used to convert percentage positions to Garrett scores, with the highest mean score indicating a serious problem faced by paddy farmers in a specific area.

SL NO	CONSTRAINTS	GARETT SCORE	RANK
1	QUALITY OF WEED	96.68	1
2	LABOUR TIME DEVOTED	66.73	2
3	PRICE OF INPUTS	64.09	3
4	PROBLEM RELATED WITH PEST	63.17	4
5	RAINFALL DISTRIBUTION	59.85	5
6	HARVESTING ISSUES	57.53	6
7	NUTRIENT DEFICIENCIES	56.81	7
8	PRICE CHANGE OF PADDY	54.81	8
9	ATTACK OF BIRDS	52.49	9
10	BUND CONSTRUCTION	51.89	10

The findings from the table reveals that quality of weeds are highly influenced by the climatic changes and the condition of temperature that exists in a particular locality. Garrett's ranking method was used for constraint analysis, revealing that weed problem is the most severe constraint faced by farmers from salt water unaffected areas. Salt water intrusion is the major constraint, followed by decreased produce quality. Improper construction and maintenance of bunds are the main reasons for salt water intrusion. Farmers perceive increased costs, machinery usage, market price, seeds availability, labor wages, and weed emergence as factors affecting salt water intrusion. Addressing these issues can make paddy farming in Kuttand more profitable.

REFERENCE

1. *Abraham, M. P. (2019). Paddy Cultivation in Kerala : A Trend Analysis of Area, Production and Productivity at District Level, 1–60.*
2. *Sanyal, Tapas Kumar Sharma, Naresh Kumar (2019), State-wise and item-wise value of output from agriculture, forestry and fishing (2011-12 to 2016-17).*
3. *Samal, P., Rout, C., Repalli, S. K., & Jambhulkar, N. N. (2018). State-Wise analysis of growth in production and profitability of rice in India. Indian Journal of Economics and Development, 14(3), 399. https://doi.org/10.5958/2322-0430.2018.00151.8*
4. *Laitonjam, N., Singh, R., Yumnam, A., Kalai, K., & Meena, N. K. (2018). Rice production in India: Decomposition and trend analysis. Plant Archives, 18(1), 435–438.*
5. *2018 Economic Review. (n.d.). Government of Kerala*
6. *Economic Review, 2016, Government of Kerala*
7. *Department of Economics & Statistics. (2017). Agricultural Statistics 2016-17 (p. 228).*
8. *One, V. (2017). Economic Review Report 2016, one (March 2017). Retrieved from www.ecostat.kerala.gov.in*
9. *Pradesh, M., Pradesh, E. U., Uttar, W., & Pradesh, H. (2015). A status note on Rice in India, 1–17.*
10. *Kumari, P., Mishra, G. C., Pant, A. K., Shukla, G., & Kujur, S. N. (2014). Comparison of forecasting ability of different statistical models for productivity of rice ... comparison of forecasting ability of different statistical models for productivity of rice (ORYZA. The Ecoscan, An Internasional Biannual Journal of Environmental, November (May 2015), 193–198.*
11. *https://alappuzha.nic.in/en/municipality-wards/*