# RESEARCH-EXTENSION GAP IN RICE TECHNOLOGY ADOPTION AMONG THE FARMERS OF SOUTH KERALA

***by***

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**(2019-11-148)**

**THESIS**

**Submitted in partial fulfilment of**

**the requirements for the degree of**

**MASTER OF SCIENCE IN AGRICULTURE**

**Faculty of Agriculture**

**Kerala Agricultural University**


**DEPARTMENT OF AGRICULTURAL EXTENSION**

**COLLEGE OF AGRICULTURE**

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**KERALA, INDIA**

**2021**

## DECLARATION

I, hereby declare that this thesis entitled **"Research-extension gap in rice technology adoption among the farmers of South Kerala"** is a bonafide record of research work done by me during the course of research and the thesis has not previously formed the basis for the award to me of any degree, diploma, associateship, fellowship or other similar title, of any other University or Society.

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## CERTIFICATE

Certified that this entitled **"Research-extension gap in rice technology adoption among the farmers of South Kerala"** is a record of research work done independently by Ms. Shanila S under my guidance and supervision and it has not previously formed the basis for the award of any degree, diploma, fellowship or associateship to her.

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***Acknowledgements***

*First and foremost, I bow my head before* ***Lord Almighty*** *whose grace had endowed me the inner strength and confidence and blessed me with a helping hand at each step during the work.*

*I am profoundly grateful to my esteemed chairman,* ***Dr. B. Seema*** *Professor and Head, Department of Agricultural Extension and chairman of the advisory committee, for her esteemed stewardship, enabling guidance, co-operation, cherishable mentoring and personal affection for which I am greatly indebted. It was an absolute pleasure and privilege for me to work with her during my M. Sc. degree programme.*

*It gives me immense pleasure to express my heartfelt thanks to* ***Dr. Allan Thomas*** *Associate Professor and Head, Communication Centre, Kerala Agricultural University and member of my advisory committee for his valuable support, note-worthy guidance and cordial co-operation during the course of investigation.*

*I am thankful to* ***Dr. Archana R. Sathyan*** *Assistant Professor, Department of Agricultural Extension and member of my advisory committee for all the love and care along with her professional guidance and suggestions provided throughout.*

*I am pleased to place my deep sense of gratitude to* ***Dr. Shalini Pillai, P.*** *Professor and Head, Department of Agronomy and member of my advisory committee for her valuable help and guidelines during the course of my study.*

*I sincerely accentuate my gratitude to* ***Dr. Pratheesh P. Gopinath*** *Assistant Professor Department of Agricultural Statistics and member of my advisory committee for his guidance, stimulating suggestions and support during the statistical analysis and preparation of the thesis.*

*I am extremely thankful to* ***Dr. Brigit Joseph****, Associate Professor and Head, Department of Agricultural Statistics for her valuable suggestions and timely help during my research work.*

*Words are insufficient to place on record my deepest sense of gratitude towards* ***Dhanusha chechi, Pooja chechi, Devapriya chechi*** *and* ***Susan chechi*** *for their moral*

*support, unparallel affection, encouragement, care and helping hands throughout the present investigation.*

*Thanks, should not be mentioned amongst friends, but it came from the bottom of my heart especially to dearest* ***Azi, Jeena, Sravz, Spandy, Allu, Pathu, Prasu*** *and* ***Ninja*** *for all the love, affection, inspiration and emotional support throughout this research.*

*I also extend my sincere thanks to the* ***Librarian,*** *College of Agriculture Vellayani and* ***Asha chechi*** *and* ***Deena*** *for their timely help and co-operation.*

*My gratitude can't be repaid through words to my loving parents, brother and grandparents for their unending love, warmth, boundless compassion and constant encouragement. I owe a lot to my beloved* ***Vappi, Ummi, Shakuttan, Vallimmi and Valyappi,*** *without whose affection, support and sacrifice, this study would not have been possible.*

*I am overwhelmed with gratitude to all my respondents, without whose whole hearted co-operation and valuable responses this study would not have been fruitful.*

*Finally, I want to convey my heartfelt gratitude to everyone who has assisted me in some way, whether directly or indirectly and whose names have either been overlooked or forgotten in the successful completion of this research.*

***SHANILA S***

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## LIST OF ABBREVIATIONS

| Abbreviations | Full form |
|---|---|
| et al | Co-workers |
| % | Percentage |
| KAU | Kerala Agricultural University |
| POP | Package Of Practices |
| PAO | Principle Agricultural Office |
| GoI | Government of India |
| GoK | Government of Kerala |
| No. | Number |
| Fig. | Figure |
| *i.e.* | That is |
| YGI | Yield Gap Index |
| SRI | System of Rice Intensification |
| IPM | Integrated Pest Management |
| S. D | Standard Deviation |

# *Introduction*

# CHAPTER 1
# INTRODUCTION

Rice is the most widely produced cereal crop in the world. Thousands of millions of people's culture, traditions, nourishment, and economics have all been influenced by it. Rice provides calories to more than half of the world's population, especially in developing countries. To meet the rising demand, the world will need around 760 million tonnes of rice by the year 2025, which is 35 percent greater than the rice production in 1996 (Duwayri *et al*., 1999). Considering its importance, the United Nations designated year 2004 as the "International Year of rice".

Rice (*Oryza sativa* L.) is a plant belonging to the family of grasses, Poaceae. Being a tropical and sub-tropical plant, it requires fairly high temperature, ranging from 20° to 40°C with an annual rainfall above 100 cm and irrigation in locations where rainfall is low. Mostly rainfed eastern zone accounts for the largest area and production but has the lowest productivity, whereas the largely irrigated north and south zones account for somewhat less area and production but have productivity half times more than that of eastern India, giving them a noticeable yield advantage (Siddiq, 2000).

India occupies first place in area and second place in the production of rice in the world, accounting for some 20 per cent of global production. It is also one of the largest consumers of the grain, with more than half of India's 1.3 billion people relying on rice for survival. Rice production of India increased from 64.6 million tonnes in 1971 to 178 million tonnes in 2020 growing at an average annual rate of 2.68 per cent (WDA, 2021).

Because of the country's many techno-feasible conditions, food grain crop productivity is often low. This is especially true in the case of rice. Research conducted in many areas indicate that, considering the current level of knowledge, technology adoption, and input utilization, average level of rice production is less. Rice's economic viability is always linked to productivity (i.e., per ha yield), which is always the result of a combination of knowledge, adoption, input utilisation, and management.

According to the International Rice Research Institute, the sustainability of rice farming in India is specifically threatened by so many difficulties including the yield gap problems. As a result, it was proposed that efforts be made in research and extension to break the trend of stagnant yield and close yield gaps in order to improve rice production and ensure world food security (IRRI, 2013).

The gaps between research yields and actual farmers' yields in a specific location and season are more accurate indicators of yield gap. Yield gap I and Yield gap II are the two main components of yield gap. Yield Gap I is the difference between research station yield and potential farm yield obtained from demonstration plots, whereas Yield Gap II is the difference between yield obtained from the nearest demonstration plot and actual yield obtained from farmers' fields. Yield Gap I cannot be narrowed or exploited because of elements that are generally not transferrable, such as environmental conditions and some built-in component technologies present at research stations. Yield Gap II, on the other hand, is primarily due to differences in management techniques and it arises because farmers adopt sub-optimal input doses and cultural practices. As a result, Yield Gap II is controllable and can be decreased by increasing research and extension efforts (Lobell *et al*., 2009).

In Kerala, paddy fields occupy 7.46 per cent of the total cropped area of the state. The land has witnessed a steady decline in the area of rice fields since 1970s and they are constantly getting converted for other purposes. In the last four decades from 8.82 lakh hectare, the paddy area has come down to 0.58 lakh hectare and the production has also declined accordingly from 13.76 lakh MT in 1972-73 to 1.82 lakh MT in 2020-21 (GoK, 2021).

The state's rice output has been reduced due to high farming costs, shortage of excellent quality seed, disease outbreaks, land fragmentation and poor marketing effectiveness (Abraham, 2019). Consequently, farmers are abandoning rice farming in favour of cash crops such as plantation crops, vegetables and fruits. Significant research and development are required to maintain current levels of food grain production without causing any damage to natural resources.

Analysis of the research-extension gap in rice production is crucial under these circumstances. Thereby, the present study will help to identify the profile characteristics of paddy growing farmers, the extent of yield gap, knowledge and adoption of KAU technologies among the rice farming community of South Kerala, as well as evaluating the constraints faced and suggestions perceived by respondent farmers. In addition, only a few research on the yield gap in rice cultivation and the adoption of KAU technologies in rice varieties have been carried out. In this context, the current study was conducted in the rice-growing tracts of South Kerala, including Thiruvananthapuram, Kollam, Alappuzha, Pathanamthitta, Kottayam, Ernakulam, and Idukki districts with the following objectives.

## 1.1 OBJECTIVES

1. To measure the of extent of popularity, acceptance and yield gap of rice varieties released by KAU among the rice farmers of South Kerala.

2. To measure the level of adoption of selected KAU technologies in rice varieties

3. To document the KAU rice varieties cultivated by farmers and sources of seeds

4. To determine the reasons for cultivating/not cultivating the variety

5. To study the personal and social characteristics of rice producing farmers

6. To identify the constraints experienced by the rice farmers with suggestions for refinement

## 1.2 SCOPE OF THE STUDY

This study was undertaken to understand the level and extent of adoption of KAU recommended rice cultivation practices by the farmers, the respondents' personal and social characteristics and the degree of yield gap among KAU released rice varieties mainly in Sothern part of Kerala which will be useful to extension workers in developing distinct location specific agricultural inputs and management strategies to bridge the yield gap.

The study's objectives suggest the practical utility of the research. The outcome of the study would give an indication as to where farmers stand in terms of knowledge

and adoption of recommended rice cultivation practises. It would support concerned extension agencies, researchers, and policymakers in developing adoption strategies to boost rice production and make the rice farming more feasible and profitable and also assist in implementing appropriate steps to close the rice yield gap.

## 1.3 LIMITATIONS OF THE STUDY

As the study was confined to the entire southern Kerala districts it was hard to cover the whole area with the limited time and resources available amidst the Covid scenario. Further, the research was part of the post graduate programme that was completed in a short period of time, there were financial and other resource constraints. Sincere efforts have been made to obtain precise and authentic information but for many of the responses the respondents were depending on their memory which might have influenced the accuracy of the responses. Despite these limitations, the researcher took every attempt to ensure that the study was objective, systematic and credible.

## 1.4 PRESENTATION OF THE THESIS

The entire study is grouped into five sections. The study's introduction, objectives, scope and limitations are covered in the first chapter. The second chapter, review of literature, is concerned with the systematic scanning and critical review of selected literatures that are useful for the present study. The research methodology is described in the third chapter, followed by the fourth chapter discusses the results of the study and how they were interpreted. The study's findings are summarised in the final chapter, along with implications and recommendations for future research. The thesis' references, appendices, and abstract are listed at the conclusion.

# *Review of Literature*

# CHAPTER 2
# REVIEW OF LITERATURE

A literature review is a compilation, classification, and evaluation of what other researchers have published on a specific topic. Literature reviews are secondary sources that do not describe any novel or unique research. A well-structured literature review provides knowledge of previous work in the field as well as an understanding into researcher's methods and procedures. It also provides proper terminology and an impartial and comprehensive assessment of previous research on the subject. With this in reference, a brief evaluation of relevant literature has been conducted in light of the study's objectives and is presented under the following primary headings.

i. Studies related to Personal, socio-economic and psychological characteristics of farmers
ii. Empirical studies related to level of adoption
iii. Empirical studies related to yield gap in rice varieties among farmers
iv. Relationship between the personal, socio-economic and psychological characteristics of farmers with their level of adoption
v. Constraints experienced by the rice farmers
vi. Suggestions of the farmers in enhancing the productivity of rice

## 2.1 STUDIES RELATED TO PERSONAL, SOCIO-ECONOMIC AND PSYCHOLOGICAL CHARACTERISTICS OF FARMERS

### 2.1.1 Age

Singh (2000) observed that the middle age group accounted for 68.00 per cent of Basmati paddy growers in Haryana, while the young age group accounted for 20.00 per cent. Only 12.00 per cent of them belonged to old age group.

Sunil (2007) observed that in Mandya district, 43.40 per cent of paddy farmers growing high-yielding varieties were middle-aged, whereas 30 per cent were young and 26.60 per cent were of old age in the study region.

Narwariya (2009) inferred that majority (39.17%) of the paddy growers from Dabra Block of Gwalior District in Madhya Pradesh, were of middle age group followed by old age group (32.50 %) and young age group (28.33%).

Lakra (2011) indicated that majority (53.75%) of the hybrid rice cultivating tribal farmers of Surguja district of Chhattisgarh in the adoption of hybrid rice production technology belonged to the middle age groups, followed by young age group (27.50 %) and older (18.75%) age group.

Lairenlakpam (2012) revealed that majority of the respondent paddy growers in Manipur state were in the medium age category (58.33 %), followed by the young age category (22.50 %) and the old age category (19.17 %).

Kumar (2015) revealed that the majority (65.00 %) of rice farmers in the Kurnool district of Andhra Pradesh who followed the recommended cultivation practices belonged to the medium age group, followed by the old (19.17 %) and the young (15.83 %) age groups.

Tengli (2016) revealed that half the rice growers (50.00 %) in the Navsari and Surat districts of South Gujarat were in in the 'middle age' category when it came in adopting improved paddy cultivation practices followed by, 35.00 per cent and 15.00 per cent, respectively, belonged to the 'young age' and 'old age' categories.

Veena (2017) reported that 55.00 per cent of rice growers in the Kabini command area of Karnataka were in the middle age group, followed by the young (25.83 %) and the old (19.17 %) age groups in her study on the yield gap of rice.

### 2.1.2 Farming Experience

Arathy (2011) stated that majority (49.17 %) of paddy farmers in Kerala's Thrissur district had medium farming experience, followed by 30.00 per cent of respondents had high farming experience and 20.83 per cent of them had low farming experience.

Lakra (2011) in his findings indicated that majority of respondents (66.25 %) had medium farming experience in hybrid rice production, followed by 18.12 per cent of rice growers had less farming experience and only 15.63 per cent them had high farming experience.

Kumar (2015) found that the majority of rice farmers (70.00 %) had medium farming experience, followed by low (17.50 %) and high (12.50 %) levels of farming experience in respondent rice farmers.

Neshva (2015) in his study on impact of the Uma (Mo16) rice variety on farmers, observed that a vast majority (90%) of the paddy growers had very high farming experience, while 8% had high farming experience and there were only 2% of the farmers having low and medium years of farming experience.

Premilal (2016) revealed that 93.00 percent of paddy farmers in Bhandara district who used the system of rice intensification (SRI) method of paddy cultivation had high farming experience, 06.00 per cent had medium farming experience and just 01.00 per cent had low farming experience.

Tengli (2016) revealed that 46.00 per cent of the rice farmers had medium farming experience followed by 44.00 per cent had higher level of farming experience and 10.00 per cent had lower level of farming experience.

Hattalli (2019) observed that 65.83 per cent of rice farmers in the Sindhudurg district of Maharashtra had medium farming experience, with an average farming experience of 31.25 years, in his study on the technology utilization behaviour of paddy growers.

### 2.1.3 Area Under Rice Cultivation

Deepa (1999) reported that 65 per cent of rice farmers had a large area under rice cultivation, whereas 35 per cent of respondent rice farmers had a small area under rice.

Kumar (2008) found that the majority of paddy farmers (80.48 %) in the Sitamarhi District of Bihar had 0.51 ha to 1.50 ha of paddy land under cultivation, in his study on the technology gap in rice farming.

Lakra (2011) observed that 49.37 per cent of hybrid rice farmers had 2.1 to 4 ha of land under rice cultivation, followed by 33.12 per cent and 15.62 per cent of respondent rice farmers had 1.1 to 2 ha and more than 4 ha area under cultivation, respectively and just 1.89 per cent of respondents had less than 1 ha.

Bhosale (2012) observed that a vast majority (70.00 %) of the respondent paddy farmers had 1.01 to 2.00 ha area under paddy, while 16. 17 per cent had up to 1 ha and only 13.33 per cent had 2.01 ha and above area under paddy cultivation.

Lairenlakpam (2012) inferred that majority of respondent rice farmers (65.00 %) had a medium area under rice cultivation, 19.17 per cent had large area and 15.83 per cent of rice farmers had small area under rice cultivation.

Prasad (2014) discovered that 59.05 per cent of beneficiary and 58.10 per cent of non-beneficiary rice growing farmers in the Hanumangarh district of Rajasthan had between 2-4 hectares of area under paddy in his study on farmers' adoption behaviour toward improved package of practices for rice cultivation. Farmers with less than 2 hectares, on the other hand, made up 20.00 per cent of beneficiaries and 28.57 per cent of non-beneficiaries. Furthermore, 20.95 per cent of beneficiary rice growers and 13.33 per cent of non-beneficiary rice growers had more than 4 ha of area under rice.

Neshva (2015) stated that about half of the respondent rice farmers were cultivating the rice variety 'Uma' in less than one hectare, while 36 per cent were cultivating in 1-2 ha and 24 per cent of respondent farmers were cultivating in more than 2 ha area.

### 2.1.4 Annual Income

Sunil (2007) observed that 37.60 per cent of paddy farmers in the Cauvery command area had a low annual income (less than Rs. 26,875), 35.80 per cent had a medium annual income (Rs 26876 to 49,009), and only 26.60 per cent had a high annual income (Rs 26876 to 49,009).

Bhosale (2012) revealed that majority (77.50 %) of paddy farmers in the Kolhapur district of Maharashtra who followed paddy production technology had a medium level of annual income (Rs.69,162 to 2,20,715), while 15 per cent of rice farmers had a high level of annual income (Rs.2,20,716 and above) whereas only 7.50 per cent of farmer respondents had a low annual income (up to Rs.69,161).

Lairenlakpam (2012) found that majority of rice farmer respondents (71.67 %) had a medium level of annual income ranging from Rs. 42847 to Rs. 96567, while 15.83 per cent had a low level of annual income ranging from Rs. 42846 to Rs. 96567. Only 12.50 per cent of the farmers had a maximum annual income of Rs. 96568 and above.

Kumar (2015) observed that majority of paddy cultivating farmers (41.67 %) had low annual income, followed by farmer respondents had medium (29.17 %) and high (29.17 %) annual income levels.

Premilal (2016) reported that majority of the respondent rice farmers (63.00 %) earned less than Rs 1,00,000 per year, while 20.00 per cent earned more than Rs 2,00,001 per year. While 17.00 per cent earned between Rs. 1,00,001 and Rs. 2,00,001 every year.

Veena (2017) inferred that 58.33 per cent of paddy growers had a medium annual income, followed by these respondents had high (21.67 %) and low annual income levels (20.00 %).

Hattalli (2019) observed that majority of rice farmer respondents (79.17 %) had a 'medium' annual income, with an average annual income of Rs.85958/-.

### 2.1.5 Mass Media Exposure

Obaiah (2004) observed that majority of FFS trained paddy growers (58.57 %) had medium mass media exposure, followed by an equal percentage of high and low mass media exposure.

Sunil (2007) revealed that 35.80 per cent of rice growers had low mass media exposure, 33.33 per cent had medium mass media exposure and 30.90 per cent of the respondent farmers had high mass media exposure.

Karthik (2009) discovered that a significant number of hybrid paddy seed growers (39.00 %) had low levels of mass media participation, while 37.00 per cent and 24.00 per cent of respondents had medium and high levels of mass media participation, in his study on the diffusion of hybrid paddy seed production technologies in Mandya district

Kumawat (2010) found that most paddy growers (60.00 %) had medium exposure to mass media, followed by 25.83 per cent paddy growers with low exposure to mass media, and 14.17 per cent with high exposure to mass media in his study on adoption behaviour of farmers in SRI practices of paddy cultivation in Shahdol district of Madhya Pradesh.

Kumar (2015) reported that almost over half of the paddy growers (57.50 %) had medium exposure to mass media, followed by 22.50 per cent and 20.00 per cent of farmer respondents had high and low levels of mass media exposure.

Verma (2015) observed in his study that medium mass media exposure was recorded by 42. 73 per cent of basmati rice growers in Budni block of Sehore district (MP), high mass media exposure by 31.82 per cent and low mass media exposure by 25.45 per cent of rice farmers.

### 2.1.6. Extension Participation

Lekshmi *et al*. (2006) found that majority of respondents (41.67 %) had medium extension participation in their study on the analysis of yield gap among rice farmers in Tamil Nadu's North Eastern Zone, followed by 38.33 per cent who had high extension participation and only 20.00 per cent of respondent farmers had low extension participation.

Karthik (2009) discovered that majority (38.00 %) of hybrid paddy seed growers had low participation in extension activities, whereas 33.00 and 29.00 per cent of hybrid paddy seed growers had medium and high participation in extension activities, respectively.

Itawdiya (2011) in his study on technological gap in sugarcane cultivation in Sehore District of Madhya Pradesh, reported that most of the sugarcane cultivators had medium participation in extension activities whereas 35.56 and 26.66 per cent of farmer respondents belonged to the high and low extension participation categories, respectively.

Narayanbhai (2013) observed that 50.00 per cent of respondent rice farmers exhibited low extension participation in his study on technology utilization behaviour of paddy growers in Gujarat's Anand region. Medium and high extension participation were represented by 29.16 and 08.34 per cent of respondent farmers, respectively.

Shalini (2017) found that the majority of hybrid paddy farmers (38.33 %) had medium extension participation, followed by low (35.00 %) and high (26.66 %) levels of extension participation in her study on adoption and economic performance of hybrid paddy cultivation practices among the farmers of Mandya district.

Veena (2017) revealed in her study that low extension participation was reported by 44.17 per cent of rice farmers, followed by 35.83 percent and 20.00 percent of respondents had medium and high levels of participation in extension activities.

### 2.1.7 Achievement Motivation

Obaiah (2004) found that more than half (58.57%) of the FFS trained paddy farmers had medium achievement motivation followed by high (21.43%) and low (20.00%) achievement motivation.

Nagesh (2005) reported that a vast majority (80.84%) of vegetable seed producing farmers in his study on the entrepreneurial behaviour of vegetable seed producing farmers in Haveri district belonged to the medium achievement motivation category followed by 11.66 per cent and 7.50 per cent of respondent farmers who belonged to the low and high achievement motivation categories, respectively.

Sunil (2007) reported that high achievement motivation accounted for 39.20 per cent of rice-growing farmers, whereas medium and low achievement motivation accounting for 37.50 per cent and 23.30 per cent of farmers, respectively.

Shalini (2017) stated that majority of respondent paddy growers (43.33 %) had a medium degree of achievement motivation, followed by 30.00 per cent had a high level of achievement motivation and 26.66 per cent of respondents had a low level of achievement motivation.

Veena (2017) in her study revealed that medium achievement motivation was found in 39.17 per cent of rice growers, followed by low achievement motivation in 35 per cent and high achievement motivation in 25.83 per cent of respondent farmers.

### 2.1.8 Risk Orientation

Deepa (1999) found that 64 per cent of respondent rice growers were in the high-risk orientation category, while 36 per cent were in the low-risk orientation category, in her study on promotional strategy for IPM in rice in the Thrissur district.

Arathy (2011) stated in her study that majority of rice farmers (61.67 %) were in the medium risk orientation category, followed by 32.50 per cent and 5.83 per cent of rice farmers in the high and low risk orientation categories.

Solanki (2011) found that the majority of respondent chickpea growers (40.00%) had a medium risk orientation, followed by 30.83 per cent had high risk orientation and 29.17 per cent of respondents had low risk orientation respectively, in his study on identifying the technological gap in adopting the chickpea recommended practices in Ashta block of Sehore district of Madhya Pradesh.

Bhosale (2012) inferred that majority of respondent rice producers (59.17%) had a medium level of risk orientation, whereas 22.50 per cent and 18.33 per cent of respondent farmers had high and low risk orientation, respectively.

Channamallikarjuna (2013) found that 42.67 per cent of paddy farmers were in low-risk oriented category in his study on adoption of the SRI method of paddy cultivation in Dharwad district by paddy farmers, followed by 33.33 per cent and 24.00 per cent of respondent farmers who were in high and medium risk orientation, respectively.

Kumar (2015) found that the majority of rice farmers (53.33 %) had a medium risk orientation, with 30.83 per cent had a high-risk orientation and 15.83 per cent had a low-risk orientation.

Anju (2016) found that 71.11 per cent of amaranth growers were in the medium risk orientation category, followed by 20.00 per cent and 8.89 per cent of amaranth growers who were in the high and low risk orientation categories, respectively, in her study on technology utilisation of KAU practises of amaranthus and vegetable cowpea in Thiruvananthapuram district.

### 2.1.9. Credit Orientation

Jayapalan (1999) in his study regarding the techno-socio-economic assessment of bitter gourd cultivation in Thiruvananthapuram district, observed that majority 62.50 per cent of the bitter gourd growers had low credit orientation followed by 37.50 per cent of respondents had high credit orientation.

Budihal (2001) found that 71.66 per cent of cotton farmers were in the medium credit orientation category, with only 15.42 per cent in the high and 12.92 per cent in the low credit orientation categories.

Ramachandran (2002) found that 37 per cent of respondents had a high credit orientation, followed by 36.00 per cent in the medium category and 26.60 per cent in the low category of credit orientation, in his study on adoption behaviour about nutrient management in cabbage-potato cropping system in Kolar district of Karnataka.

Lekshmi *et al*. (2006) found that 50.00 per cent of respondent paddy farmers had a medium degree of credit orientation, followed by 40.00 per cent and 10 per cent of paddy farmers who had high and low degree of credit orientation, respectively.

Nagabhushana (2007) discovered that 43.33 per cent of potato farmers were in the medium credit orientation category in his study concerning the farming performance of potato cultivators in Karnataka's Hassan district, followed by 30.67 per cent in the high credit orientation category and 26.00 per cent in the low credit orientation category.

Arathy (2011) found that the majority of rice farmers (60.83 %) had a medium credit orientation, while 22.50 and 16.67 per cent of rice farmers had low and high credit orientation, respectively.

### 2.1.10 Innovativeness

Naik (2006) discovered that 41.34 per cent of groundnut farmers had medium innovativeness in his research on the training needs of groundnut farmers in the Anantapur district of Andhra Pradesh, whereas 33.33 and 25.33 per cent of groundnut farmers had low and high levels of innovativeness, respectively.

Kalyan (2011) found that 59.17 per cent of groundnut cultivators were in the medium innovativeness category in his study on analysing the impact of groundnut production technologies in the Chittoor district of Andhra Pradesh, followed by the high (20.83 %) and low (20.00 %) innovativeness categories, respectively.

Kumar (2015) discovered that majority of rice farmers (40.00 %) had a medium degree of innovativeness, whereas 33.33 per cent and 26.67 per cent of farmers had low and high degrees of innovativeness, respectively.

Anju (2016) reported that 62.22 per cent of amaranth growers were in the medium innovativeness category, followed by 20.00 per cent and 17.78 per cent of amaranth farmers in the high and low innovativeness categories, respectively.

Parushni (2017) in her study on technology gap of ginger cultivation in Shivamogga district, discovered that 50.84 per cent of ginger growers had medium innovativeness, followed by 34.16 per cent and 15 per cent of ginger growers with low and high degrees of innovativeness.

Shalini (2017) stated that 37.50 per cent of rice farmers had a medium degree of innovativeness, whereas 35.00 per cent and 27.50 per cent of rice farmers had high and low levels of innovativeness, respectively.

Veena (2017) inferred that 45.83 per cent of rice farmers fall into the low innovativeness group, followed by 37.50 per cent of them fall into the medium category and 16.67 into the low category, respectively.

### 2.1.11 Knowledge level of the farmers about KAU recommended rice cultivation practices

Sarkar *et al*. (2002) found that 57.65 per cent of rice farmers had a medium level of knowledge in their study on tribal leaders' knowledge and adoption of improved paddy cultivation technologies, while 27.06 per cent and 15.29 per cent of respondents had low and high levels of knowledge about rice production technology, respectively.

Mahatab (2010) found that majority of aerobic rice growers (53.33 %) had a medium level of knowledge about recommended aerobic rice cultivation practices among the rice growers of eastern dry zone of Karnataka, with 14.44 per cent had a low level of overall knowledge and 32.22 per cent had a high level of overall knowledge, respectively.

Lakra (2011) discovered that majority of respondent rice farmers (54.37 %) had a medium level of knowledge about hybrid rice production technology, followed by 35.63 per cent and 10.00 per cent of respondents had high and low level of knowledge on hybrid rice production technologies.

Channamallikarjuna (2013) inferred that majority of paddy growing farmers (41.33 %) had a medium level of knowledge about SRI paddy growing methods, followed by 30.67 per cent of them had a high level of knowledge and 28.00 per cent had a low level of knowledge, respectively.

Verma (2015) discovered during his survey that majority of basmati rice growers (54.54 %) had a medium level of knowledge, followed by 26.37 per cent and 19.09 per cent of basmati rice growers who had high and low levels of knowledge, respectively.

Shalini (2017) stated that majority of rice farmers (60.00 %) had medium overall knowledge regarding hybrid paddy growing techniques, with 20.83 per cent had high overall knowledge and 19.16 per cent had low overall knowledge, respectively.

Veena (2017) revealed that majority (60.00 %) of paddy growing farmers in the Kabini command area had medium knowledge of recommended rice growing practices, while 20.83 per cent and 19.67 per cent of respondents had high and low levels of knowledge, respectively.

## 2.2 EMPIRICAL STUDIES RELATED TO THE LEVEL OF ADOPTION

Kamalakkannan (2003) in his study on the research-extension gaps in commercial vegetable farming in eastern Palakkad found that the majority of commercial vegetable growers (65.00 %) were medium adopters, with 16.25 per cent and 18.75 per cent of vegetable producing farmers belonged to the low and high adoption categories, respectively.

Raghuwanshi (2005) in his study regarding the adoption behaviour of rice growers in controlling various insect pests of rice crop in Dhamtari district of Chhattisgarh, found that majority (63.75 %) of the rice growers possessed a medium adoption level, while 20.00 per cent and 16.25 per cent of rice growers who possessed low and high adoption levels, respectively.

Rizwana (2006) in her study regarding the gender concerns in rice production technology in Raipur district of Chhattisgarh, observed that all (100 %) the rice farmers completely adopted some practices like time of sowing, improved variety, raising nursery, fertilizer doses and age of seedlings. But the farmers who adopted fully the number of seedlings per hill and the seed rate were 93.75 and 97.50 per cent, respectively.

Singh and Jay (2010) concluded that majority percentage of respondent rice farmers (44.17 %) possessed medium level of adoption, followed by 37.50 per cent and 18.33 per cent of respondent rice farmers who belonged to the low and high adoption level categories, respectively, in their study on adoption level and constraints in rice production technology.

Sasane *et al*. (2012) found that 52.00 per cent of paddy growers showed a medium adoption level in their study on paddy cultivation practices knowledge and adoption among the farmers of north Kashmir, whereas 16.67 per cent and 31.33 per cent of rice farmers possessed low and high adoption levels, respectively.

Singh and Yadav (2014) found that the majority (50.83 %) of the paddy growers had medium level of adoption, while the remaining 29.17 per cent and 20.00 per cent had

low and high levels of adoption, respectively, in their study on the knowledge and adoption gap of tribal farmers towards rice production technology in Bastar.

## 2.3 STUDIES RELATED TO YIELD GAP IN RICE VARIETIES AMONG FARMERS

Nagabhushanam and Herle (1997) in their research concerning the yield gap of paddy found that, yield gap between progressive farmers and average farmers in case of paddy was 26.11 per cent. Whereas the yield gap between the research station yields and average farmer's yield was 34.74 per cent, but that between research station and progressive farmers was only 3.63 per cent.

Singh (1997) in his study concerning the factors affecting yield gaps in Bihar, revealed that yield gap with respect to paddy in case of marginal, small and medium farmers were 43.50, 58.00 and 60.50 per cent respectively.

Nagabhushanam and Kartikeyan (1998) in their study about the differential levels of yield and its influential factors on paddy farmers revealed that, yield gap between progressive paddy farmers were 24.74 per cent in Uttara Kannada district of Karnataka.

Prakash (2000) in his study on technological gap, yield gap and constraints of paddy cultivation in Palakkad district of Kerala, found that the low yield gap was constituted mainly by large farmers (50 %) and small farmers (38.24 %), while high yield gap group was constituted mainly by marginal farmers (62.50 %). In case of medium yield gap, small and marginal farmers were more as compared to large farmers.

Venkateshappa (2003) in his study on analysing the water use efficiency of paddy farmers in Cauvery command area, found that majority (36.60 %) of the respondent paddy farmers possessed a high level of yield gap, while 31.70 per cent of respondents were found each in the low and medium yield gap category.

Sunil (2007) observed that there was an overall yield gap of 7.16 q/ac accounting to 7.90 per cent in paddy yield in Mandya district.

## 2.4 RELATIONSHIP BETWEEN THE PERSONAL, SOCIO-ECONOMIC AND PSYCHOLOGICAL CHARACTERISTICS OF FARMERS WITH THEIR LEVEL OF ADOPTION.

Deepa (1999) observed in her study that area under rice, achievement motivation, extension participation, orientation towards risk showed a positive and significant correlation with the symbolic adoption of respondent rice producers towards IPM in rice whereas the variables, income from rice and innovativeness were non-significant.

Sudhakar (2002) observed in his study that under irrigated condition, the variables like area under cotton cultivation, exposure towards mass media, innovativeness, annual income and orientation towards risk possessed a positive and significant correlation with the extent of adoption.

Pottappa (2008) reported that mass media exposure and extension participation of potato farmers showed a significant relationship with the extent of adoption at 5 per cent level of significance and annual income showed a significant relationship at 1 per cent level of significance. The other variables namely age, annual income, innovativeness was not significantly related.

Channamallikarjuna (2013) observed that experience in system of rice intensification method of farming, innovative proness, risk orientation and extension participation showed positive and significant relationship with their adoption of recommended practices at 1 per cent significance level whereas, variables namely family income, mass media exposure and area under SRI method showed a positive and significant relationship with adoption of recommended practices at 5 per cent significance level.

Narayanbhai (2013) in his study concluded that age and yearly income of rice farmer respondents had significant correlation with adoption behaviour. Whereas, variables namely experience in paddy farming, participation in extension activities and risk orientation showed a non-significant correlation with adoption behaviour.

Verma (2015) in his study at Sehore district of Madhya Pradesh, indicated that variables like age, annual income, mass media exposure, knowledge level and extension contact showed a significant association with the extent of adoption of basmati rice growers.

Shalini (2017) revealed that family income, extension participation and innovativeness showed a significant relationship with the extent of adoption of hybrid paddy farmers at 5 per cent level and mass media exposure and knowledge level showed significant relationship at 1 per cent significance level. The other variables namely, age and achievement motivation showed non- significant relationship with extent of adoption.

## 2.5 CONSTRAINTS EXPERIENCED BY THE FARMERS

Jana and Verma (2003) observed that high cost of pesticides, unavailability of chemicals, lack of relevant technical guidance, labour scarcity, increased labour costs, paddy weeders unattainability in local markets and their high costs were all mentioned by paddy growers as barriers in adopting recommended plant protection practices.

Singh *et al*. (2004) found that the respondents' primary problem was the lack of timely financial resources, in their study on the adoption trend and constraints evaluation of basmati rice in Uttaranchal. The inaccessibility of inputs such as quality seeds, fertilizers, bio fertilizers, etc. were the main concerns of about 60 per cent of the respondents.

Vijay *et al*. (2008) identified the constraints experienced by respondent paddy growers in the Sitamadhi district of Bihar which included uncertain contacts with extension workers (82.85 %), high farm labour charges (81.43 %), labour shortages during peak time, insufficient knowledge regarding plant protection practices (75.25 %), high price of synthetic fertilizers (71.90%) and inadequate knowledge regarding seed and seedling treatment (71.00 %).

Shivamurthy (2008) carried out a study on paddy farmers in the eastern dry zone of Karnataka cited lack of quality seeds, skilled labour, plant protection chemicals, improved farm implements, lack of profitable marketing system, high input costs, high cultivation costs, high labour wages, shortage of water supply and pest and disease epidemics as constraints to rain fed paddy cultivation.

Shalini (2017) observed that lack of timely labour (94.16 %), sudden hike in fertilizer prices (93.33%), marketing related problems (90.83%), high cost of planting material (88.66%), high labour charge (84.16%), lack of availability of seeds (52.50%), lack of

technical guidance (45.83%) and pest attack (6.66%) were the constraints faced by majority of respondent paddy growers.

Veena (2017) revealed that constraints faced by respondents include delay in release of canal water which decreases rice yield (89.17%), timely inputs unavailability (82.50 %), shortage of labour at the right time (72.50 %), pest and disease incidence attacks (69.17 %), unavailability of agricultural implements in time (65.83 %), lack of credit facilities (62.50 %), lack of awareness on recommended rice cultivation practices (57.50 %), lack of knowledge on recommended rice cultivation practices (57.50 %), lack of technical guidance & trainings (45.83 %) and also 40.83 per cent of the rice farmers stated that they were also facing other constraints like poor soil health, difficulty in getting FYM and costly inputs.

## 2.6 SUGGESTIONS OF THE FARMERS IN ENHANCING THE PRODUCTIVITY OF RICE

Parmar (2006) proposed the following major suggestions in his study which includes, farmers must be secured by agricultural insurance schemes at seasonal breakdown, accompanied by viable economic market prices for farm products, provision of agricultural inputs at a subsidised rate for marginal and small farmers, timeous availability of water supply, good scientific assistance and support for farmers, farm components and inputs made accessible at the grassroot level and technological advances through training should also be given.

Darandale *et al*. (2014) found that minimising input prices (93.33 %), offering real - time expert advice (86.67 %), supplying healthy and quality seeds at the right moment (80.83 %), not pressuring growers to take insurance because it adds to their financial burden (77.50 %), and changing the crop insurance scheme (72.80 %) are the most common constraints faced by cotton growers.

Salunkhe (2014) discovered these recommendations mentioned by the Gurjari paddy producers for adopting paddy production technology which includes, providing subsidies for farm machinery purchases, making high-cost inputs available at a lower cost through specific agencies, systematised extension activities at each grama

panchayat, making the procedure for obtaining crop loan and crop insurance easier, recruiting personnel at the village level, and providing quality seed at low cost.

Tengli (2016) found that the respondent paddy growers offered the following suggestions for overcoming the constraints which were, provide financial support for purchasing farm machinery, form generic agriculture stores at which top notch inputs are retailed at a relatively low fare, offer additional facility for leveraging the advantage of hedging, construct a supply chain network for ensuring the input availability at right time, facilitate appropriate information regarding marketing and canals should be built in unreached areas.

Shalini (2017) in her study revealed the suggestions expressed by the hybrid paddy growers as; provision and supply of quality inputs at correct time, government should give inputs like seeds and fertilizers at a subsidized rate, timely and adequate information regarding availability of inputs, prices etc., protection from middlemen exploitation, provision for suitable market infrastructure *viz.* transportation, storage etc., and cooking quality of hybrid rice should be improved through research activities in order of priority.

# *Methodology*

# CHAPTER 3
# METHODOLOGY

The methodology chapter describes the methods and procedures used to perform the study, with more information provided under the following subheadings.



## 3.1 RESEARCH DESIGN

The process of planning the research in order to successfully address the research problem is known as research design. "A strategy that defines how, when, and where data will be collected and analysed" is what a research design implies (Parahoo, 1997).

*Ex-post facto* research design is a systematic investigation in which the researcher does not have direct control over the independent variables because their explanations and

indications have already occurred or because they are fundamentally not manipulatable (Kerlinger, 1983). "*Ex-post facto"* design was followed in this research as there is no scope to manipulate the research design for the independent variables.

## 3.2 LOCALE OF THE STUDY

The research was carried out during the year of 2020-2021 in Thiruvananthapuram, Kollam, Alappuzha, Pathanamthitta, Kottayam, Ernakulam, and Idukki districts, which constitute the rice-growing areas of South Kerala.

### 3.2.1. Brief description of the study area:

Kerala is located in the south-western corner of the Indian peninsula, in the southern section of the Western Ghats, with Tamil Nadu to the east and Karnataka to the north and the Arabian Sea to the west. It is a state in India with a long history and culture of rice farming and rice farming is seen as a symbol of affluence and traditional heritage. Kerala State is divided into 14 districts viz., Alappuzha, Ernakulam, Idukki, Kollam, Pathanamthitta, Thiruvananthapuram and Kottayam (constituting South Kerala) and Kannur, Kasargode, Kozhikode, Palakkad, Malappuram, Thrissur and Wayanad (constituting North Kerala), of these Alappuzha and Palakkad had the largest rice-growing area. This study looked at the cultivation of local and KAU-released rice varieties in the main rice-growing regions of South Kerala.

## 3.3 SAMPLING PROCEDURE

### 3.3.1 Selection of blocks for the study:

Of all the 7 districts comprising Southern part of Kerala, a list of 7 blocks were purposively selected from each district with the help of scientists from Krishi Vigyan Kendras (KVKs), Regional Agricultural Research Stations (RARS) and Agricultural officers from respective Krishi Bhavans, based on highest area under paddy cultivation.

**Table-I: Districts and Blocks Selected for the Study**

| Sl. No | Name of district | Total No. of blocks | Selected blocks |
|---|---|---|---|
| 1. | Alappuzha | 12 | Veliyanad |
| 2. | Ernakulam | 14 | Alangad |
| 3. | Idukki | 8 | Nedumkandam |
| 4. | Kollam | 11 | Sasthamcotta |


**Fig.1: Location of study**

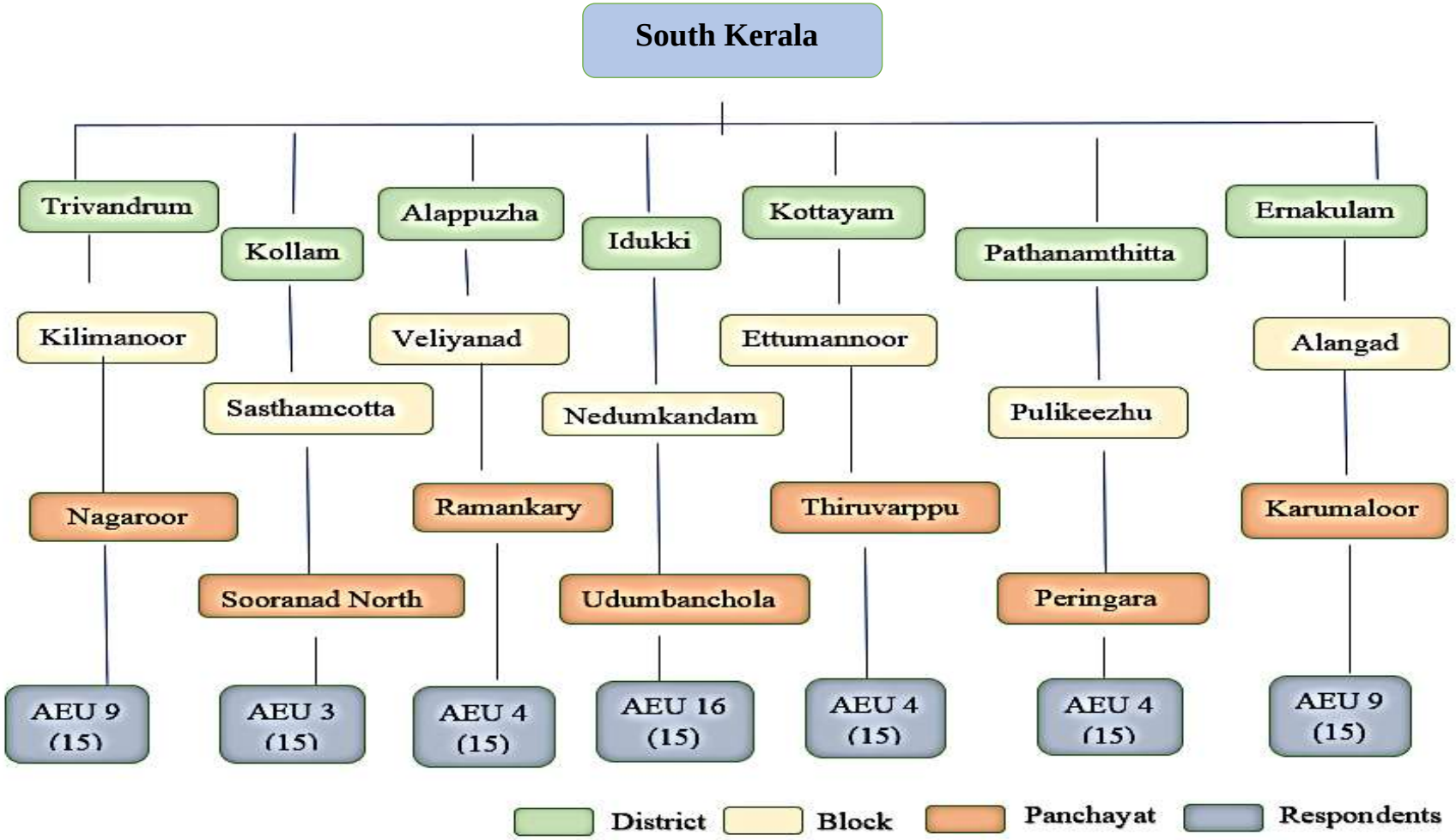



**Fig. 2: Particulars of Sampling**

| | | | |
|---|---|---|---|
| 5. | Kottayam | 11 | Ettumanoor |
| 6. | Pathanamthitta | 8 | Pulikeezhu |
| 7. | Thiruvananthapuram | 11 | Kilimanoor |

### 3.3.2 Selection of panchayats:

Subsequently, one panchayat with maximum rice farmers from each block were selected in consultation with the Principal Agricultural Office (PAO). The respective AEUs of these selected panchayat were identified and documented.

**Table-II: Names of selected panchayats and number of respondents from respective blocks**

| Sl. No | Name of blocks | Selected panchayats | No. of respondents |
|---|---|---|---|
| 1. | Veliyanad | Ramankary | 15 |
| 2. | Alangad | Karumalloor | 15 |
| 3. | Nedumkandam | Udumbanchola | 15 |
| 4. | Sasthamcotta | Sooranad North | 15 |
| 5. | Ettumannoor | Thiruvarppu | 15 |
| 6. | Pulikeezhu | Peringara | 15 |
| 7. | Kilimanoor | Nagaroor | 15 |

### 3.3.3 Selection of respondents:

Following the discussions with the corresponding Agricultural Officers, a list of rice farmers from designated panchayats were obtained. By adopting a simple random sample technique, fifteen rice farmers from each panchayat were chosen, totalling 105 respondents. The criteria for selecting the farmers were that they should have a minimum of 50 cents of rice field. In case sufficient farmers were not available from one panchayat, the next panchayat with maximum rice farmers were selected.

The selection procedure is shown Fig.1 and 2

## 3.4 SELECTION OF RECOMMENDED PRACTICES

Fifteen recommended practices from Package of Practices (KAU, 2016) in rice were selected after discussing with subject matter specialists. Of the 15 practices, 11 were production practices and 4 were plant protection practices.

## 3.5 OPERATIONALIZATION AND MEASUREMENT OF VARIABLES

The variables that were deemed to be relevant to the current study were discovered and selected after a thorough examination of the available literature and consultation with extension education specialists.

A list of 41 independent variables related to the profile characteristics of the farmer respondents for meeting the objectives of the study were selected. These variables were sent to 55 judges including extension scientists, faculty members of extension department in various colleges and research stations under KAU and PhD scholars.

They were instructed to evaluate the variables critically and rate their relevance on a five-point scale ranging from most relevant, more relevant, relevant, less relevant, and least relevant, with weightages of five, four, three, two, and one, respectively. Only 40 out of the 55 judges were responded.

These variables with the mean relevancy scores are presented in Appendix-II. The extent of adoption and yield gap were the main dependent variables and eleven independent variables were also finalised for the study namely, age, farming experience, area under rice cultivation, annual income, mass media exposure, extension participation, achievement motivation, risk orientation, credit orientation, innovativeness and knowledge level. Six additional variables namely, source of rice seed, labour utilisation, popularity & acceptance of KAU rice varieties, ownership status, storage facility and value addition of rice and rice-based products were also incorporated into the study.

The list of variables, their operationalization and procedure followed for the measurement of each of the variables have been enumerated here**;**

**Table-III: Variables and their empirical measurement**

| Sl. No. | Variables | Empirical Measurement |
|---|---|---|
| **A.** | **Dependent variables** | |
| 1. | Adoption | Scale suggested by Singh and Singh (1967) |
| 2. | Yield gap | Schedule prepared for the study |
| **B.** | **Independent Variables** | |
| 1. | Age | Chronological age of the respondent |
| 2. | Farming experience | Number of years of experience in farming at the time of investigation |
| 3. | Area under rice Cultivation | Schedule developed for the study |
| 4. | Annual income | Schedule developed for the study |
| 5. | Mass media exposure | Schedule developed for the study |
| 6. | Extension participation | Scale developed by Dhaliwal (1963) |
| 7. | Achievement motivation | Scale developed by Gopala (2010) |
| 8. | Risk orientation | Scale developed by Supe (1969) |
| 9. | Credit orientation | Scale developed by Beal and Sibley (1967) and used by Esakkimuthu (2012) |
| 10. | Innovativeness | Scale developed by Syam Kumar (1999) with suitable modifications |
| 11. | Knowledge level | Teacher made test |

### 3.5.1 Operationalization and measurement of dependent variables

#### *3.5.1.1. Extent of Adoption of selected KAU recommended practices for rice cultivation as perceived by farmers.*

The extent of adoption was defined as farmers using all the recommended cultivation practices in paddy agriculture as stated in the Kerala Agricultural University's package of practices.

The adoption quotient, which was established by Chattopadhyay (1963) and modified by Singh and Singh (1967), was used to determine the level of adoption. Accordingly, the adoption quotient for each respondent was calculated using the formula below.

$$AQ = \frac{\sum_{i=1}^{n} \frac{e_i}{p_i} \times 100}{N}$$

Where,

AQ = Adoption quotient

ei = Extent of adoption of each practice

pi = Potentiality of adoption of each practice

N = Total number of practices selected

For calculating the adoption quotient of various practices, different scoring procedures were used. For quantifiable data such as seed rate, quantity of fertilisers applied, spacing etc., the original numerical data was given as extent of adoption (ei), and the recommended practice was considered as the potentiality of adoption of that practice.

In terms of different stages of adoption, fifteen practises were measured. On a 15-point adoption scale, each farmer's level of adoption was determined. Non-adoption (0), awareness (1), interest (3), evaluation (6), trial (10) and adoption (15) were the weighted values corresponding to the response categories.

Practices that could not be quantified were scored dichotomously as 'Yes' or 'No,' with a maximum score of '1' for 'Yes' and a minimum score of '0' for 'No.'

After calculating the adoption quotient for various practices, the adopters were categorized and compared with the standard Rogers (1982) curve.

(i) Extent of adoption of scientific production practices by rice farmers and its relationship with the personal characteristics of the rice farmers.

Simple correlation was used to find the relation of selected independent variables with the adoption quotient of each farmer.

(ii) Extent of adoption of farmer practices by rice farmers

Farmer practices were defined as the agricultural methods or techniques followed by the farmers in a locality that has been passed down from generation to generation. This includes techniques developed by rice farmers based on their personal experience and interventions, rather than evaluating the scientific reason for the procedures.

The rice farmer respondents were asked about the farmer practices known to them and the practices which they follow. The major practices adopted were documented and expressed as percentage of farmer practices identified for rice crop.

***3.5.1.2. Yield Gap***

Yield gap is operationally defined as the difference between the maximum potential yield obtained at the research station and farmer's actual yield. It was hypothesized as caused by biophysical and socio-economic constraints. Biophysical constraints include the uncontrollable natural factors like rainfall, soil fertility, pests and diseases. Socioeconomic constraints include the social and economic conditions that prevent farmers from using the recommended social technology.

Accordingly, the following index was used to calculate the variable as given below.

$$\textbf{Yield gap (\%)} = \frac{\textbf{Potential yield} - \textbf{Actual yield}}{\textbf{Actual yield}} \times 100$$

**Potential yield**

The maximum attainable yield in the given environments as determined for eg: by simulation models with plausible physiological & agronomic conditions (Evans and Fischer, 1999)

**Actual yield**

It is actually the farm yield which reflects the current soil, climate conditions and farmer management levels (Sadras *et al*., 2015)

**Yield gap**

Yield gaps are estimated by the difference between potential yield and average farmers' yields over some specified spatial and temporal scale of interest (Lobell *et al*., 2009)

### 3.5.2 Operationalization and measurement of independent variables

#### *3.5.2.1. Age*

It is operationally defined as the total number of years completed by the respondent paddy farmers at the time of study and categorization of age was done based on Census report, 2011 classification method.

| Category | Age group (years) | Score |
|---|---|---|
| Young | $\leq Q_1$ (48 years) | 1 |
| Middle aged | $>Q_1$ to $\leq Q_3$ (48-65 years) | 2 |
| Old aged | $>Q_3$ (65 years) | 3 |

The respondents were classified into different categories based on age and expressed as frequency and percentage.

#### *3.5.2.2. Farming experience*

In the present study, farming experience is operationally defined as the total number of years since the respondent is involved in paddy cultivation.

| Category | Farming experience (in years) | Score |
|---|---|---|
| Low | $\leq Q_1$ (20 years) | 1 |
| Medium | $>Q_1$ to $\leq Q_3$ (20-40 years) | 2 |
| High | $>Q_3$ (40 years) | 3 |

The respondents were classified into different categories based on their farming experience and expressed as frequency and percentage.

### *3.5.2.3. Area under Rice Cultivation*

In the present study, area under rice cultivation is operationally defined as the extent of area utilised for paddy cultivation in acres. The respondents were classified into different categories and expressed as frequency and percentage.

| Category | Area under rice cultivation (acres) | Score |
|---|---|---|
| Small | $\leq Q_1$ (<1 acre) | 1 |
| Medium | $>Q_1$ to $\leq Q_3$ (1 to 5 acres) | 2 |
| Large | $>Q_3$ (>5 acres) | 3 |

### *3.5.2.4. Annual Income*

Annual income of the respondent family refers to the total annual earnings of the farmer from the on farm and off farm activities. This was measured in terms of lakhs of rupees per year as expressed by the respondent paddy farmers.

The respondents were classified into different categories and expressed as frequency and percentage.

| Category | Annual Income (in Rupees) | Score |
|---|---|---|
| Low | $\leq Q_1$ (<75,000) | 1 |
| Medium | $>Q_1$ to $\leq Q_3$ (75,000 to 2,25,000) | 2 |
| High | $>Q_3$ (>2,25,000) | 3 |

### *3.5.2.5. Mass Media Exposure*

It is operationally defined as the exposure to different mass media information sources by the respondent. A schedule was developed to measure the degree of mass media exposure of the respondents, the different items included, and scores assigned are given below.

| Sl. No | Items | Score | |
|---|---|---|---|
| 1. | Possession of TV/Radio | Yes<br>No | 1<br>0 |
| 2. | Subscriber to news paper | Yes | 1 |

| | | | |
|---|---|---|---|
| | | No | 0 |
| 3. | Subscriber to farm magazines | Yes<br>No | 1<br>0 |
| 4. | Others | Yes<br>No | 1<br>0 |
| 5. | Listening to radio | Regularly<br>Occasionally<br>Never | 2<br>1<br>0 |
| 6. | Viewing TV | Regularly<br>Occasionally<br>Never | 2<br>1<br>0 |
| 7. | Reading newspaper | Regularly<br>Occasionally<br>Never | 2<br>1<br>0 |
| 8. | Reading farm magazines | Regularly<br>Occasionally<br>Never | 2<br>1<br>0 |
| 9. | Others | Regularly<br>Occasionally<br>Never | 2<br>1<br>0 |

The respondents were classified into different categories-based on quartiles.

| Sl. No. | Category | Criterion |
|---|---|---|
| 1. | Low mass media exposure | $\leq Q_1$ |
| 2. | Medium mass media exposure | $>Q_1$ to $\leq Q_3$ |
| 3. | High mass media exposure | $>Q_3$ |

### *3.5.2.6. Extension Participation*

It is operationally defined as the extent of participation of farmers in different extension activities like field days, demonstrations, training programmes, meetings etc. The scale adopted for measuring extension participation of the respondents was developed by Dhaliwal (1963). The scoring pattern followed was as follows,

| Sl. No | Extension Activity | Regular (2) | Occasional (1) | Never (0) |
|---|---|---|---|---|
| 1. | Method demonstration | | | |
| 2. | Result demonstration | | | |
| 3. | Farm and home visit | | | |
| 4. | Training programmes | | | |
| 5. | Krishimela | | | |
| 6. | Field visit | | | |
| 7. | Field day | | | |
| 8. | Group meeting/ Group discussion | | | |
| 9. | Campaign | | | |
| 10. | Others | | | |

Thus, the maximum score that one could get was 20 and minimum being zero. Based on score obtained, the respondents were classified into three categories using quartiles as a measure of check.

| Category | Criteria |
|---|---|
| Low | $\leq Q_1$ |
| Medium | $>Q_1$ to $\leq Q_3$ |
| High | $>Q_3$ |

### *3.5.2.7. Achievement motivation*

It is operationally defined as the striving to do a good work with a standard of excellence which may be task related, self-related.

The scale adopted for measuring achievement motivation was developed by Gopala (2010). The scale consisted of seven statements to be rated on a five-point continuum viz., strongly agree, agree, undecided, disagree and strongly disagree with the score of 5, 4, 3, 2 and 1, respectively. The possible score varied from 7 to 35. High score indicated higher achievement motivation of the respondents. The statements are given below

| Sl. No | Statements | Response categories | | | | |
|---|---|---|---|---|---|---|
| | | SA | A | UD | DA | SDA |
| 1. | One should enjoy paddy cultivation as much as a play | | | | | |
| 2. | In paddy field, one should work like a servant at everything until he is satisfied with the results | | | | | |
| 3. | One should succeed in agriculture even if one has been neglectful to his family | | | | | |
| 4. | One should have determination and driving ambition to achieve certain things in life (even if these qualities make one unpopular) | | | | | |
| 5. | Agricultural work should come first even if one cannot take rest | | | | | |
| 6. | Even when one's interest is in danger, he should concentrate on his job and forget his obligations to others | | | | | |
| 7. | In agriculture, one should set difficult goals for oneself and try to accomplish them | | | | | |

Based on the score obtained, the respondents were grouped into three categories using quartiles as a measure of check.

| Category | Criteria |
|---|---|
| Low | $\leq Q_1$ |
| Medium | $>Q_1$ to $\leq Q_3$ |
| High | $>Q_3$ |

### *3.5.2.8. Risk orientation*

It is operationally defined as the degree to which the respondent paddy farmers were oriented towards risk and uncertainty and had the courage to face various problems

in farming.

The scale adopted for measuring risk orientation of the respondents was developed by Supe (1969). The scale contained six statements which were rated on a five-point continuum ranging from strongly agree, agree, undecided, disagree and strongly disagree with scores of 5, 4, 3,2,1 respectively. In the case of negative statements, the scoring procedure was reversed. The statements are given below

| Sl. No | Statements | Response categories | | | | |
|---|---|---|---|---|---|---|
| | | SA | A | UD | DA | SDA |
| 1. | A farmer should grow large number of crops to avoid greater risk in involved in growing one or two crops | | | | | |
| 2. | A farmer should take more chance in making a big profit than to be content with smaller and less risky profit | | | | | |
| 3. | A farmer who is willing to take greater risk than the average farmer usually does better financially | | | | | |
| 4. | It is good for a farmer to take risk when he knows his chance of risk is high | | | | | |
| 5. | Trying an innovative organic method involves risk but it is worth | | | | | |
| 6. | It is better for a farmer not to follow the KAU recommended practices of rice unless most others in the locality have used it with success (-) | | | | | |

| Statements | Response | | | | |
|---|---|---|---|---|---|
| | Strongly Agree | Agree | Undecided | Disagree | Strongly Disagree |
| Positive | 5 | 4 | 3 | 2 | 1 |
| Negative | 1 | 2 | 3 | 4 | 5 |

Based on the score obtained, the respondents were grouped into three categories using quartiles as a measure of check.

| Category | Criteria |
|---|---|
| Low | $\leq Q_1$ |
| Medium | $>Q_1$ to $\leq Q_3$ |
| High | $>Q_3$ |

### *3.5.2.9. Credit Orientation*

It is operationally defined as the favourable and positive attitude of the respondent paddy farmers towards obtaining credit from institutional sources.

The original scale developed by Beal and Sibley (1967) which was adopted by Esakkimuthu (2012) was used to measure credit orientation. The scale contained 5 statements. The first and last statements were measured in yes/ no response with scores two and one respectively. The second and third items were measured on a 4-point continuum as very difficult, difficult, easy and very easy, with scores 1,2,3 & 4

respectively. The 4th item was measured on a 4-point continuum of SA, A, DA & SDA with scores 4,3,2 &1 respectively. Summation of these scores on all these items was the credit orientation score of the respondents. The possible score varied from 0 to 16. The statements are given below

| **Sl. No** | **Statements** | **Response** | | | |
|---|---|---|---|---|---|
| 1. | Do you think farmer like you should borrow credit from bank for agricultural purpose? | Yes (2) | No (1) | | |
| 2. | In your opinion, how difficult it is to secure credit for agriculture purpose? | Very Difficult (1) | Difficult (2) | Easy (3) | Very Easy (4) |
| 3. | How a farmer is treated when he goes to secure credit from bank/ co-operative societies? | Very Badly (1) | Badly (2) | Fair (3) | Very Fair (4) |
| 4. | There is nothing wrong in taking credit from institutional sources for increasing production. | SA (4) | A (3) | DA (2) | SDA (1) |
| 5. | Have you taken credit previously? | Yes (2) | No (1) | | |

Based on the score obtained, the respondents were grouped into three categories using quartiles as a measure of check.

| **Category** | **Criteria** |
|---|---|
| Low | $\leq Q_1$ |
| Medium | $>Q_1$ to $\leq Q_3$ |
| High | $>Q_3$ |

***3.5.2.10. Innovativeness***

It is operationally defined as the degree of relative earliness with which a respondent used a new improved technology in a social system.

The scale adopted for measuring innovativeness in the present study was developed by Syam Kumar (1999) with suitable modifications. The scale contained 7 statements which were rated on a three-point scale viz., yes, undecided and no with scores 2, 1 and 0 respectively for positive statements and 0, 1 and 2 respectively for negative statements. The minimum and maximum scores were 0 and 16 respectively. The statements are given below

| Sl. No | Statements | Response categories | | |
|---|---|---|---|---|
| | | Yes (2) | Undecided (1) | No (0) |
| 1. | Do you want to learn new ways of farming? | | | |
| 2. | If the agricultural extension worker gives a talk on improved cultivation aspects, will you attend it? | | | |
| 3. | If the govt. helps you in establishing a farm elsewhere, will you accept the deal? | | | |
| 4. | Do you want a change in your life? | | | |
| 5. | A farmer should try to do farming the way his parents did (-) | | | |
| 6. | Do you want your sons to be farmers? (-) | | | |
| 7. | It is better to enjoy today and let tomorrow take care of itself (-) | | | |
| 8. | A man's future is in the hands of God (-) | | | |

Based on the score obtained, the rice farmers were grouped into three categories using quartiles as a measure of check.

| Category | Criteria |
|---|---|
| Low | $\leq Q_1$ |
| Medium | $>Q_1$ to $\leq Q_3$ |
| High | $>Q_3$ |

### *3.5.2.11. Knowledge level*

It is operationally defined as the level of understanding of different scientific production practices as stated in the recommended package of practices. It indicated that, the respondent farmer had enough in-depth understanding about the recommended practices. The "Teacher made test" was employed to measure the knowledge level of respondents.

Ten recommended practices were selected based on specialists' suggestion and review of literature. The questions were meticulously constructed using the Kerala Agricultural University's package of practices (2011). Each respondent was given a score of one for the practice that is known and zero score for the practice which the farmer does not know. The maximum score obtained by a respondent was 10 and minimum was zero. By adding the scores for each practice, each respondent's overall

knowledge score was calculated. The mean value of knowledge level of 105 respondent paddy farmers were calculated and the respondents were categorised into high, medium, and low groups based on knowledge level with quartiles as a measure of check.

### 3.5.3 Other variables purposively selected for the study

Since the objective of the study also includes the extent of popularity and acceptance of KAU rice varieties and production practices followed by paddy farmers a few other variables were considered other than the selected independent variables. They are described below;

#### *3.5.3.1. Source of Rice seed*

It is operationally defined as the agency to which the respondents were depending for purchasing seeds of the rice varieties they cultivate like government institutions, fellow farmers or self- produced.

| Agency / Source of rice seed | Yes (1) | No (0) |
|---|---|---|
| 1. Government institutions<br>a) KAU<br>b) KSSDA<br>c) NSC<br>d) State Seed Farms<br>e) Krishibhavan | | |
| 2. Fellow farmers | | |
| 3. Self- produced | | |
| 4. Others (specify) | | |

#### *3.5.3.2. Labour Utilisation*

It is operationally defined as the total number of labourers (including male and female) involved in rice cultivation in one season of rice production. According to this, the respondents were divided into three groups: family labour, hired labour, and family along with hired labour with a score of 3, 2 and 1 respectively.

| Category | No. of labourers | | Score |
|---|---|---|---|
| | Male | Female | |
| Family labour | | | 3 |
| Hired labour | | | 2 |
| Family + hired labour | | | 1 |

### *3.5.3.3. Popularity & Acceptance of KAU rice varieties*

Popularity and acceptance of KAU rice varieties of farmers were measured on a perceptive level. It defines whether the KAU released rice varieties are being liked, accepted, popular and cultivated by a large number of people in a particular area due to its special qualities.

**a) Popularity of KAU rice varieties**

| Sl. No | KAU rice varieties | Very popular (2) | Popular (1) | Unpopular (0) |
|---|---|---|---|---|
| 1. | Uma | | | |
| 2. | Jaya | | | |
| 3. | Jyothi | | | |
| 4. | Sreyas | | | |
| 5. | Manurathna | | | |
| 6. | Kanchana | | | |
| 7. | Aiswarya | | | |
| 8. | Others (specify) | | | |

**b) Acceptance of KAU rice varieties**

| Sl. No | KAU rice varieties | High acceptance (2) | Acceptance (1) | No Acceptance (0) |
|---|---|---|---|---|
| 1. | Uma | | | |
| 2. | Jaya | | | |
| 3. | Jyothi | | | |
| 4. | Sreyas | | | |
| 5. | Manupriya | | | |
| 6. | Kanchana | | | |
| 7. | Aiswarya | | | |
| 8. | Others (specify) | | | |

### *3.5.3.4. Ownership Status*

It means whether the property acquired by the respondents has been passed down from generations or the respondent have purchased/ acquired from their own income / resources. According to this, the respondents were categorized into 3 groups namely self- acquired property type, ancestral property type or both with a score of 3, 2 and 1 respectively.

| Property type | Yes | No | Score |
|---|---|---|---|
| 1. Self-acquired | | | 3 |
| 2. Ancestral | | | 2 |
| 3. Both | | | 1 |

### *3.5.3.5. Storage facility*

It is operationally defined as the availability of any food storage facility for storing large amounts of food either for short or long periods, or for the distribution in normal food channels.

| Category | Yes (1) | No (0) |
|---|---|---|
| Bag storage (Gunny bags) | | |
| Wooden bin (Pathayam) | | |
| Metallic & concrete silos | | |
| Granary room | | |
| Warehouses / Civil supplies/ PDS | | |
| Others | | |

### *3.5.3.6. Value Addition of Rice & Rice- Based Products*

It is operationally defined as the extent to which rice and its byproducts were subjected to a change, by means of packing, processing or upgrading the quality for higher monetary gains.

| Category | Yes (1) | No (0) |
|---|---|---|
| Rice powder | | |
| Rice bran oil | | |
| Rice flakes | | |
| Puffed rice | | |
| Rice starch | | |
| Liquid glucose from broken rice | | |
| Others | | |

## 3.5.4 Constraints experienced by the rice farmers

Constraints faced by paddy farmers were collected after extensive review of literature, discussion with experts, subject matter specialists and officials. The interview schedule comprised a list of 10 constraints and the enumerated list was open ended so that the

farmers could add more constraints faced by them. The respondents were asked to record their extent of severity perceived on each statement of constraints and these responses were recorded on a four-point continuum as ‘most important’, ‘important’, ‘less important’, and ‘least important’ which were scored ‘four’, ‘three’, ‘two’, and ‘one’ respectively.

### 3.5.5 Reasons for cultivating or not cultivating KAU released rice varieties

Various general reasons were identified after review of literature, discussion with the experts and non-sample respondents and a list was developed which was delivered to the respondent farmers for scoring. The reasons were ranked from 10 to 1 with the highest score for the most important reason. For each reason, mean of the score was found out and these reasons were ranked from highest to lowest based on the mean score. High mean score means it was the most important reason for cultivating / non-cultivating KAU released rice varieties.

## 3.6 DATA COLLECTION PROCEDURE

For collecting data from the farmer respondents, a well-structured interview schedule was devised (Appendix II). The data collection was done mainly through telephonic interview amid Covid-19 circumstances and some via face-to-face contact. The interview schedule developed was finalized after the review by subject matter specialists and it was then directly administered to the paddy farmers by the investigator. The survey instrument that was used to collect the data consisted of 25 questions which included open ended questions, multiple choice questions and questions that had rating scale. The respondents were interviewed in their local language. Adequate care was taken to make the schedule clear, complete, explicit, comprehensive and understandable. The copy of the schedule in both English and Malayalam version is given in Appendix II.

## 3.7 STATISTICAL TOOLS USED FOR DATA ANALYSIS

The collected data were scored, tabulated and analysed using various statistical methods as described below.

### 3.7.1 Frequency

To identify the number of farmers distributed into different groups a simple frequency distribution was used here.

### 3.7.2 Percentage Analysis

Percentage analysis were used to make the simple comparison of different groups.

### 3.7.3 Mean and Standard Deviation

The respondents were grouped into categories based on scoring pattern into low, medium and high groups for the variables based on the mean scores and standard deviation.

| **Category** | **Criteria** |
|---|---|
| Low | Less than (Mean- ½ SD) |
| Medium | Between (Mean ± ½ SD) |
| High | More than (Mean + ½ SD) |

### 3.7.4 Correlation Analysis

A simple correlation analysis was utilised to describe the relationship between the study's dependent and independent variables. The significance of the correlation coefficient was tested for 5 per cent and 1 per cent levels of significance.

### 3.7.5 Quartile Deviation

The spread of a distribution around a measure of its central tendency, most typically the mean or average, was determined using this method. The data set is divided into four groups, each with an equal number of values. The $25^{th}$, $50^{th}$, and $70^{th}$ percentiles, often known as the first, second and third quartiles, are used to divide quartiles.

Quartiles divides the data into quarters so that 25 per cent of the estimations are less than the lower quartiles, 50 per cent of the estimations are less than the mean, and

75 per cent of the estimations are less than the upper quartile. This was adapted to here to categorise respondents based on their socio-economic characteristics and was also used to divide the recommended practices into high, medium, and low based on knowledge and adoption by the respondent farmers.

### 3.7.6 Friedman Test

When the dependent variable being measured is ordinal, the non-parametric test called Friedman test is used, to examine the differences between groups. Each row (or block) is ranked collectively, and the values of these ranks are then considered by columns. This tool was adapted here to study the factors contributing to the yield gap in Paddy and its influence.

## 3.8 HYPOTHESIS OF THE STUDY

The major hypothesis sets for the study states that there is no significant difference between the factors affecting yield gap of rice varieties and there is no significant difference in the extent of adoption of selected KAU technologies in rice varieties. Also, there exists no significant contribution of the characteristics of the respondents (independent variables) in the extent of adoption of selected KAU technologies in rice among the farmers of South Kerala.

## 3.9 CONCEPTUAL FRAMEWORK FOR THE STUDY

A conceptual model has been built for the study, which diagrammatically denotes the main dimensions and proposed relationships among the variables, based on results drawn from the literature.

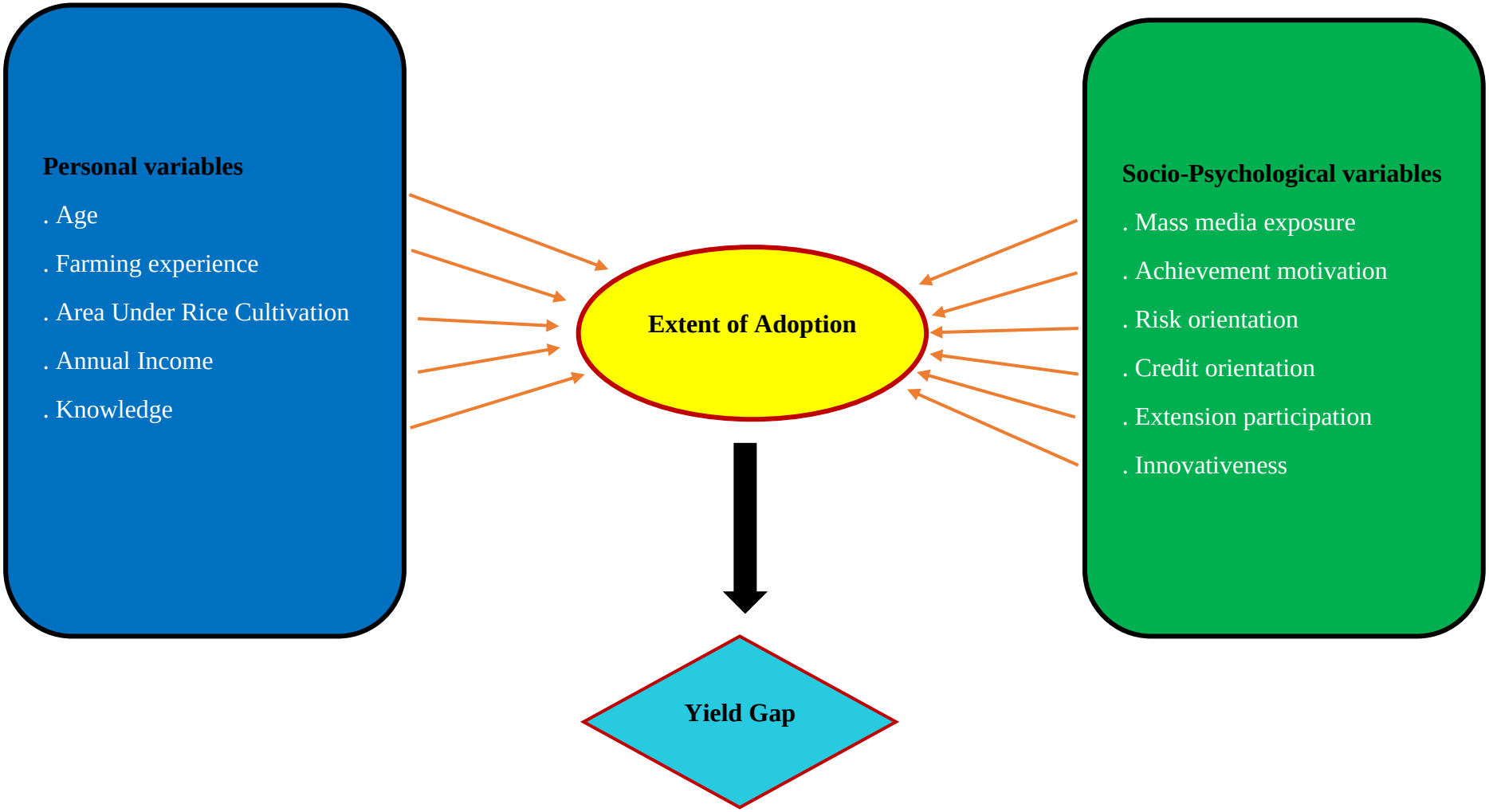



Plate I: Conceptual framework for the study

# *Results & Discussion*

# CHAPTER 4
# RESULTS AND DISCUSSION

The conclusions and discussion in this chapter are based on the examination of data gathered through survey research. The following sections contain the results and discussions.

4.1 Personal and social characteristics of respondent paddy growers

4.2 Additional variables selected for the study

4.3 Extent of adoption of KAU recommended practices by rice farmers

4.3.1 Distribution of respondents based on the extent of adoption of recommended practices by rice farmers

4.3.2 Adopter categorisation of rice farmer respondents based on level of adoption of recommended practices in rice

4.3.3 Adoption of the recommended practices by the respondent farmers in percentage

4.3.4 Adoption of recommended varieties by rice farmers

4.3.5 Relation between the extent of adoption of farmers' practices with the selected characteristics of the respondents.

4.4 Farmer practices by respondent rice farmers

4.5 Yield gap among rice varieties in the districts of South Kerala

4.6 Comparative analysis of yield gap of KAU rice varieties by respondent farmers in South Kerala

4.7 Assessment of the factors influencing yield gap of rice varieties

4.7.1 Friedman test for factors affecting yield gap in Uma rice variety

4.7.2 Friedman test for factors affecting yield gap in Jyothi rice variety

4.8 Constraints experienced by rice farmers in South Kerala

4.9 Reasons for cultivating and not cultivating KAU released rice varieties

4.9.1 Reasons for cultivating KAU released rice varieties

4.9.2 Reasons for not cultivating KAU released rice varieties

4.10 Suggestions for refinement as perceived by the farmers

## 4.1 DISTRIBUTION OF RESPONDENTS BASED ON THE PERSONAL AND SOCIAL CHARACTERISTICS OF RICE FARMERS

The distribution of rice farmer respondents is shown below, based on their personal and societal characteristics as determined by judges' rating.

### 4.1.1 Age

Age is the total number of years completed by the respondent paddy farmers at the time of study. The result on distribution of respondents based on their age is given in Table 4.

On analysis of Table 4 it was evident that 53.34 per cent of rice farmers surveyed belonged to middle age category, followed by young age (27.61%) and old aged farmers (19.05 %).

On examining the district wise distribution of respondents based on age, in, Thiruvananthapuram, Kollam, Alappuzha, Pathanamthitta, Kottayam, and Ernakulam districts there were about 46.66, 60, 73.34, 60, 60 and 40 per cent of respondents under middle aged category. In Idukki district the respondents mostly belonged to young age category with 53.33 per cent followed by 33.34 per cent respondents under middle age category.

Respondents at the old age category were comparatively low, mainly in three districts, with 0, 13.33, and 20 per cent in Kollam, Idukki, and Ernakulam respectively, while respondents in the old age category were quite high in Kottayam and Pathanamthitta districts, with 33.33 and 26.67 percent. However, the old and young age categories of respondent farmers were evenly distributed in Thiruvananthapuram and Alappuzha districts, with 26.67 and 13.33 percent respectively.

Hence it was concluded that majority of the rice farmers belonged to the middle age category and young age and only less than 20 per cent of respondents were old farmers.

The probable reason for large number of middle-aged farmers may be that, people in their forties and fifties are responsible for their families, work hard to increase revenue to feed their families, and improve family welfare. Furthermore, compared to older and younger paddy growers, middle-aged paddy growers are more enthusiastic, have greater physical vitality, and work more efficiently.

The findings of the study agree with those of Singh (2000), Sunil (2007), and Lakra (2011), who found that middle-aged farmers are more eager to work than elderly farmers.

### 4.1.2 Farming experience

Farming experience is the number of years since the respondent farmers are involved in paddy cultivation. The respondents were categorised into distinct groups based on farming experience and presented in Table 5.

From Table 5 it was inferred that 54.29 per cent of the farmers had an experience in between 20 to 40 years followed by 32.38 per cent of respondents with less than 20 years of farming experience and only 13.33 per cent of farmers had an experience greater than 40 years.

The district wise distribution also reflected the same as the total results with 73.33, 53.34, 60, 60, 53.33 and 46.67 per cent farmers of Kollam, Alappuzha, Pathanamthitta, Kottayam, Idukki and Ernakulam districts respectively having an experience in between 20 to 40 years in the field of agriculture while Thiruvananthapuram district had more farmers (53.34%) with farming experience less than 20 years and only 33.33 per cent farmers had an experience in between 20 to 40 years.

The table shows that the majority of the respondents had a medium level of farming experience, followed by those with low and high levels of rice farming experience. This could be because many of the respondents were in their forties and fifties; the younger

generation was uninterested in agriculture and rice growing. As a result, the majority of the respondents had a medium degree of farming experience.

This finding is in line with the results of Lakra (2011) and Kumar (2015).

### 4.1.3 Area under rice cultivation

Area under rice cultivation is defined as the extent of area utilised for paddy cultivation in acres. The respondents were classified into various categories based on area under rice cultivation and presented in Table 6.

It was deduced from the table that majority of the respondents cultivated rice in area between 1 to 5 acres (53.33 %). About 25.71 per cent of farmers cultivated rice in less than 1 acre land and 20.96 per cent farmers' utilized area more than 5 acres for rice farming.

District wise distribution also reflected similar trend where majority of respondents utilized an area between 1 to 5 acres. In Kollam, Alappuzha, Pathanamthitta, Kottayam and Ernakulam districts there were 93.33, 66.67, 53.33, 53.34 and 66.67 per cent of farmers who cultivated rice in an area between 1 to 5 acres while in Thiruvananthapuram and Idukki districts majority of farmers about 60 and 93.33 per cent had less than 1 acre land under rice cultivation.

As a result, it can be inferred that majority of paddy growers who responded had a medium area under paddy cultivation. This finding is in line with the results of Bhosale (2012).

### 4.1.4 Annual income

Annual income refers to the total annual earnings from, on farm and off farm activities of the farmer. This was expressed by the respondent paddy farmers in lakhs of rupees each year, which is shown in Table 7.

A cursory look at Table 7 revealed that 41.9 per cent of the rice farmers obtained an income between 75,000 to 2.25 lakhs followed by 33.33 per cent with an income

Table 4. Distribution of respondents based on age

| **Category (Years)** | **Trivandrum (n=15)** | | **Kollam (n=15)** | | **Alappuzha (n=15)** | | **Pathanamthitta (n=15)** | | **Kottayam (n=15)** | | **Idukki (n=15)** | | **Ernakulam (n=15)** | | **Total (N=105)** | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % |
| ≤ 48 | 4 | 26.67 | 6 | 40 | 2 | 13.33 | 2 | 13.33 | 1 | 6.67 | 8 | 53.33 | 6 | 40 | 29 | 27.61 |
| >48 to ≤ 65 | 7 | 46.66 | 9 | 60 | 11 | 73.34 | 9 | 60 | 9 | 60 | 5 | 33.34 | 6 | 40 | 56 | 53.34 |
| >65 | 4 | 26.67 | 0 | 0 | 2 | 13.33 | 4 | 26.67 | 5 | 33.33 | 2 | 13.33 | 3 | 20 | 20 | 19.05 |
| | | | | | | | | | | | | | | | Maximum -86 | |
| | | | | | | | | | | | | | | | Minimum -30 | |
| | | | | | | | | | | | | | | | Mean -56.171 | |
| | | | | | | | | | | | | | | | S.D -11.07 | |

Table 5. Distribution of respondents based on farming experience

| **Category (Years)** | **Trivandrum (n=15)** | | **Kollam (n=15)** | | **Alappuzha (n=15)** | | **Pathanamthitta (n=15)** | | **Kottayam (n=15)** | | **Idukki (n=15)** | | **Ernakulam (n=15)** | | **Total (N=105)** | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % |
| ≤ 20 | 8 | 53.34 | 4 | 26.67 | 5 | 33.33 | 4 | 26.67 | 2 | 13.33 | 6 | 40 | 5 | 33.33 | 34 | 32.38 |
| >20 to ≤ 40 | 5 | 33.33 | 11 | 73.33 | 8 | 53.34 | 9 | 60 | 9 | 60 | 8 | 53.33 | 7 | 46.67 | 57 | 54.29 |
| >40 | 2 | 13.33 | 0 | 0 | 2 | 13.33 | 2 | 13.33 | 4 | 26.67 | 1 | 6.67 | 3 | 20 | 14 | 13.33 |
| | | | | | | | | | | | | | | | Maximum-65 | |
| | | | | | | | | | | | | | | | Minimum-3 | |
| | | | | | | | | | | | | | | | Mean-28.133 | |
| | | | | | | | | | | | | | | | S.D-13.025 | |

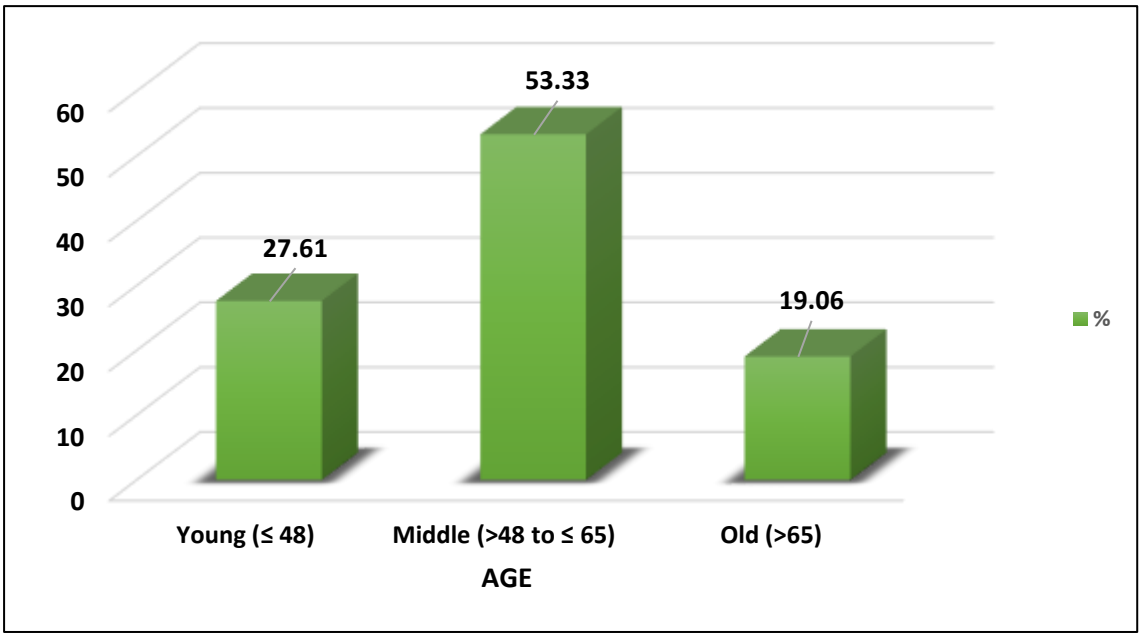



Fig. 3. Distribution of respondents based on age

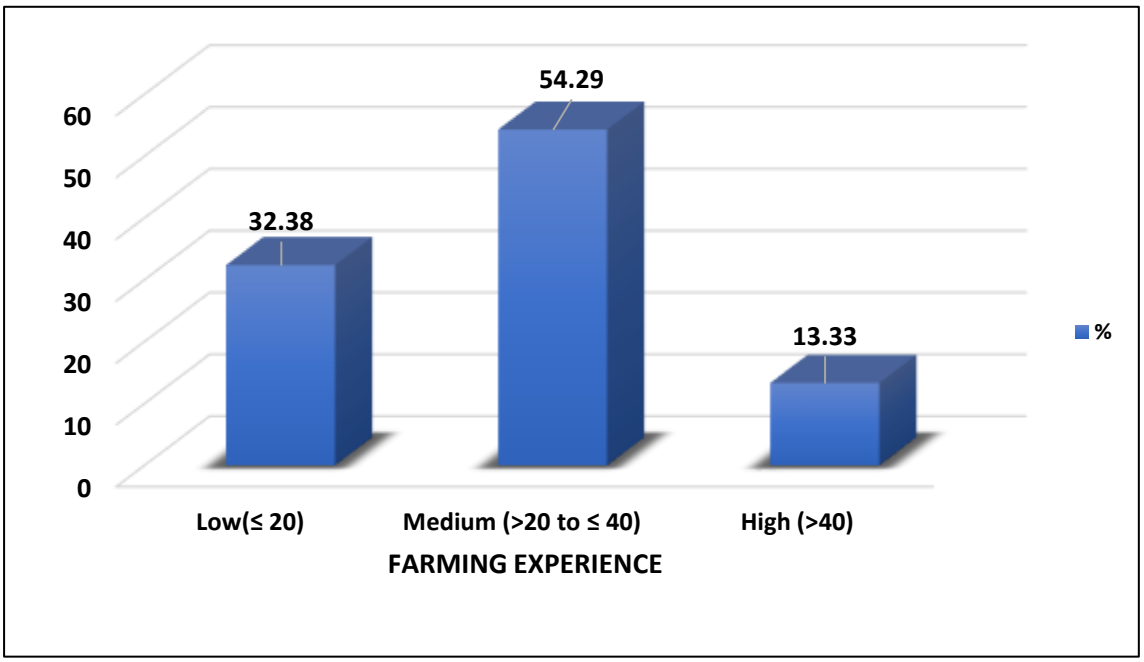



Fig. 4. Distribution of respondents based on farming experience

Table 6. Distribution of respondents based on area under rice cultivation (in acres)

| **Category (in acres)** | **Trivandrum (n=15)** | | **Kollam (n=15)** | | **Alappuzha (n=15)** | | **Pathanamthitta (n=15)** | | **Kottayam (n=15)** | | **Idukki (n=15)** | | **Ernakulam (n=15)** | | **Total (N=105)** | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % |
| ≤ 1 | 9 | 60 | 1 | 6.67 | 0 | 0 | 0 | 0 | 2 | 13.33 | 14 | 93.33 | 1 | 6.67 | 27 | 25.71 |
| >1 to ≤ 5 | 6 | 40 | 14 | 93.33 | 10 | 66.67 | 8 | 53.33 | 8 | 53.34 | 0 | 0 | 10 | 66.67 | 56 | 53.33 |
| >5 | 0 | 0 | 0 | 0 | 5 | 33.33 | 7 | 46.67 | 5 | 33.33 | 1 | 6.67 | 4 | 26.66 | 22 | 20.96 |
| | | | | | | | | | | | | | | | Maximum-30 | |
| | | | | | | | | | | | | | | | Minimum-0.5 | |
| | | | | | | | | | | | | | | | Mean-3.821 | |
| | | | | | | | | | | | | | | | S.D - 4.095 | |

Table 7. Distribution of the respondents based on annual income

| **Category (in rupees)** | **Trivandrum (n=15)** | | **Kollam (n=15)** | | **Alappuzha (n=15)** | | **Pathanamthitta (n=15)** | | **Kottayam (n=15)** | | **Idukki (n=15)** | | **Ernakulam (n=15)** | | **Total (N=105)** | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % |
| ≤ 75,000 | 12 | 80 | 3 | 20 | 1 | 6.67 | 2 | 13.33 | 11 | 73.33 | 1 | 6.67 | 5 | 33.33 | 35 | 33.33 |
| >75,000 to ≤2,25,000 | 3 | 20 | 11 | 73.33 | 0 | 0 | 9 | 60 | 3 | 20 | 12 | 80 | 6 | 40 | 44 | 41.9 |
| >2,25,000 | 0 | 0 | 1 | 6.67 | 14 | 93.33 | 4 | 26.67 | 1 | 6.67 | 2 | 13.33 | 4 | 26.67 | 26 | 24.77 |
| | | | | | | | | | | | | | | | Maximum-7,00,000 | |
| | | | | | | | | | | | | | | | Minimum -25,000 | |
| | | | | | | | | | | | | | | | Mean -166752.38 | |
| | | | | | | | | | | | | | | | S.D -136025.01 | |

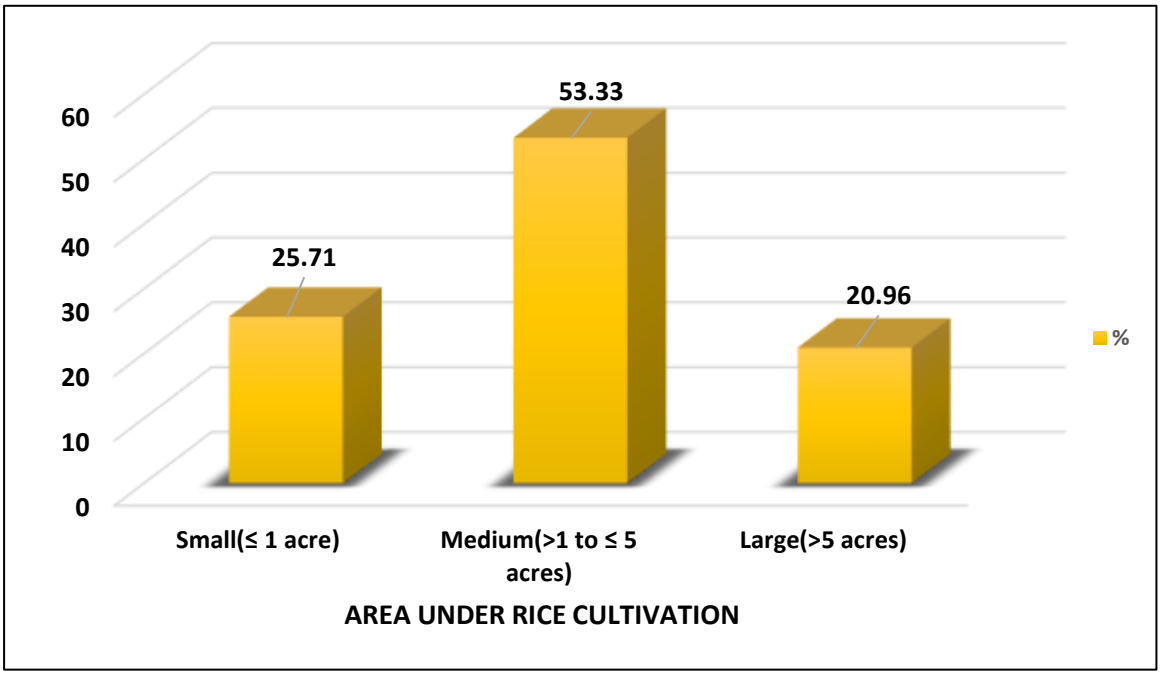



Fig. 5. Distribution of respondents based on area under rice cultivation

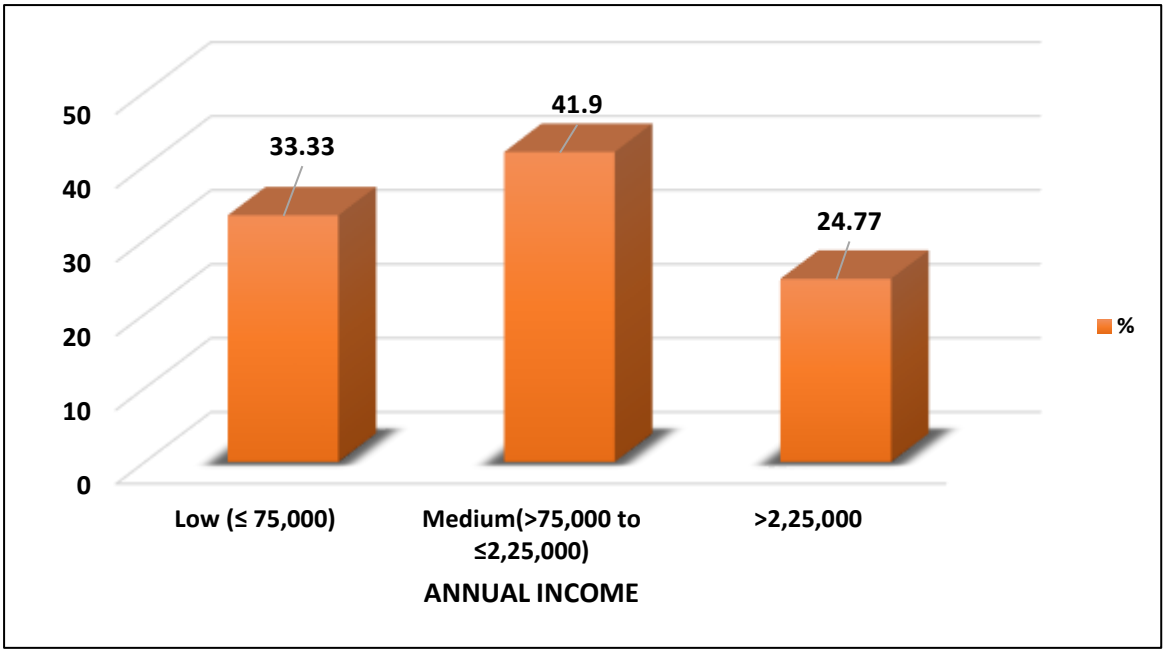



Fig. 6. Distribution of respondents based on annual income

less than 75,000 while only 24.77 per cent farmers obtained an income greater than 2.25 lakhs.

District wise distribution indicated that in Kollam, Pathanamthitta, Idukki and Ernakulam districts about 73.33, 60, 80 and 40 per cent of the farmers received an income between 75,000 to 2.25 lakhs while in Thiruvananthapuram and Kottayam districts about 80 and 73.33 per cent of farmers obtained an income less than 75,000 and in Alappuzha about 93.33 per cent of farmers were incurring an income of more than 2.25 lakhs.

The area under rice cultivation and practicing of subsidiary occupations by the respondents, could be the reasons for this varying income categories of paddy growers.

The findings are consistent with those of Lairenlakpam (2012) and Hattalli (2019).

### 4.1.5 Mass media exposure

Mass media exposure refers to the exposure to different mass media information sources by the respondent paddy farmers. The farmer respondents were categorised as high, medium, and low based on mass media exposure and presented in Table 8.

It was summarised from Table 8 that 60.95 per cent of the rice farmers had medium exposure to mass media followed by 36.19 per cent of farmers with low mass media exposure while only 2.86 per cent farmers had a high mass media exposure. Hence, the mass media exposure of the respondents ranged from medium to low.

District wise distribution also reflected the total result, where majority of the farmer respondents in Thiruvananthapuram, Kollam, Alappuzha, Pathanamthitta, Kottayam, Idukki and Ernakulam districts about 53.33, 66.67, 66.67, 53.33, 60, 66.67 and 60 per cent respectively had medium exposure to mass media and further identified that none of the farmers from Trivandrum, Kollam, Alappuzha, Pathanamthitta, Kottayam, and Idukki districts had a high mass media exposure except in Ernakulam where about 6.67 per cent of respondents had high exposure to mass media.

This trend might be due to the presence of a greater number of mass media channels in the area, such as television telecasting a number of agriculture-related programmes, All India Radio programmes, and easy availability of newspapers and farm magazines and also majority of the respondents had medium annual income, implying that every household had a television and a mobile phone. They were, on the other hand, paying less attention to print media because many of them were not subscribers to agricultural magazines and also due to a lack of time.

The findings are consistent with those of Kumawat (2010) and Verma (2015).

### 4.1.6 Extension participation

Farmers' involvement in various extension activities such as field days, demonstrations, training programmes, and meetings refers as extension participation. Based on their extension participation, the farmers were divided into three groups: high, medium, and low. and presented in Table 9.

It was revealed from Table 9 that 57.14 per cent of the rice farmers had low extent of participation in different extension activities like field days, demonstrations, training programmes, meetings etc., followed by 24.77 per cent of farmers with medium extension participation while only 18.09 per cent farmers had high extent of participation in different extension activities.

The district wise distribution also reflected similar results in Thiruvananthapuram, Kollam, Pathanamthitta, Kottayam, Idukki and Ernakulam districts about 73.33, 46.66, 53.33, 60, 100 and 40 per cent of the farmers had low extension participation except in Alappuzha district, 40.00 per cent of farmers fall into the category of high extension participation and only 26.67 per cent of respondents had low extension participation.

During Covid-19 pandemic period most of the extension activities were conducted on an online mode. This might have influenced the limited extension participation of farmers, due to the poor net connectivity and related issues. This finding is in line with the results of Karthik (2009) and Narayanbhai (2013).

Table 8. Distribution of respondents based on their mass media exposure

| **Category** | **Trivandrum (n=15)** | | **Kollam (n=15)** | | **Alappuzha (n=15)** | | **Pathanamthitta (n=15)** | | **Kottayam (n=15)** | | **Idukki (n=15)** | | **Ernakulam (n=15)** | | **Total (N=105)** | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % |
| Low (≤7) | 7 | 46.67 | 5 | 33.33 | 3 | 20 | 7 | 46.67 | 6 | 40 | 5 | 33.33 | 5 | 33.33 | 38 | 36.19 |
| Medium (>7 to ≤9) | 8 | 53.33 | 10 | 66.67 | 10 | 66.67 | 8 | 53.33 | 9 | 60 | 10 | 66.67 | 9 | 60 | 64 | 60.95 |
| High (>9) | 0 | 0 | 0 | 0 | 2 | 13.33 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 6.67 | 3 | 2.86 |
| | | | | | | | | | | | | | | | Maximum- 10 | |
| | | | | | | | | | | | | | | | Minimum- 5 | |
| | | | | | | | | | | | | | | | Mean- 7.914 | |
| | | | | | | | | | | | | | | | S.D- 1.029 | |

Table 9. Distribution of respondents based on their extension participation

| **Category** | **Trivandrum (n=15)** | | **Kollam (n=15)** | | **Alappuzha (n=15)** | | **Pathanamthitta (n=15)** | | **Kottayam (n=15)** | | **Idukki (n=15)** | | **Ernakulam (n=15)** | | **Total (N=105)** | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % |
| Low (≤7) | 11 | 73.33 | 7 | 46.66 | 4 | 26.67 | 8 | 53.33 | 9 | 60 | 15 | 100 | 6 | 40 | 60 | 57.14 |
| Medium (>7 to ≤8) | 2 | 13.34 | 4 | 26.67 | 5 | 33.33 | 6 | 40 | 4 | 26.67 | 0 | 0 | 5 | 33.33 | 26 | 24.77 |
| High (>8) | 2 | 13.33 | 4 | 26.67 | 6 | 40 | 1 | 6.67 | 2 | 13.33 | 0 | 0 | 4 | 26.67 | 19 | 18.09 |
| | | | | | | | | | | | | | | | Maximum- 10 | |
| | | | | | | | | | | | | | | | Minimum- 4 | |
| | | | | | | | | | | | | | | | Mean- 7.266 | |
| | | | | | | | | | | | | | | | S.D- 1.409 | |

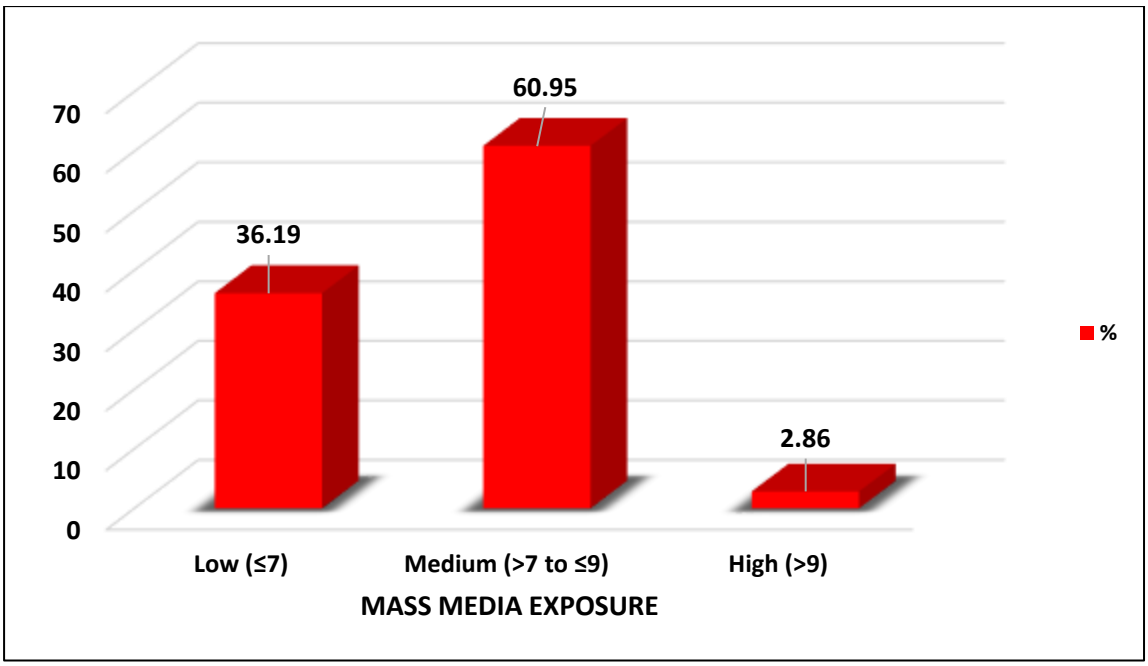



Fig. 7. Distribution of respondents based on mass media exposure

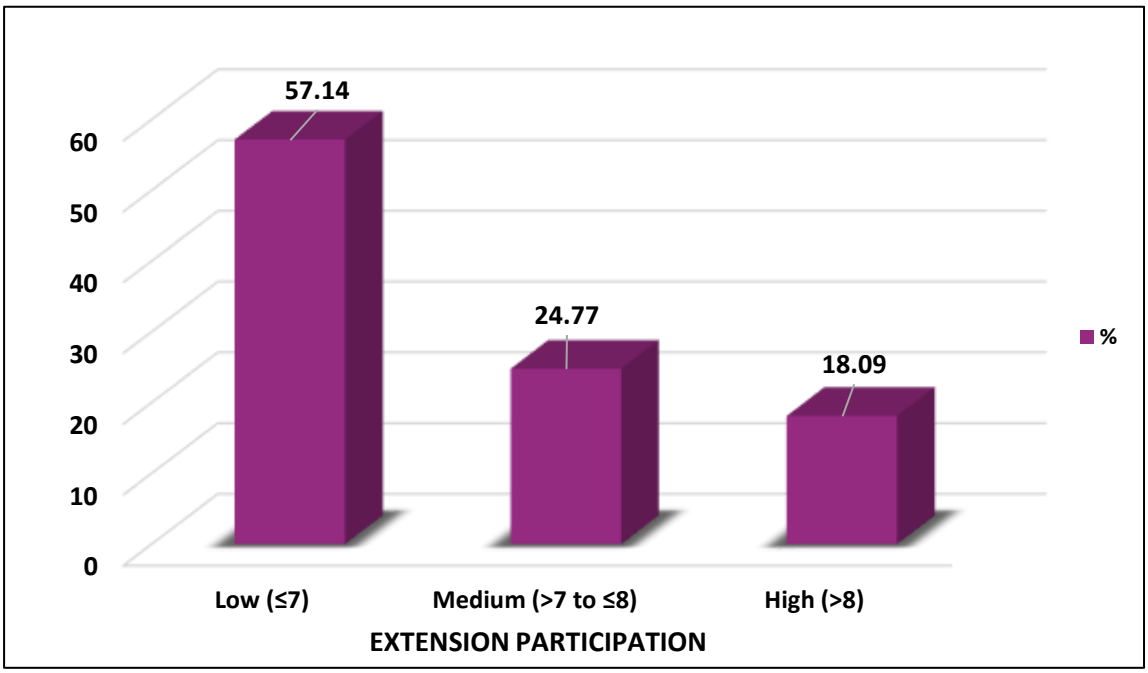



Fig. 8. Distribution of respondents based on extension participation

Table 10. Distribution of respondents based on their achievement motivation

| **Category** | **Trivandrum (n=15)** | | **Kollam (n=15)** | | **Alappuzha (n=15)** | | **Pathanamthitta (n=15)** | | **Kottayam (n=15)** | | **Idukki (n=15)** | | **Ernakulam (n=15)** | | **Total (N=105)** | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % |
| Low (≤21) | 8 | 53.33 | 2 | 13.33 | 1 | 6.67 | 7 | 46.67 | 7 | 46.67 | 4 | 26.66 | 9 | 60 | 38 | 36.19 |
| Medium (>21 to ≤23) | 6 | 40 | 10 | 66.67 | 10 | 66.66 | 7 | 46.66 | 8 | 53.33 | 7 | 46.67 | 4 | 26.67 | 52 | 49.52 |
| High (>23) | 1 | 6.67 | 3 | 20 | 4 | 26.67 | 1 | 6.67 | 0 | 0 | 4 | 26.67 | 2 | 13.33 | 15 | 14.29 |
| | | | | | | | | | | | | | | | Maximum- 25 | |
| | | | | | | | | | | | | | | | Minimum- 18 | |
| | | | | | | | | | | | | | | | Mean- 21.87 | |
| | | | | | | | | | | | | | | | S.D- 1.481 | |

Table 11. Distribution of respondents based on their risk orientation

| **Category** | **Trivandrum (n=15)** | | **Kollam (n=15)** | | **Alappuzha (n=15)** | | **Pathanamthitta (n=15)** | | **Kottayam (n=15)** | | **Idukki (n=15)** | | **Ernakulam (n=15)** | | **Total (N=105)** | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % |
| Low (≤22) | 12 | 80 | 5 | 33.33 | 7 | 46.67 | 9 | 60 | 7 | 46.67 | 0 | 0 | 8 | 53.33 | 48 | 45.71 |
| Medium (>22 to ≤24) | 2 | 13.34 | 8 | 53.34 | 7 | 46.66 | 6 | 40 | 8 | 53.33 | 11 | 73.33 | 7 | 46.67 | 49 | 46.67 |
| High (>24) | 1 | 6.66 | 2 | 13.33 | 1 | 6.67 | 0 | 0 | 0 | 0 | 4 | 26.66 | 0 | 0 | 8 | 7.62 |
| | | | | | | | | | | | | | | | Maximum- 26 | |
| | | | | | | | | | | | | | | | Minimum- 15 | |
| | | | | | | | | | | | | | | | Mean-22.428 | |
| | | | | | | | | | | | | | | | S.D- 1.828 | |

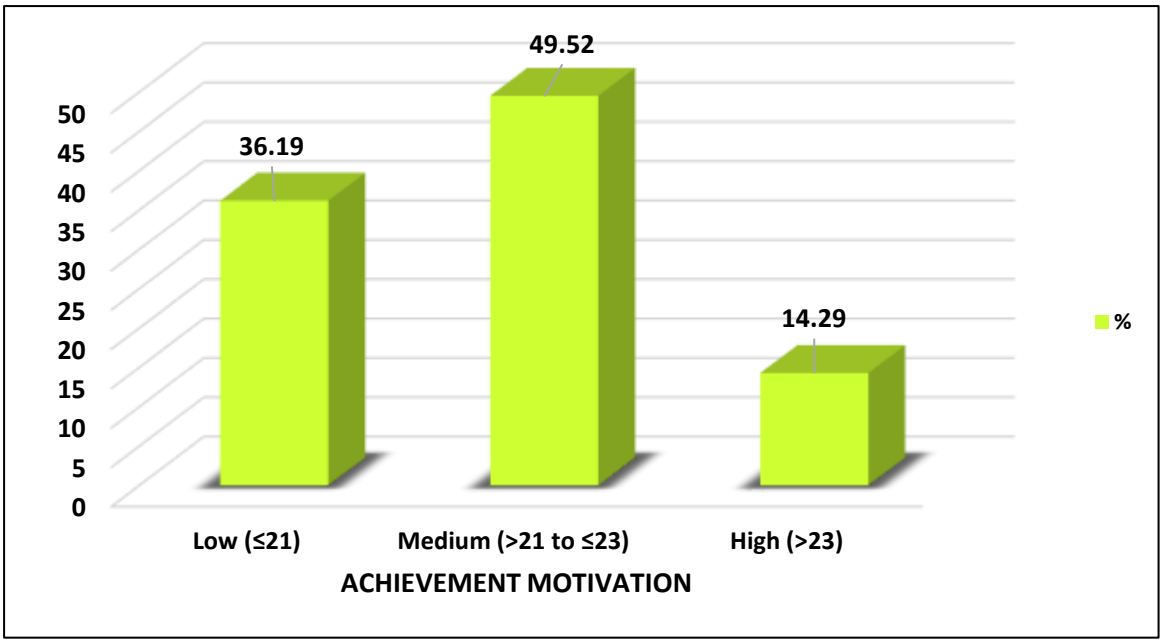



Fig. 9. Distribution of respondents based on achievement motivation

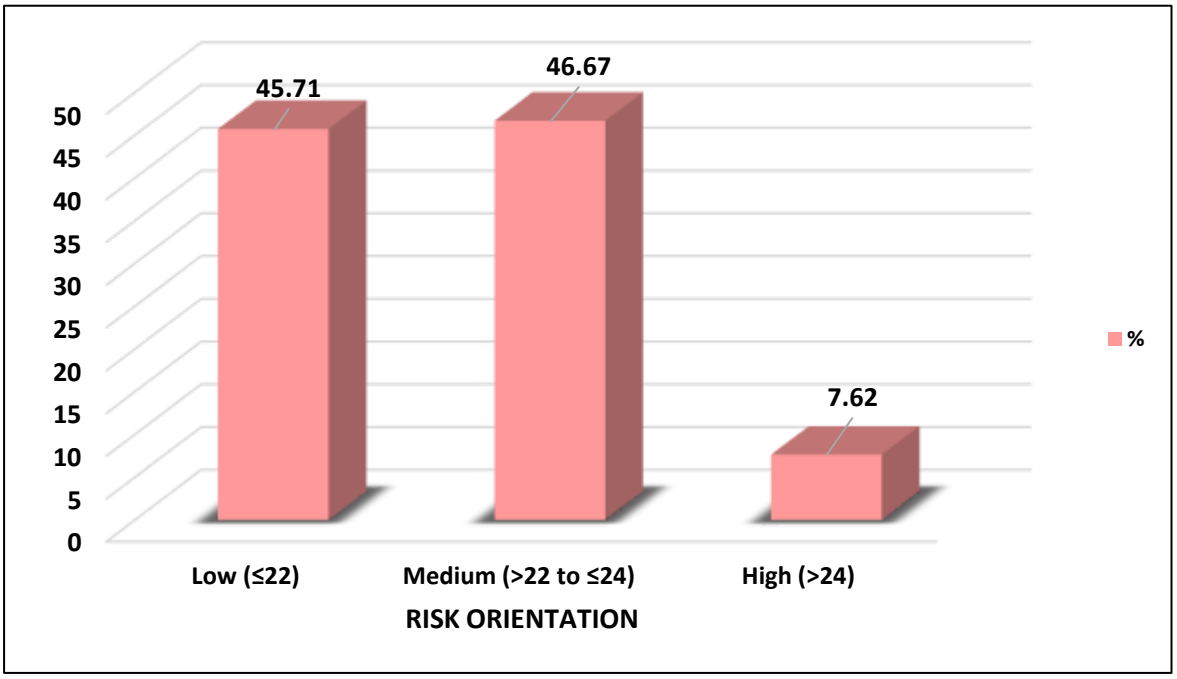



Fig. 10. Distribution of respondents based on risk orientation

### 4.1.7 Achievement motivation

Achievement motivation refers to the striving to do a good work with a standard of excellence which may be task related, self-related. The farmer respondents were grouped as high, medium, and low based on achievement motivation and presented in Table 10.

From the Table 10, it was inferred that 49.52 per cent of the respondent rice farmers had medium achievement motivation followed by 36.19 per cent of farmers with low achievement motivation while only 14.29 per cent farmers had high achievement motivation.

District wise distribution indicated that in Kollam, Alappuzha, Pathanamthitta, Kottayam and Idukki districts about 66.67, 66.66, 46.66, 53.33 and 46.67 per cent of the farmers had medium achievement motivation while in Thiruvananthapuram and Ernakulam districts 53.33 and 60 per cent of farmers fall into the category of low achievement motivation and only 40 and 26.67 per cent farmers belonged to medium category.

The reason for this may be due to the fact that achievement motivation is the foundation upon which all other motives, derives, and characteristics are built. It is a motivator that allows a person to set higher goals and work hard to achieve them.

These findings are consistent with the results of Nagesh (2005) and Veena (2017).

### 4.1.8 Risk orientation

The degree to which the respondent paddy farmers are oriented towards risk and uncertainty and had the bravery to tackle diverse farming challenges refers as risk orientation. Based on their risk orientation, the respondents were divided into three categories: high, medium, and low and presented in Table 11.

From the Table 11, it was inferred that 46.67 per cent of the rice farmers had medium risk orientation followed by 45.71 per cent of farmers with low-risk orientation while only 7.62 per cent farmers had high risk orientation.

District wise distribution indicated that in Kollam, Alappuzha, Kottayam, and Idukki districts about 53.34, 46.66, 53.33 and 73.33 per cent of the farmers had medium risk orientation while in Thiruvananthapuram, Pathanamthitta and Ernakulam districts 80, 60 and 53.33 per cent of farmers fall into the category of low-risk orientation and about 13.34, 40 and 46.67 per cent of farmers had medium risk orientation.

This could be due to the fact that majority of the farmers have medium area under rice cultivation and were unable to take additional risks. Extension agencies should take important initiatives to encourage more young aged people to participate in farming activities so that they can take more calculated risks and earn extra economic returns.

This finding is in line with the findings of Arathy (2011) and Kumar (2015).

### 4.1.9 Credit orientation

The degree to which the respondent rice farmers had a favourable and positive attitude about acquiring finance from institutional sources refers as credit orientation. Based on their credit orientation, the farmers were divided into three groups: high, medium, and low. and presented in Table 12.

From the Table 12, it was inferred that 46.67 per cent of the rice farmers had low credit orientation followed by 42.85 per cent of farmers with medium credit orientation while only 10.48 per cent farmers had high credit orientation.

According to the district-level data, about 40, 53.33, 66.67, 46.67, and 40 percent of farmers in Kollam, Alappuzha, Pathanamthitta, Kottayam, and Ernakulam districts had medium credit orientation, while 73.33 per cent of farmers in Thiruvananthapuram and Idukki districts had low credit orientation and only 26.67 per cent had medium credit orientation, respectively.

This credit orientation status could be due to a variety of factors, including the difficulty in obtaining credit from a bank for agricultural purposes due to the lengthy procedures followed there, and the farmers' lack of time to complete these procedures.

Table 12. Distribution of respondents based on their credit orientation

| **Category** | **Trivandrum (n=15)** | | **Kollam (n=15)** | | **Alappuzha (n=15)** | | **Pathanamthitta (n=15)** | | **Kottayam (n=15)** | | **Idukki (n=15)** | | **Ernakulam (n=15)** | | **Total (N=105)** | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % |
| Low (≤11) | 11 | 73.33 | 6 | 40 | 4 | 26.67 | 5 | 33.33 | 6 | 40 | 11 | 73.33 | 6 | 40 | 49 | 46.67 |
| Medium (>11 to ≤13) | 4 | 26.67 | 6 | 40 | 8 | 53.33 | 10 | 66.67 | 7 | 46.67 | 4 | 26.67 | 6 | 40 | 45 | 42.85 |
| High (>13) | 0 | 0 | 3 | 20 | 3 | 20 | 0 | 0 | 2 | 13.33 | 0 | 0 | 3 | 20 | 11 | 10.48 |
| | | | | | | | | | | | | | | | Maximum- 14 | |
| | | | | | | | | | | | | | | | Minimum- 8 | |
| | | | | | | | | | | | | | | | Mean- 11.6 | |
| | | | | | | | | | | | | | | | S.D- 1.6207 | |

Table 13. Distribution of respondents based on their innovativeness

| **Category** | **Trivandrum (n=15)** | | **Kollam (n=15)** | | **Alappuzha (n=15)** | | **Pathanamthitta (n=15)** | | **Kottayam (n=15)** | | **Idukki (n=15)** | | **Ernakulam (n=15)** | | **Total (N=105)** | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % |
| Low (≤10) | 9 | 60 | 2 | 13.33 | 6 | 40 | 4 | 26.66 | 3 | 20 | 4 | 26.67 | 2 | 13.33 | 30 | 28.57 |
| Medium (>10 to ≤14) | 6 | 40 | 13 | 86.67 | 6 | 40 | 7 | 46.67 | 11 | 73.33 | 9 | 60 | 12 | 80 | 64 | 60.96 |
| High (>14) | 0 | 0 | 0 | 0 | 3 | 20 | 4 | 26.67 | 1 | 6.67 | 2 | 13.33 | 1 | 6.67 | 11 | 10.48 |
| | | | | | | | | | | | | | | | Maximum-16 | |
| | | | | | | | | | | | | | | | Minimum-8 | |
| | | | | | | | | | | | | | | | Mean-12.19 | |
| | | | | | | | | | | | | | | | S.D- 2.08 | |

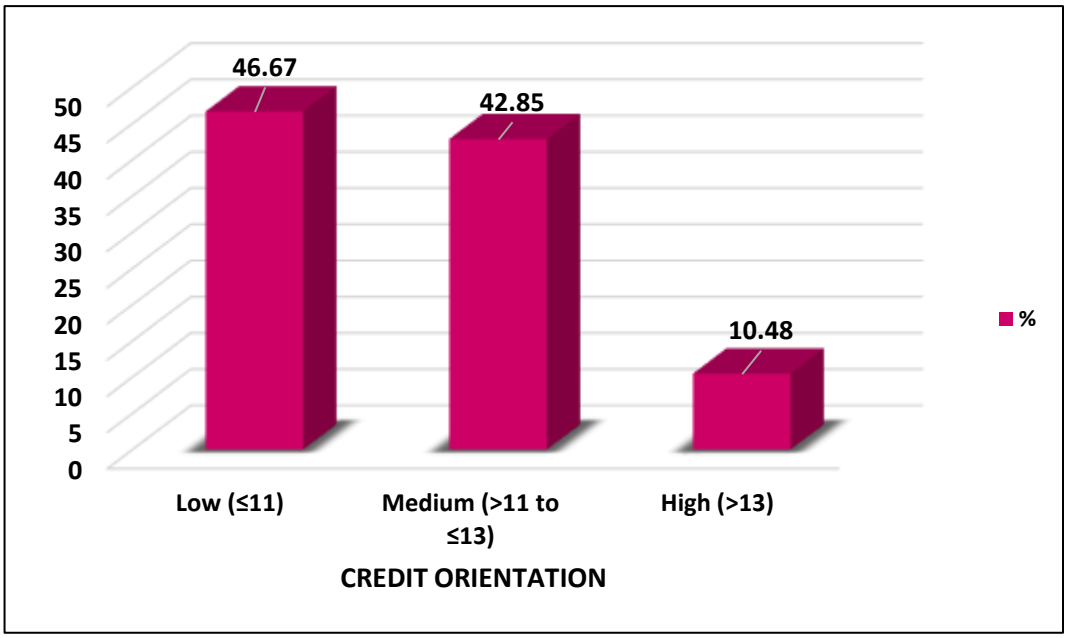



Fig. 11. Distribution of respondents based on credit orientation

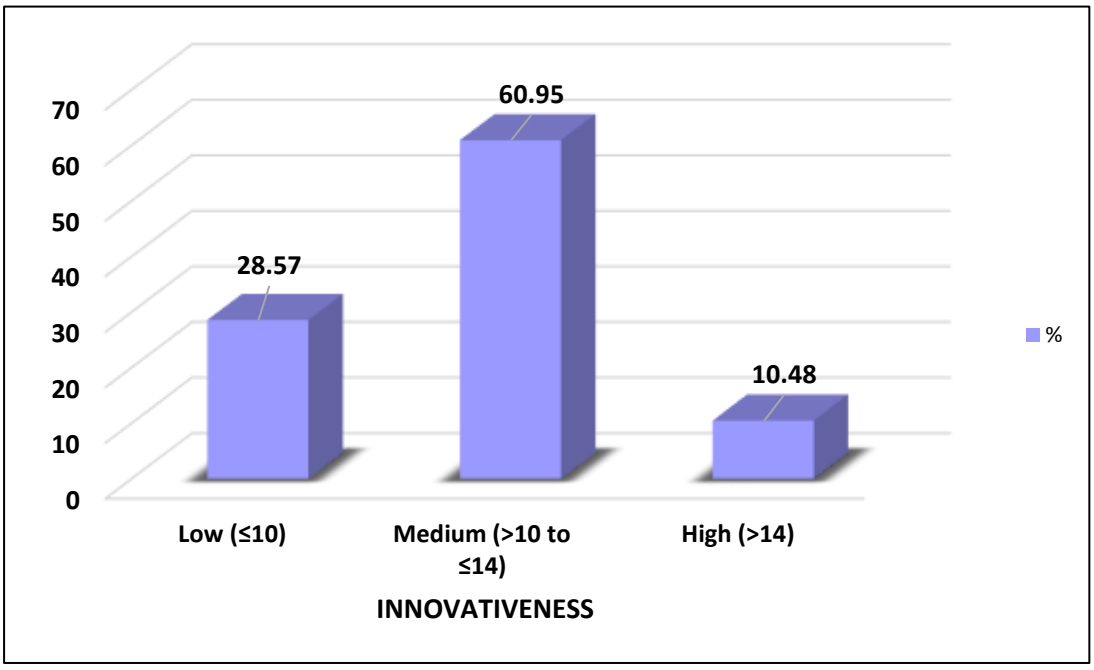



Fig. 12. Distribution of respondents based on innovativeness

Another reason for this low credit orientation status could be that bank employees are hesitant to lend to elderly individuals in a fear that they will not be able to repay the loan before they die.

This finding is in line with the findings of Jayapalan (1999).

### 4.1.10 Innovativeness

Innovativeness refers to the degree of relative earliness with which a respondent used a new improved technology in a social system. The farmer respondents were grouped as high, medium, and low based on innovativeness and presented in Table 13.

From the Table 13, it was inferred that 60.96 per cent of the rice farmers had medium innovativeness followed by 28.57 per cent of farmers with low innovativeness while only 10.48 per cent farmers had high innovativeness.

District wise distribution also reflected the total result, where in Kollam, Alappuzha, Pathanamthitta, Kottayam, Idukki, and Ernakulam districts about 86.67, 40, 46.67, 73.33, 60 and 80 per cent of the farmers had medium innovativeness while 60 per cent of farmers in Thiruvananthapuram district had low innovativeness and about 40 per cent of rice farmers had medium innovativeness.

The trend may be true in the sense that innovative paddy growers are more open to adopting new technology, whereas medium innovativeness, is due to the respondent paddy growers' moderate participation in extension activities and mass media programmes. Low innovativeness, on the other hand, could be attributable to the fact that the respondent paddy grower waits for other members of his social system to adopt the innovation and succeed, or that their economic situation has stopped them from adopting innovations.

This finding is in line with the findings of Naik (2006), Kumar (2015) and Parushni (2017).

### 4.1.11 Knowledge of selected recommended practices

Knowledge level refers to the level of understanding of different scientific production practices as stated in the recommended package of practices possessed by the respondent paddy farmers. The “Teacher made test” was employed to measure the knowledge level of respondents.

#### *4.1.11.1 Distribution of respondents based on their knowledge of selected practices*

The farmer respondents were grouped as high, medium, and low based on their knowledge of selected practices and presented in Table 14.

From the Table 14, it was inferred that 60 per cent of the rice farmers had medium knowledge level in different scientific production practices as stated in the recommended package of practices followed by 33.33 per cent of farmers with low knowledge level while only 6.67 per cent farmers had high knowledge level.

District wise distribution also reflected the total result, where in Thiruvananthapuram, Kollam, Alappuzha, Kottayam, Idukki and Ernakulam districts about 53.33, 66.67, 66.67, 73.34, 60 and 66.67 per cent of the farmers had medium knowledge level while in Pathanamthitta district, 60 percent of farmers had low knowledge levels and only 33.33 per cent had medium knowledge levels.

From the above observations, it was concluded that majority of the respondent rice farmers had a medium level of knowledge on scientific paddy production practices. This was most likely owing to the farmers' high level of literacy and education. Other characteristics which might have contributed included high achievement motivation, exposure to mass media, farming experience, and innovativeness. The low knowledge level of respondent farmers may be due to lack of exposure to new technology, low extension contacts or lack of involvement in training and demonstration programmes. The findings also highlight the importance of developing a knowledge development strategy about recommended paddy growing practices in order to enhance the number of farmers with a high degree of knowledge. The findings are in agreement with findings of Sarkar *et al* (2002) and Mahatab (2010).

Table 14. Distribution of respondents based on their knowledge of selected practices

| **Category** | **Trivandrum (n=15)** | | **Kollam (n=15)** | | **Alappuzha (n=15)** | | **Pathanamthitta (n=15)** | | **Kottayam (n=15)** | | **Idukki (n=15)** | | **Ernakulam (n=15)** | | **Total (N=105)** | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % |
| Low (≤7) | 7 | 46.67 | 5 | 33.33 | 3 | 20 | 9 | 60 | 2 | 13.33 | 5 | 33.33 | 4 | 26.66 | 35 | 33.33 |
| Medium (>7 to ≤9) | 8 | 53.33 | 10 | 66.67 | 10 | 66.67 | 5 | 33.33 | 11 | 73.34 | 9 | 60 | 10 | 66.67 | 63 | 60 |
| High (>9) | 0 | 0 | 0 | 0 | 2 | 13.33 | 1 | 6.67 | 2 | 13.33 | 1 | 6.67 | 1 | 6.67 | 7 | 6.67 |
| | | | | | | | | | | | | | | | Maximum- 10 | |
| | | | | | | | | | | | | | | | Minimum- 6 | |
| | | | | | | | | | | | | | | | Mean- 8 | |
| | | | | | | | | | | | | | | | S.D- 0.94 | |

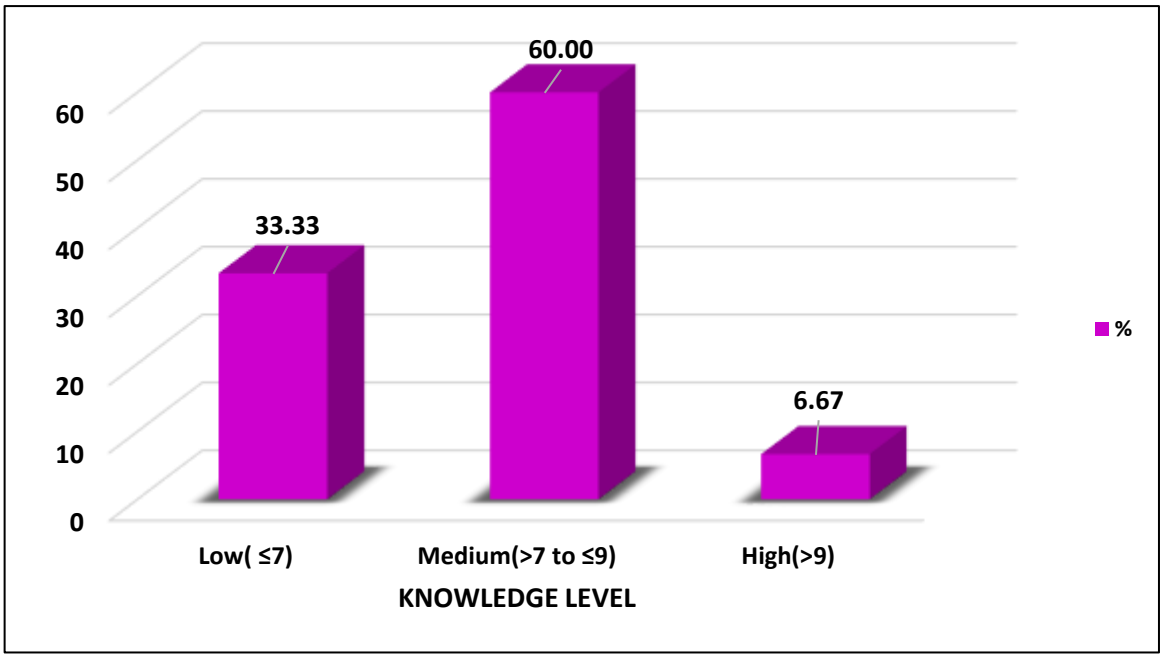



Fig. 13. Distribution of respondents based on knowledge of selected practices

### *4.1.11.2 Item wise knowledge of farmer respondents about the recommended practices in rice cultivation*

Item wise knowledge of farmer respondents about the recommended practices of rice was assessed and the results are presented in Table 15. A perusal of Table 15 revealed that about 97.14 per cent of the respondents had knowledge about time of harvesting of paddy i.e., harvesting is done when 80% of grains in a panicle is mature, 95.24 per cent of farmers know about recommended varieties in their area and 92.38 per cent of farmers know about recommended spacing for short duration i.e., 15cm x 10cm. The least known practices were usage of trichocards to control rice yellow stem borer and maintaining water level @ 1.5cm during transplanting which only 54.29 and 43.81 per cent of farmers respectively had knowledge about.

About 89.52 per cent farmers had knowledge about the seed rate during transplanting, regarding recommended dose of NPK for short duration 82.86 per cent of farmers had knowledge followed by usage of bioagents like *Pseudomonas* & *Trichoderma* for seed treatment (78.09%), practicing cultural methods of weed management (72.38%) and rice seedlings be transplanted from the nursery to main field after 20-25 days (70.48%).

The results imply that more extension activities should be focussed on popularisation and use of trichocards to control rice yellow stem borer and as well as water level to be maintained during transplanting.

Table 15. Item wise knowledge of respondents about the recommended practices in rice

| Sl. No. | Recommended Practices | Known | % | Not Known | % |
|---|---|---|---|---|---|
| 1 | Seed rate is 60-65 kg/ha during transplanting | 94 | 89.52 | 11 | 10.48 |
| 2 | Recommended spacing for short duration is 15cm x 10cm | 97 | 92.38 | 8 | 7.62 |
| 3 | Varieties: Uma, Jyothi, Kanchana, Manumithra and Hraswa | 100 | 95.24 | 5 | 4.76 |
| 4 | Recommended dose of NPK for short duration is 70:35:35 kg/ha | 87 | 82.86 | 18 | 17.14 |

| | | | | | |
|---|---|---|---|---|---|
| 5 | Usage of bioagents like *Pseudomonas & Trichoderma* for seed treatment | 82 | 78.09 | 23 | 21.91 |
| 6 | Practicing cultural methods of weed management | 76 | 72.38 | 29 | 27.62 |
| 7 | Harvesting is done when 80% of grains in a panicle is mature | 102 | 97.14 | 3 | 2.86 |
| 8 | Rice seedlings be transplanted from the nursery to main field after 20-25 days | 74 | 70.48 | 31 | 29.52 |
| 9 | Water level to be maintained @ 1.5cm during transplanting | 46 | 43.81 | 59 | 56.19 |
| 10 | Usage of trichocards to control rice yellow stem borer | 57 | 54.29 | 48 | 45.71 |

### 4.2 Additional variables selected for the study

The distribution of rice farmer respondents is shown below, based on some additional variables selected for the study.

#### 4.2.1 Source of rice seed

Source of rice seed refers as the agency to which the respondents were depending for purchasing seeds of the rice varieties they cultivate like government institutions, fellow farmers or self- produced. The respondents were categorized into 3 categories namely govt institutions (KAU, KSSDA, NSC, KB and State seed farms), fellow farmers and self-produced based on the source of rice seed and results are presented in Table 16.

From the Table 16, it was inferred that 59.05 per cent of the rice farmers depend on government institutions as their source of seed followed by 28.57 per cent of farmers depended on fellow farmers while about 12.38 per cent of farmers used their own self-produced seeds.

According to district-level data, about 60, 53.33, 53.33, 46.67, 80.00, 53.33 and 66.67 percent of respondents from Thiruvananthapuram, Kollam, Alappuzha, Pathanamthitta, Kottayam, Idukki, and Ernakulam districts rely on government institutions as their source of seed, while only 26.67, 33.34, 40.00, 33.33, 20.00, 26.67

Table 16. Distribution of respondents based on their source of rice seed

| **Category** | **Trivandrum (n=15)** | | **Kollam (n=15)** | | **Alappuzha (n=15)** | | **Pathanamthitta (n=15)** | | **Kottayam (n=15)** | | **Idukki (n=15)** | | **Ernakulam (n=15)** | | **Total (N=105)** | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % |
| Govt Institutions | 9 | 60 | 8 | 53.33 | 8 | 53.33 | 7 | 46.67 | 12 | 80 | 8 | 53.33 | 10 | 66.67 | 62 | 59.05 |
| Fellow farmers | 4 | 26.67 | 5 | 33.34 | 6 | 40 | 5 | 33.33 | 3 | 20 | 4 | 26.67 | 3 | 20 | 30 | 28.57 |
| Self-produced | 2 | 13.33 | 2 | 13.33 | 1 | 6.67 | 3 | 20 | 0 | 0 | 3 | 20 | 2 | 13.33 | 13 | 12.38 |
| | | | | | | | | | | | | | | | Maximum-3 | |
| | | | | | | | | | | | | | | | Minimum-1 | |
| | | | | | | | | | | | | | | | Mean- 2.066 | |
| | | | | | | | | | | | | | | | S.D- 0.823 | |

Table 17. Distribution of respondents based on labour utilised

| **Category** | **Trivandrum (n=15)** | | **Kollam (n=15)** | | **Alappuzha (n=15)** | | **Pathanamthitta (n=15)** | | **Kottayam (n=15)** | | **Idukki (n=15)** | | **Ernakulam (n=15)** | | **Total (N=105)** | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % |
| Family labour | 1 | 6.67 | 3 | 20 | 0 | 0 | 0 | 0 | 3 | 20 | 0 | 0 | 3 | 20 | 10 | 9.52 |
| Hired labour | 12 | 80 | 12 | 80 | 15 | 100 | 15 | 100 | 1 | 6.67 | 15 | 100 | 12 | 80 | 82 | 78.09 |
| Family + Hired labour | 2 | 13.33 | 0 | 0 | 0 | 0 | 0 | 0 | 11 | 73.33 | 0 | 0 | 0 | 0 | 13 | 12.39 |
| | | | | | | | | | | | | | | | Maximum-3 | |
| | | | | | | | | | | | | | | | Minimum-1 | |
| | | | | | | | | | | | | | | | Mean- 2.028 | |
| | | | | | | | | | | | | | | | S.D- 0.469 | |

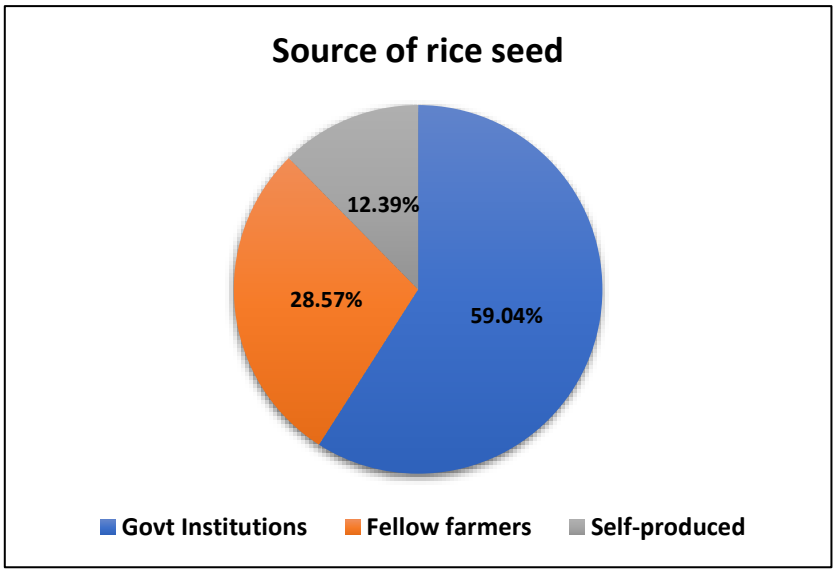



Fig. 14. Distribution of respondents based on source of rice seed


Fig. 15. Distribution of respondents based on labour utilisation

and 20.00 per cent of respondent farmers from these respective districts depend on fellow farmers for seed source.

From the above observations, it is clear that majority of the respondent farmers rely on government institutions such as KAU, KSSDA, NSC, Krishibhavan and State seed farms for seed sources due to lower prices and consistent seed availability, while only a small percentage of farmers used their own self-produced seeds due to lack of time in producing seeds and less potential of the produced seeds when compared to those purchased from institutions.

### 4.2.2 Labour utilisation

Labour utilisation refers as the total number of labourers (including male and female) involved in rice cultivation in a season of rice production. According to this, the respondents were divided into three groups: family labour, hired labour, and family along with hired labour and results are presented in Table 17.

From the Table 17, it was inferred that hired labour was utilised by 78.09 percent of rice farmers, followed by 12.39 per cent of farmers who used both hired and family labour and only 9.52 percent of rice farmers used their own family members to work in the field.

According to district-level data, about 80, 80, 100, 100, 100 and 80 per cent of farmers from Thiruvananthapuram, Kollam, Alappuzha, Pathanamthitta, Idukki and Ernakulam districts respectively, utilised hired labour except in Kottayam district, where 73.33 per cent of farmers used both hired and family labour, while only 6.67 per cent used hired labour.

From the above observations, it is clear that majority of the respondents used hired labour rather than involving their family members in farming. This was primarily due to extensive rice cultivation, choice of not involving family members in farming, a lack of time to engage in farming activities and preference for white collar jobs over field work.

### 4.2.3 Popularity and acceptance of KAU rice varieties as perceived by the respondent farmers

Popularity and acceptance of KAU rice varieties refers to, whether the KAU released rice varieties are being liked, accepted, popular and cultivated by people in a particular area due to its special qualities. This variable was measured on a perceptive level. The farmer respondents were grouped as high, medium, and low based on popularity and acceptance of KAU rice varieties and presented in Table 18 & 19.

By analysing the results, regarding the popularity of KAU varieties about 40.96 per cent of the rice farmers opined that they had low popularity regarding KAU rice varieties followed by 37.14 per cent of farmers had medium popularity and around 21.90 per cent of farmers had high popularity regarding KAU rice varieties.

According to district-level data, about 53.33, 100, 60 and 73.33 per cent of farmers from Thiruvananthapuram, Alappuzha,

Pathanamthitta and Kottayam districts had low popularity of KAU rice varieties except in Ernakulam and Kollam districts where 60 and 66.67 per cent of farmers fall in the category of high popularity regarding KAU rice varieties while in Idukki district about 86.67 per cent of farmers had medium popularity regarding KAU rice varieties.

By analysing the results, about 48.57 per cent of the rice farmers had low acceptance of KAU rice varieties followed by 39.05 per cent of farmers had medium acceptance and around 12.38 per cent of farmers had high acceptance regarding KAU rice varieties.

According to district-level data, about 46.67, 53.33, 100 and 73.33 per cent of farmers from Thiruvananthapuram, Alappuzha, Kottayam and Idukki districts had low acceptance of KAU rice varieties except in Kollam, Pathanamthitta and Ernakulam districts where 80.00, 46.67 and 40.00 per cent of farmers fall in the category of medium acceptance regarding KAU rice varieties and 20.00, 33.33 and 33.33 per cent of farmers from Thiruvananthapuram, Pathanamthitta and Ernakulam districts had high acceptance regarding KAU rice varieties.

Table 18. Distribution of respondents based on popularity of KAU rice varieties as perceived by the farmers

| **Category** | **Trivandrum (n=15)** | | **Kollam (n=15)** | | **Alappuzha (n=15)** | | **Pathanamthitta (n=15)** | | **Kottayam (n=15)** | | **Idukki (n=15)** | | **Ernakulam (n=15)** | | **Total (N=105)** | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % |
| Low (≤5) | 8 | 53.33 | 0 | 0 | 15 | 100 | 9 | 60 | 11 | 73.33 | 0 | 0 | 0 | 0 | 43 | 40.96 |
| Medium (>5 to ≤6) | 5 | 33.34 | 5 | 33.33 | 0 | 0 | 6 | 40 | 4 | 26.67 | 13 | 86.67 | 6 | 40 | 39 | 37.14 |
| High (>6) | 2 | 13.33 | 10 | 66.67 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 13.33 | 9 | 60 | 23 | 21.90 |
| | | | | | | | | | | | | | | | Maximum-9 | |
| | | | | | | | | | | | | | | | Minimum- 4 | |
| | | | | | | | | | | | | | | | Mean- 5.885 | |
| | | | | | | | | | | | | | | | S.D- 1.076 | |

Table 19. Distribution of respondents based on acceptance of KAU rice varieties as perceived by the farmers

| **Category** | **Trivandrum (n=15)** | | **Kollam (n=15)** | | **Alappuzha (n=15)** | | **Pathanamthitta (n=15)** | | **Kottayam (n=15)** | | **Idukki (n=15)** | | **Ernakulam (n=15)** | | **Total (N=105)** | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % |
| Low (≤6) | 7 | 46.67 | 3 | 20 | 8 | 53.33 | 3 | 20 | 15 | 100 | 11 | 73.33 | 4 | 26.67 | 51 | 48.57 |
| Medium (>6 to ≤8) | 5 | 33.33 | 12 | 80 | 7 | 46.67 | 7 | 46.67 | 0 | 0 | 4 | 26.67 | 6 | 40 | 41 | 39.05 |
| High (>8) | 3 | 20 | 0 | 0 | 0 | 0 | 5 | 33.33 | 0 | 0 | 0 | 0 | 5 | 33.33 | 13 | 12.38 |
| | | | | | | | | | | | | | | | Maximum-11 | |
| | | | | | | | | | | | | | | | Minimum- 5 | |
| | | | | | | | | | | | | | | | Mean- 6.809 | |
| | | | | | | | | | | | | | | | S.D- 1.532 | |

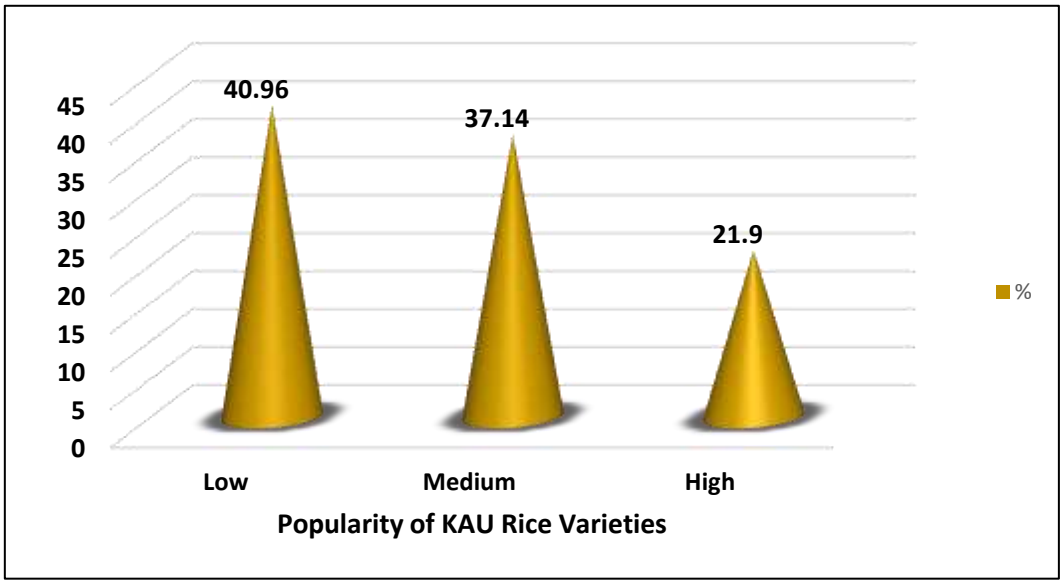



Fig. 16. Distribution of respondents based on popularity of KAU rice varieties

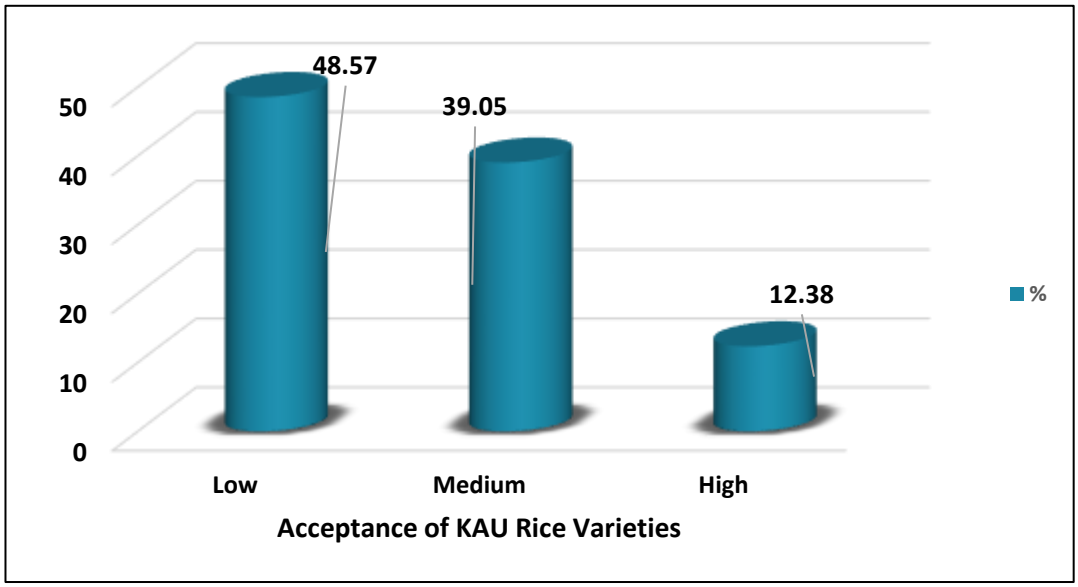



Fig. 17. Distribution of respondents based on acceptance of KAU rice varieties

Table 20. Distribution of respondents based on ownership status

| **Category** | **Trivandrum (n=15)** | | **Kollam (n=15)** | | **Alappuzha (n=15)** | | **Pathanamthitta (n=15)** | | **Kottayam (n=15)** | | **Idukki (n=15)** | | **Ernakulam (n=15)** | | **Total (N=105)** | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % |
| Self-acquired | 0 | 0 | 0 | 0 | 2 | 13.33 | 1 | 6.67 | 0 | 0 | 1 | 6.67 | 0 | 0 | 4 | 3.81 |
| Ancestral | 9 | 60 | 11 | 73.33 | 13 | 86.67 | 10 | 66.66 | 11 | 73.33 | 10 | 66.66 | 11 | 73.33 | 75 | 71.42 |
| Both | 6 | 40 | 4 | 26.67 | 0 | 0 | 4 | 26.67 | 4 | 26.67 | 4 | 26.67 | 4 | 26.67 | 26 | 24.77 |
| | | | | | | | | | | | | | | | Maximum-3 | |
| | | | | | | | | | | | | | | | Minimum-1 | |
| | | | | | | | | | | | | | | | Mean- 2.209 | |
| | | | | | | | | | | | | | | | S.D- 0.494 | |

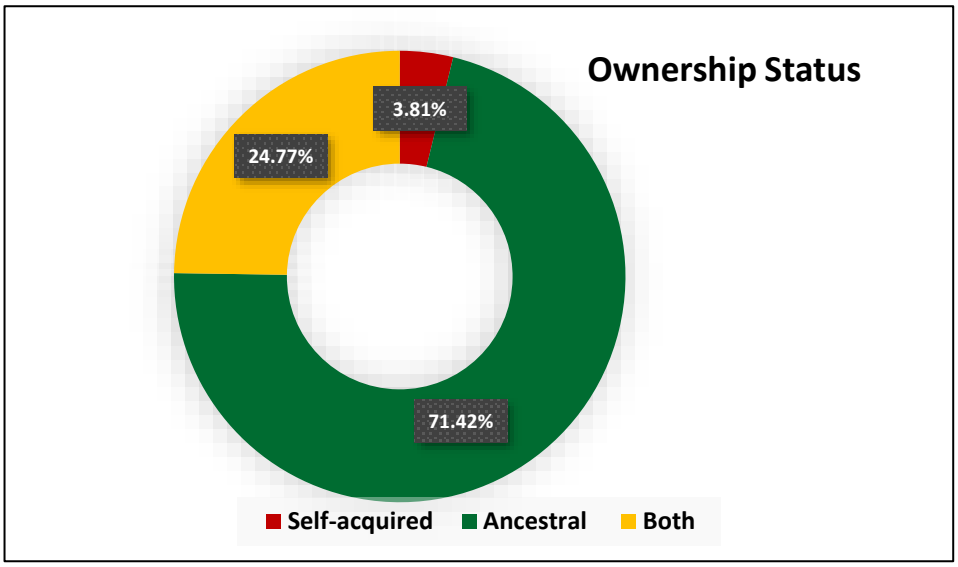



Fig. 18. Distribution of respondents based on ownership status

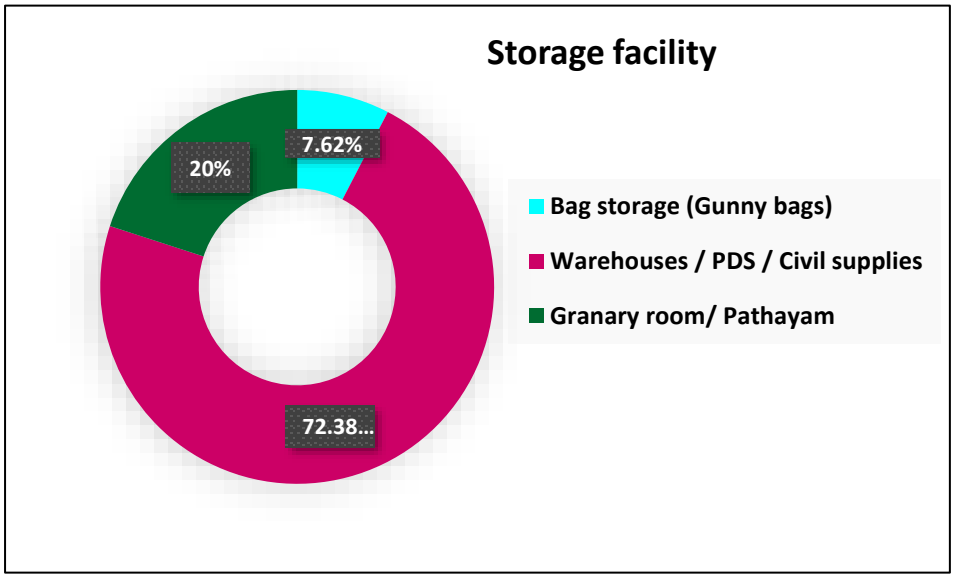



Fig. 19. Distribution of respondents based on storage facility

From the above observations, it is clear that majority of the respondent farmers had low popularity and acceptance of KAU rice varieties. Farmers are always looking for yield and pest resistance, although some varieties, particularly Uma, are providing them with relatively excellent returns and disease resistance. That is why farmers prefer this variety over other seeds. The most popular and acceptable rice variety in Kerala is Uma, which is grown in nearly 60% of paddy fields across the state but lately a shift has started, with some fields cultivating new varieties developed by KAU since the resistance of Uma varieties has declined.

### 4.2.4 Ownership status

Ownership status refers to, whether the property acquired by the respondents had been passed down from generations or the respondent had purchased/ acquired from their own income / resources. According to this, the respondents were categorized into 3 groups namely self- acquired property type, ancestral property type or cultivating both on their self-acquired and ancestral property and the results are presented in Table 20.

By analysing the results about 71.42 per cent of rice farmers cultivate on ancestral land, followed by 24.77 per cent who cultivate on both their own property and ancestral land, and just 3.81 per cent of rice farmers cultivate on self-acquired land.

According to district-level data, about 60, 73.33, 86.67, 66.66, 73.33, 66.66 and 73.33 per cent of respondents from Thiruvananthapuram, Kollam, Alappuzha, Pathanamthitta, Kottayam, Idukki, and Ernakulam districts were cultivating rice on their ancestral property and no farmers from Thiruvananthapuram, Kollam, Kottayam and Ernakulam districts cultivate on self-acquired land except farmers from Alappuzha (13.33%), Pathanamthitta (6.67%) and Idukki districts (6.67%).

From the above observations, it is clear that majority of the respondents cultivate on ancestrally acquired land, implying that they are farmers who have been into farming since their forefathers and have a lot of experience. The farmers who produce on both self-acquired and ancestral land include leased land as well. The inherited land must be divided among siblings in subsequent generations.

### 4.2.5 Storage facility

Storage facility refers to the availability of any food storage facility for storing large amounts of food either for short or long periods, or for the distribution in normal food channels. According to this, the respondents were categorized into 3 groups namely storage using bags especially gunny bags, storing in warehouses/ sell directly through PDS/ Civil supplies and storage in granaries and the results are presented in Table 21.

By analysing the results about 72.39 per cent of the rice farmers supply the grains directly through civil supplies/ PDS immediately after harvesting followed by 20.00 per centage of farmers store grains in *Pathayam* and granaries while the remaining 7.61 per cent of farmers used gunny bag storage system.

According to district-level data, about 80, 100, 86.67, 73.33, 66.67 and 100 per cent farmer respondents from Thiruvananthapuram, Kollam, Alappuzha, Pathanamthitta, Kottayam and Ernakulam districts supply the grains directly through civil supplies/ PDS/ warehouses immediately after harvesting, except for Idukki district, where 66.67 per cent of farmers store their grains in *Pathayam*/granaries and no farmers supply the grains directly through civil supplies/ PDS/ warehouses.

From the above observations, it is clear that majority of the respondents prefer to sell their cultivated rice directly to the Supplyco, with the exception of farmers in Idukki district, who only produce paddy for home use because many of the farmers in this district are spice and beverage crop cultivators, so most of the rice farmers in this district keep their harvested grains in gunny bags and store them in granary rooms/ *Pathayam* for long-term consumption.

### 4.2.6 Value addition of rice and rice- based products

Value addition of rice and rice- based products refers to the extent to which rice and its byproducts when subjected to a change by means of packing, processing or upgrading the quality for higher monitory gains. The table 22. shows the number of rice farmers who had done and not done value addition of rice.

Table 21. Distribution of respondents based on storage facility

| **Category** | **Trivandrum (n=15)** | | **Kollam (n=15)** | | **Alappuzha (n=15)** | | **Pathanamthitta (n=15)** | | **Kottayam (n=15)** | | **Idukki (n=15)** | | **Ernakulam (n=15)** | | **Total (N=105)** | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % |
| Bag storage (Gunny bags) | 1 | 6.67 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 13.33 | 5 | 33.33 | 0 | 0 | 8 | 7.61 |
| Warehouses / PDS / Civil supplies | 12 | 80 | 15 | 100 | 13 | 86.67 | 11 | 73.33 | 10 | 66.67 | 0 | 0 | 15 | 100 | 76 | 72.39 |
| Granary room/ *Pathayam* | 2 | 13.33 | 0 | 0 | 2 | 13.33 | 4 | 26.67 | 3 | 20 | 10 | 66.67 | 0 | 0 | 21 | 20 |
| | | | | | | | | | | | | | | | Maximum-3 | |
| | | | | | | | | | | | | | | | Minimum-1 | |
| | | | | | | | | | | | | | | | Mean- 2.123 | |
| | | | | | | | | | | | | | | | S.D- 0.5131 | |

Table 22. Distribution of respondents based on value addition of rice & rice- based products

| **Category** | **Trivandrum (n=15)** | | **Kollam (n=15)** | | **Alappuzha (n=15)** | | **Pathanamthitta (n=15)** | | **Kottayam (n=15)** | | **Idukki (n=15)** | | **Ernakulam (n=15)** | | **Total (N=105)** | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % |
| Yes | 7 | 46.67 | 5 | 33.33 | 8 | 53.33 | 4 | 26.67 | 9 | 60 | 4 | 26.67 | 5 | 33.33 | 42 | 40 |
| No | 8 | 53.33 | 10 | 66.67 | 7 | 46.67 | 11 | 73.33 | 6 | 40 | 11 | 73.33 | 10 | 66.67 | 63 | 60 |
| | | | | | | | | | | | | | | | Maximum-3 | |
| | | | | | | | | | | | | | | | Minimum-0 | |
| | | | | | | | | | | | | | | | Mean- 0.619 | |
| | | | | | | | | | | | | | | | S.D- 0.881 | |

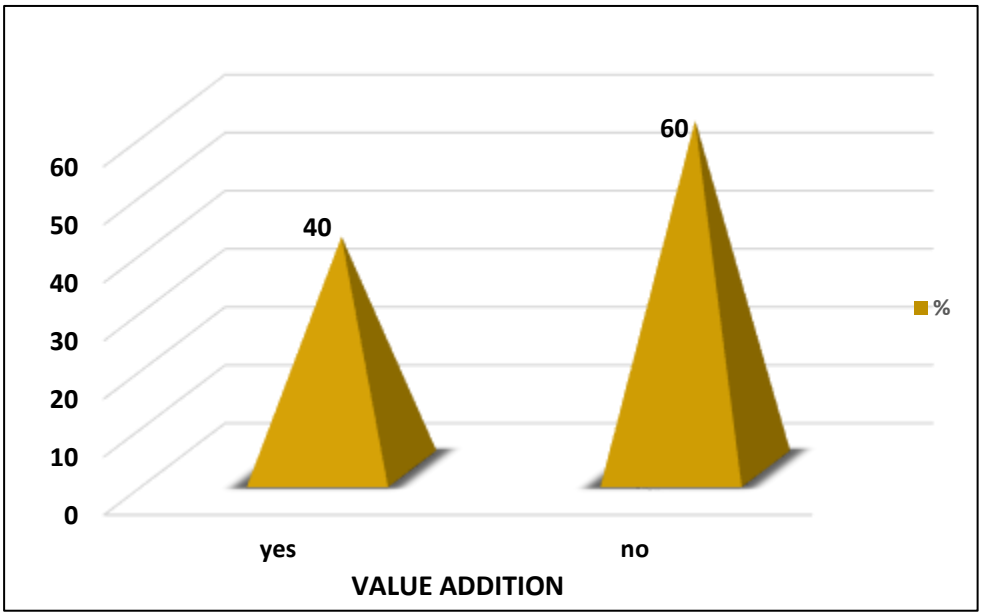



Fig. 20. Distribution of respondents based on value addition of rice and rice- based products

By analysing the results, about 60 per cent of the rice farmers said ‘No’ when they asked about value addition of rice while the remaining 40 per cent of farmers undertake value addition of rice and rice- based products.

According to district-level data, about 53.33, 66.67, 46.67, 73.33, 40, 73.33 and 66.67 per cent of respondent farmers from Thiruvananthapuram, Kollam, Alappuzha, Pathanamthitta, Kottayam, Idukki, and Ernakulam districts were not doing any kind of value-addition regarding rice and rice-based products while 46.67, 33.33, 53.33, 26.67, 60, 26.67 and 33.33 per cent of farmers from Thiruvananthapuram, Kollam, Alappuzha, Pathanamthitta, Kottayam, Idukki, and Ernakulam districts were undertaking value addition of rice and rice- based products.

From the above observations, it is clear that majority of the respondents were not doing any value addition of rice and rice- based products due to a lack of understanding on how to do so, lack of market awareness and lack of time. According to the findings of the study, many farmers expressed interest in value-addition and they suggested that farmer training programmes on processing and value-addition to be conducted. Rice bran oil, rice flakes, activated charcoal manufactured from rice husk *(Umikkari)*, raw rice *(Pachari)* are the value-added rice products made by majority of respondent paddy farmers.

## 4.3 EXTENT OF ADOPTION OF KAU VARIETIES AND SELECTED RECOMMENDED PRACTICES

Extent of adoption refers as making full use of all the recommended cultivation practices in paddy cultivation by the farmers as suggested in the package of practices (POP) published by Kerala Agricultural University.

Accordingly, the following titles explains the extent of adoption of selected KAU recommended practices for rice cultivation, its relationship with the personal characteristics of farmers, adopter categorisation of rice farmer respondents and adoption of recommended varieties by rice farmers.

### 4.3.1 Distribution of respondents based on the extent of adoption of recommended practices by rice farmers

The distribution of respondents based on the extent of adoption of recommended cultivation practices by rice farmers is presented in Table 23. The respondents were categorised into high, medium, and low adopters of recommended practices in rice.

On perusal of Table 23 it was evident that majority of farmers fell under medium category with 50.48 per cent level of adoption. It was followed by low and high category with 25.71 and 23.81 per cent respectively. As a result, it was deduced that majority of the rice farmers had medium to low level of adoption of recommended practices.

This is in line with the findings of Kamalakkannan (2003), Raghuwanshi (2005), Singh and Jay (2010) and Sasane *et al* (2012).

The average adoption score was 61.77, with a range of 28 to 93.77. There was no respondent who completely adopted all the practices recommended in the POP by KAU for rice cultivation.

In the District wise distribution, the adoption level ranged from low (60 %) to high (33.33 %) in Thiruvananthapuram district. In Kollam district the adoption ranged from high (40 %) to low (33.33 %) whereas in Alappuzha district the adoption ranged from medium (66.67 %) to high (26.66%). While considering Pathanamthitta district

Table 23. Distribution of respondents based on the extent of adoption of recommended practices by rice farmers

| **Category** | **Trivandrum (n=15)** | | **Kollam (n=15)** | | **Alappuzha (n=15)** | | **Pathanamthitta (n=15)** | | **Kottayam (n=15)** | | **Idukki (n=15)** | | **Ernakulam (n=15)** | | **Total (N=105)** | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % |
| Low (≤54.66) | 9 | 60 | 5 | 33.33 | 1 | 6.67 | 1 | 6.67 | 1 | 6.67 | 8 | 53.33 | 2 | 13.33 | 27 | 25.71 |
| Medium (>54.66 to ≤69.33) | 1 | 6.67 | 4 | 26.67 | 10 | 66.67 | 14 | 93.33 | 11 | 73.33 | 6 | 40 | 7 | 46.67 | 53 | 50.48 |
| High (>69.33) | 5 | 33.33 | 6 | 40 | 4 | 26.66 | 0 | 0 | 3 | 20 | 1 | 6.67 | 6 | 40 | 25 | 23.81 |
| | | | | | | | | | | | | | | | Maximum- 93.77 | |
| | | | | | | | | | | | | | | | Minimum-28 | |
| | | | | | | | | | | | | | | | Mean-61.77 | |
| | | | | | | | | | | | | | | | S.D-12.773 | |

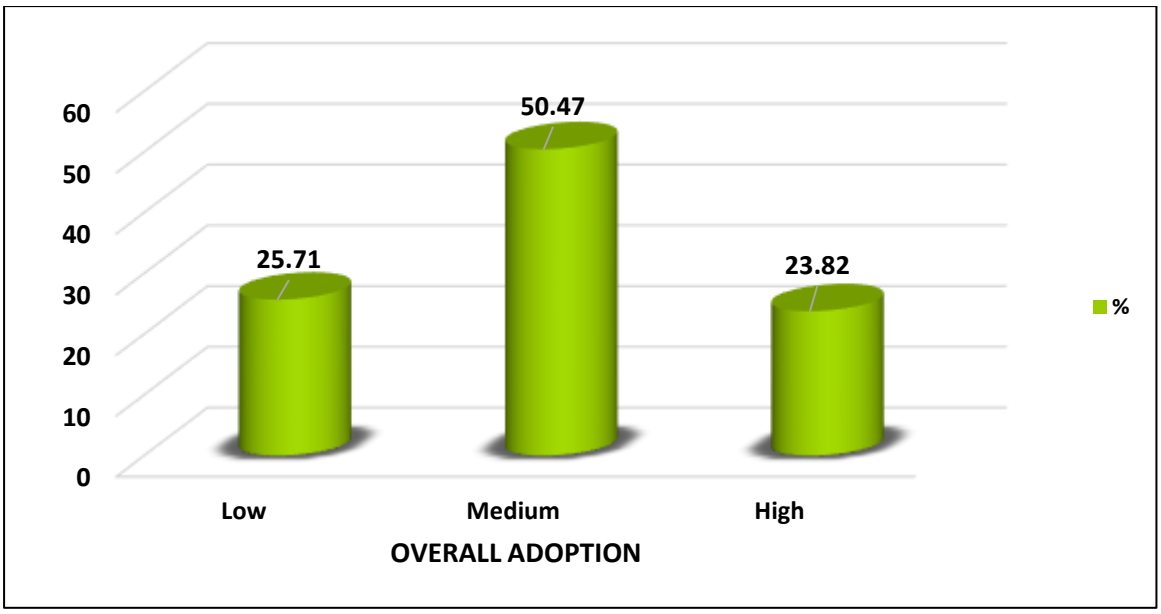



Fig. 21. Distribution of respondents based on overall adoption of recommended practices

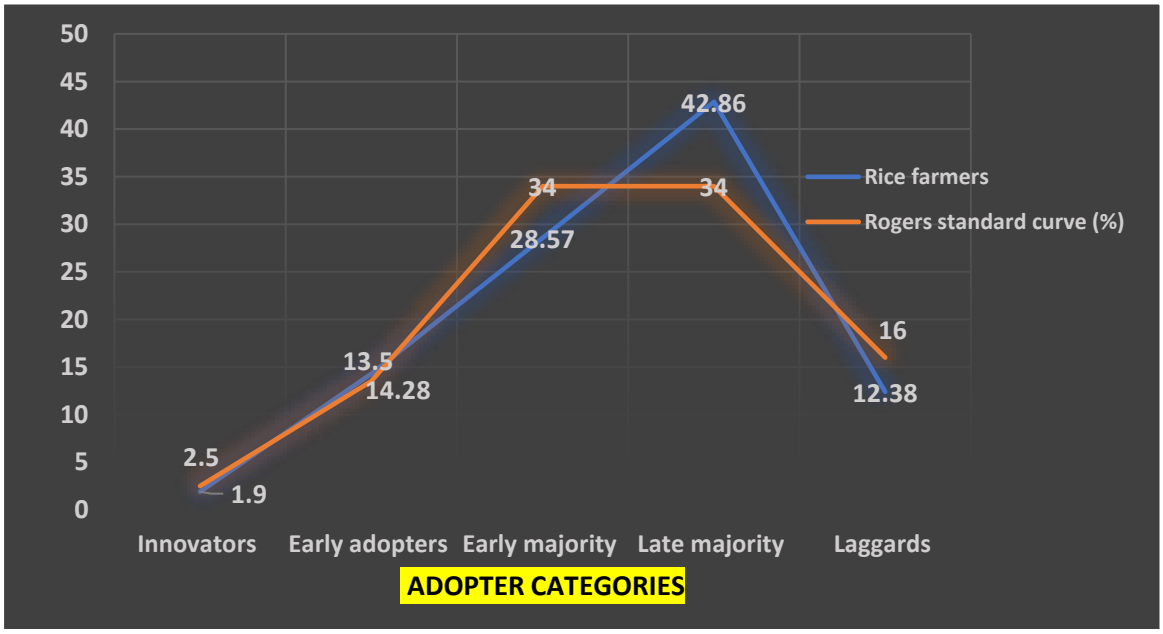



Fig. 22. Adopter categorisation of recommended practices

1 – Innovators, 2 – Early adopters, 3 – Early majority, 4- Late majority and 5- Laggards

the adoption level ranged from medium (93.33 %) to low (6.67 %) whereas in Kottayam district the adoption level ranged from medium (73.33 %) to high (20 %). In Idukki district the adoption ranged from low (53.33 %) to medium (40 %) while in Ernakulam district the adoption level ranged from medium (46.67 %) to high (40 %).

### 4.3.2 Adopter categorisation of rice farmer respondents based on level of adoption of recommended practices in rice

According to Rogers (1982), farmer respondents were classified as innovators, early adopters, early majority, late majority and laggards.

Table 24. Adopter categorisation of rice farmer respondents on level of adoption of recommended practices.

| Category | No. | % | Roger's standard curve (%) |
|---|---|---|---|
| Innovators | 2 | 1.90 | 2.5 |
| Early adopters | 15 | 14.28 | 13.5 |
| Early majority | 30 | 28.57 | 34 |
| Late majority | 45 | 42.87 | 34 |
| Laggards | 13 | 12.38 | 16 |
| Total | 105 | 100 | |

On observing Table 24 and Fig. 22, it was inferred that, the percentage of innovators is 1.90 per cent which is less than 2.5 per cent in the standard Rogers curve. Early adopters were 14.28 per cent which was greater than the 13.5 per cent in Roger's curve indicating more adoption of recommended practices in rice cultivation. The early majority farmers are lesser and late majority farmers are more in number as compared to standard Roger's curve which indicates that adoption is comparatively lesser. Laggards or traditionals are 12.38 per cent in case of rice farmers as against 16 per cent in a standard curve.

The percentage of farmers falling under the early adopter category is more than the standard curve indicates higher rate of adoption at the same time the percentage coming under the other three categories indicates lesser adoption. Therefore, focusing

on the late majority and laggards through various and successful teaching programs can improve overall adoption. The results of the adopter categorization show that there is a need for an effective extension mechanism, as well as assistance and encouragement, in order to lower the percentage of late majority and increase the percentage of early majority. This is very important because rice is Kerala's most economically dominant and stable food crop. More efforts should be made to develop and disseminate location specific and sustainable production and protection practices that meet the needs of farmers.

### 4.3.3 Adoption of the recommended practices by the respondent farmers in percentage

The percentage of adoption of the recommended practices were found out and presented in Table 25.

On perusal of Table 25 it was inferred that 94.28 per cent of farmers adopted suitable months for sowing in all 3 crop seasons, 90.47 per cent of farmers adopted recommended varieties like Uma, Jyothi, Kanchana and Manurathna followed by the usage of recommended plant protection chemicals for pest and diseases (74.28 %), fertilizer applied per hectare (60%), adoption of recommended frequency of irrigation to be maintained (57.14 %), following the adoption of cultural methods of weeding (55.23 %), usage of bioagents for seed treatment (48.57 %), adoption of recommended nursery management practices (46.66 %), adoption of recommended frequency of weeding (45.71 %), usage of trichocards against stem borer (44.76 %), adoption of recommended stages for seedling transplanting (42.85 %), adoption of recommended main field prep. practices before transplanting (40.95 %), seed rate (25.71 %), spacing (21.90 %) and adoption of recommended management of aged/over-raised seedlings (20 %).

In the District wise distribution, most of the farmers adopted the suitable months for sowing as recommended with 80, 100, 100, 93.33, 100, 86.66 and 100 per cent respectively in Thiruvananthapuram, Kollam, Alappuzha, Pathanamthitta, Kottayam, Idukki and Ernakulam districts since this practice was perceived as very effective to the farmers. Adoption of recommended management of aged/over-raised seedlings was the

Table 25. Adoption of the recommended practices by the respondents in percentage

| Sl. No | Recommended practices | Trivandrum (n=15) | | Kollam (n=15) | | Alappuzha (n=15) | | Pathanamthitta (n=15) | | Kottayam (n=15) | | Idukki (n=15) | | Ernakulam (n=15) | | Total (N=105) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % |
| 1. | Suitable months for sowing in all 3 crop seasons (*Virippu, Mundakan & Puncha*) | 12 | 80 | 15 | 100 | 15 | 100 | 14 | 93.33 | 15 | 100 | 13 | 86.66 | 15 | 100 | 99 | 94.28 |
| 2. | Recommended KAU rice varieties- Uma, Jyothi, Kanchana, Manurathna | 13 | 86.66 | 13 | 86.66 | 13 | 86.66 | 15 | 100 | 15 | 100 | 13 | 86.66 | 13 | 86.66 | 95 | 90.47 |
| 3. | Usage of recommended plant protection chemicals for P&D | 14 | 93.33 | 10 | 66.66 | 12 | 80 | 13 | 86.66 | 13 | 86.66 | 5 | 33.33 | 11 | 73.33 | 78 | 74.28 |
| 4. | Fertilizer applied per hectare: NPK – 70:35:35 kg/ha (S.D) NPK – 90:45:45 kg/ha (M.D) | 7 | 46.66 | 9 | 60 | 12 | 80 | 9 | 60 | 7 | 46.66 | 10 | 66.66 | 9 | 60 | 63 | 60 |
| 5. | Adoption of recommended frequency of irrigation to be maintained | 9 | 60 | 5 | 33.33 | 10 | 66.66 | 10 | 66.66 | 12 | 80 | 7 | 46.66 | 7 | 46.66 | 60 | 57.14 |
| 6. | Follow cultural methods of weeding | 5 | 33.33 | 5 | 33.33 | 8 | 53.33 | 12 | 80 | 12 | 80 | 11 | 73.33 | 5 | 33.33 | 58 | 55.23 |
| 7. | Usage of bioagents for seed treatment: *Pseudomonas & Trichoderma* | 4 | 26.66 | 6 | 40 | 8 | 53.33 | 12 | 80 | 9 | 60 | 8 | 53.33 | 4 | 26.66 | 51 | 48.57 |

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8. | Adoption of recommended nursery management practices | 12 | 80 | 5 | 33.33 | 10 | 66.66 | 5 | 33.33 | 5 | 33.33 | 3 | 20 | 9 | 60 | 49 | 46.66 |
| 9. | Weeding:<br>First weeding: 20 days after planting<br>Second weeding: 40 days after planting | 5 | 33.33 | 6 | 40 | 6 | 40 | 11 | 73.33 | 9 | 60 | 5 | 33.33 | 6 | 40 | 48 | 45.71 |
| 10. | Usage of trichocards against stem borer | 8 | 53.33 | 3 | 20 | 7 | 46.66 | 10 | 66.66 | 6 | 40 | 6 | 40 | 7 | 46.66 | 47 | 44.76 |
| 11. | Transplanting stages of seedlings: 18-21 days (S.D) & 20-25 days (M.D) | 11 | 73.33 | 7 | 46.66 | 3 | 20 | 0 | 0 | 5 | 33.33 | 8 | 53.33 | 11 | 73.33 | 45 | 42.85 |
| 12. | Adoption of recommended main field prep. practices before transplanting? | 11 | 73.33 | 7 | 46.66 | 3 | 20 | 5 | 33.33 | 2 | 13.33 | 7 | 46.66 | 8 | 53.33 | 43 | 40.95 |
| 13. | Seed rate- Transplanting:60-65 kg/ha, Broadcasting:80-100 kg/ha | 3 | 20 | 4 | 26.66 | 3 | 20 | 6 | 40 | 4 | 26.66 | 2 | 13.33 | 5 | 33.33 | 27 | 25.71 |
| 14. | Spacing:<br>15cmx10cm (S.D)<br>20cmx15cm (Ist crop, M.D)<br>20cmx10cm (IInd crop, M.D)<br>20cmx10cm (IIIrd crop, M.D) | 2 | 13.33 | 4 | 26.66 | 3 | 20 | 3 | 20 | 3 | 20 | 4 | 26.66 | 4 | 26.66 | 23 | 21.90 |
| 15. | Adoption of recommended management of aged/over-raised seedlings | 2 | 13.33 | 7 | 46.66 | 4 | 26.66 | 0 | 0 | 0 | 0 | 4 | 26.66 | 4 | 26.66 | 21 | 20 |

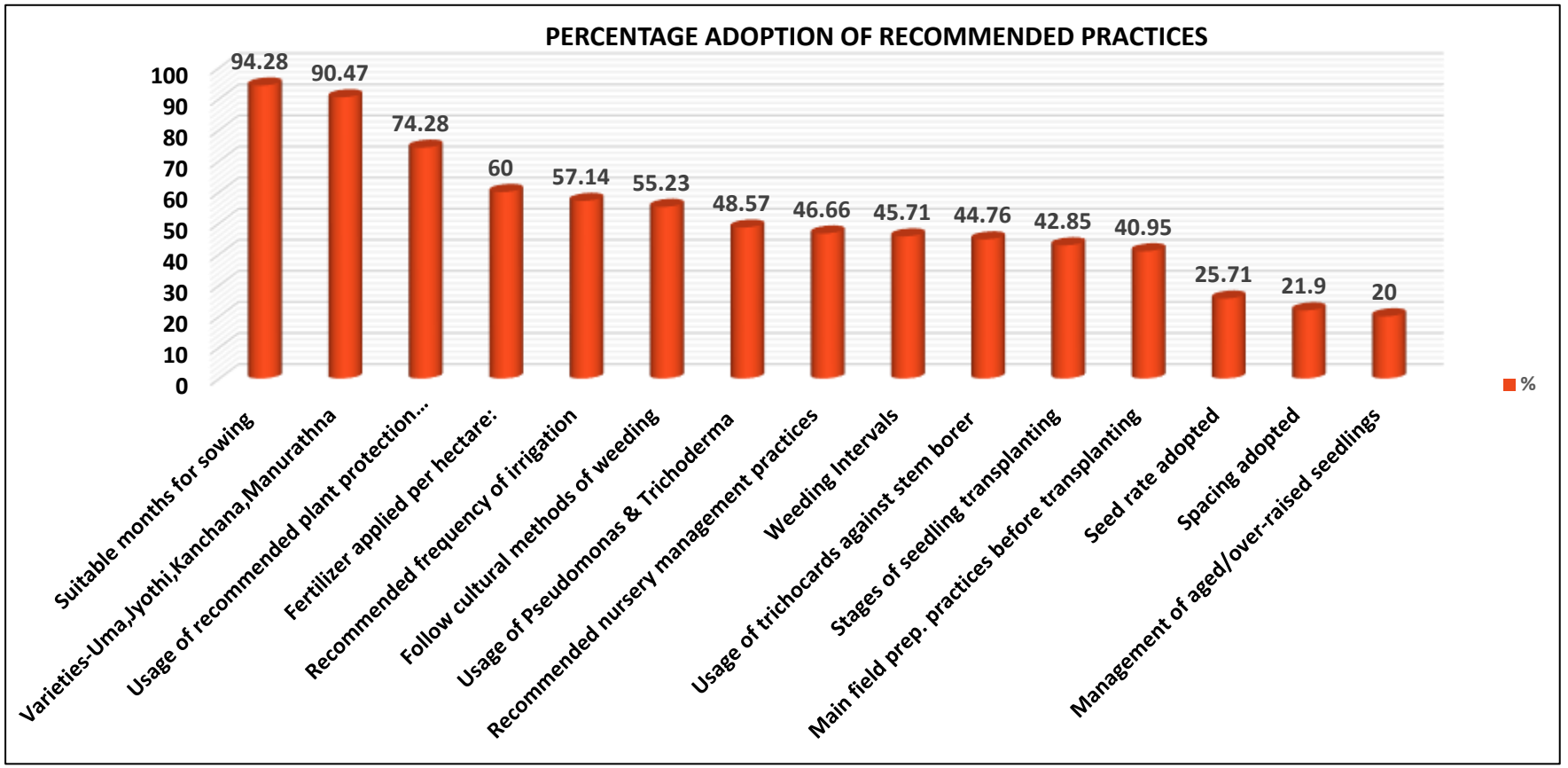



Fig. 23. Percentage of respondents adopting the recommended practices in rice cultivation

Table 26. Percentage of respondents adopting the recommended varieties

| **Category** | **Trivandrum (n=15)** | | **Kollam (n=15)** | | **Alappuzha (n=15)** | | **Pathanamthitta (n=15)** | | **Kottayam (n=15)** | | **Idukki (n=15)** | | **Ernakulam (n=15)** | | **Total (N=105)** | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % |
| Uma | 8 | 53.33 | 11 | 73.33 | 15 | 100 | 13 | 86.66 | 15 | 100 | 0 | 0 | 6 | 40 | 68 | 64.76 |
| Jyothi | 5 | 33.33 | 2 | 13.33 | 0 | 0 | 2 | 13.33 | 0 | 0 | 1 | 6.67 | 2 | 13.33 | 12 | 11.43 |
| Manurathna | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8 | 53.33 | 0 | 0 | 8 | 7.62 |
| Kanchana | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 40 | 6 | 5.71 |
| Hraswa | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 26.66 | 0 | 0 | 4 | 3.81 |
| Others | 2 | 13.33 | 2 | 13.33 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 13.33 | 1 | 6.66 | 7 | 6.67 |

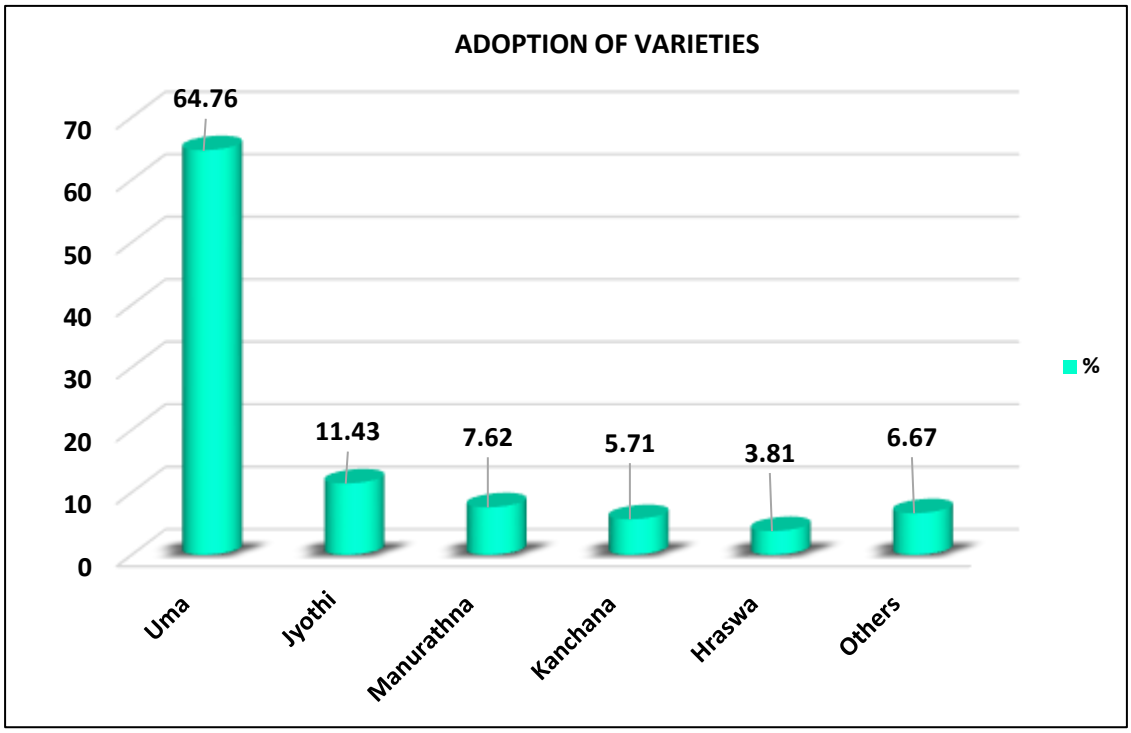



Fig. 24. Percentage of respondents adopting the recommended varieties

least adopted practice, with only 13.33 per cent of respondents in Thiruvananthapuram district, 46.66 per cent of respondents in Kollam district, 26.66 per cent of respondents in Alappuzha, Idukki, and Ernakulam districts adopted this practice while Kottayam and Pathanamthitta districts had no farmers adopting the recommended management of aged/over-raised seedlings. This might be because the farmers did not perceive this practice as useful for them as in some districts namely Alappuzha, Kottayam and Pathanamthitta they are practicing direct sowing instead of transplanting so only gap filling is needed for them and many of the farmers who adopt transplanting method were strictly following the recommended time duration to which the seedlings should be transplanted.

### 4.3.4 Adoption of recommended varieties by rice farmers

Adoption of the recommended varieties by the respondents were found out and presented in Table 26.

On perusal of Table 26 showed that, the most adopted variety by the rice farmers was Uma where 64.76 per cent of the farmers adopted it, followed by Jyothi (11.43 %) and other varieties (6.67 %) which included some local varieties like Thavalakannan, Rakthasali, Cheradi, Njavara etc. Uma was preferred by majority of the farmers owing to its accessibility and market preference. The adoption of other varieties like Manurathna, Kanchana and Hraswa were less mainly due to its non-availability and non-suitability to their region according to farmers.

### 4.3.5 Relation between the extent of adoption of recommended practices with the selected characteristics of the respondents.

Simple correlation analysis was used to determine the influence of the independent factors on the extent of adoption and the results are presented in Table 27.

Table 27. Correlation between extent of adoption of recommended practices by rice farmers and the selected independent variables

| Variable | Independent variable | Correlation coefficient |
|---|---|---|
| $X_1$ | Age | 0.129 $^{NS}$ |
| $X_2$ | Farming experience | 0.126 $^{NS}$ |
| $X_3$ | Area under rice cultivation | 0.170 $^{NS}$ |
| $X_4$ | Annual income | 0.129 $^{NS}$ |
| $X_5$ | Mass media exposure | 0.179 $^{NS}$ |
| $X_6$ | Extension participation | 0.409** |
| $X_7$ | Achievement motivation | 0.218** |
| $X_8$ | Risk orientation | 0.076 $^{NS}$ |
| $X_9$ | Credit orientation | 0.145 $^{NS}$ |
| $X_{10}$ | Innovativeness | 0.269* |
| $X_{11}$ | Knowledge level | 0.173 $^{NS}$ |

** - Significant at 1 % level * - Significant at 5 % level

It was evident from Table 27, that age, farming experience, area under rice cultivation, annual income, mass media exposure, risk orientation and knowledge level possessed no significant relation with the extent of adoption. And the results of the correlation revealed that out of 11 independent variables selected for the study, 3 variables were positively and significantly related to the dependent variable adoption of recommended practices by rice farmers. The most important factors influencing technology adoption of recommended practices were extension participation and achievement motivation at 1% significance with correlation coefficient values of 0.409 and 0.218, respectively, followed by innovativeness at 5% significance with a correlation coefficient value of 0.269.

#### *4.3.5.1 Extension participation and extent of adoption of selected KAU recommended practices for rice cultivation as perceived by farmers*

Extension participation of respondent farmers had a positive and significant relationship with the adoption of recommended practices of rice. Participation in extension activities enables possibilities for learning, exposure to new information, and field visits related to improved farming practices, and it helps to reinforce their knowledge about agricultural innovations, which leads to effective decisions in adopting innovative technology packages. The current study's findings are consistent with those of Deepa (1999), Pottappa (2008) and Channamallikarjuna (2013).

#### *4.3.5.2 Achievement motivation and extent of adoption of selected KAU recommended practices for rice cultivation as perceived by farmers*

Achievement motivation of respondent farmers had a positive and significant relationship with the adoption of recommended practices of rice. The probable reason for this might be that the respondent rice farmers are likely to work hard for a living and over time, they will be aiming for goals that will allow them to attain the minimum family expenditure. This could have generated a desire to accomplish something in their lives. Higher extension participation and innovativeness of the farmers in the study area might presumably be a reason for this increased achievement motivation. The finding of the study is in agreement with that of Deepa (1999).

#### *4.3.5.3 Innovativeness and extent of adoption of selected KAU recommended practices for rice cultivation as perceived by farmers*

The table revealed that there is a significant relationship between adoption of recommended practices and innovativeness of paddy growers. This could be because innovativeness can be regarded as a subsequent interaction product of many psychological factors acting on an individual. A farmer who has been determined to be innovative will naturally put greater pressure on himself and work more depending on the favourable environment to live a happy life. He is likely to learn about recommended practices and implement them on his farm because of this approach. Thus, the respondent farmers' innovativeness may have encouraged them to follow the

recommended practices of rice. The finding of the study is in agreement with that of Sudhakar (2002), Channamallikarjuna (2013) and Shalini (2017).

## 4.4 FARMER PRACTICES BY RESPONDENT RICE FARMERS

Farmer practices can be defined as the agricultural methods or techniques followed by the farmers of a locality that has been passed down from generation to generation. This knowledge system is critical for the well-being of their components as well as sustainable development.

Rice farmers established their own techniques based on personal experience and intervention, rather than evaluating the scientific reason for the procedures. Table 28 shows the results of the number of farmer practices with respect to rice crop.

Table 28: Farmer practices by respondent farmers in rice cultivation

| Sl. No | Districts | No. | % |
|---|---|---|---|
| 1 | Thiruvananthapuram | 8 | 53.33 |
| 2 | Kollam | 6 | 40 |
| 3 | Alappuzha | 5 | 33.33 |
| 4 | Pathanamthitta | 6 | 40 |
| 5 | Kottayam | 3 | 20 |
| 6 | Idukki | 4 | 26.66 |
| 7 | Ernakulam | 5 | 33.33 |

Farmer practices were documented, it showed that the number of farmer practices adopted were the highest in Thiruvananthapuram (53.33%) followed by Kollam (40%) and Pathanamthitta (40%) districts and farmer practices adopted least in the district of Kottayam (20%) due to extensive area of rice cultivation and majority of farmers from Kottayam were progressive and followed most of the KAU rice recommended practices.

From the 105 rice farmers surveyed, 10 farmer practices were mostly identified. The details of the different farmer practices identified from all the seven districts are presented in table 28.

Table 29. List of farmer practices by respondent farmers in rice cultivation

| Farmer Practices |
| --- |
| 1. To reduce the attack of ear bug, a solution composed from 1 kg garlic extract, 200 g tobacco leaves, and 200 g washing powder soaked in 200 litres water is sprayed on the affected paddy field.<br>2. Spreading of tree barks and leaves in rice field to enrich the soil fertility.<br>3. To suppress major weeds (Varinellu), common salt is dissolved in water and sprayed on rice fields.<br>4. Spreading mango and Citrus leaves near the field to check the insect pests.<br>5. Mixture of salt+ tree barks +ash, are ploughed along with the soil to improve fertility.<br>6. Placing bamboo sticks as bird perches to reduce pest attack.<br>7. Sarees are tied around field boundaries to prevent wild boar attack.<br>8. Burning tyres and dried coconut leaves at evening to reduce rice bug attack.<br>9. Bottles are tied on film tapes; its striking sound during wind helps to prevent birds from eating crop.<br>10. Bursting crackers and lighting bulbs at night to reduce attack of birds like Neelakkozhi and Eranda. |

Documentation of various farmer practices demonstrated that the farmers were not completely reliant on scientific procedures, and that they still used their beliefs, values, and native practices for crop cultivation. Farmer practices are cost-effective and applicable for a certain location or culture, and researchers should take these practises into account for future development.

## 4.5 YIELD GAP AMONG RICE VARIETIES IN THE DISTRICTS OF SOUTH KERALA

The average yield gap of popularly cultivating KAU released rice varieties of respondent rice farmers for the first cropping season was studied and the results are presented in the following Tables.

### 4.5.1. Yield gap of Uma rice variety by the respondent farmers in South Kerala

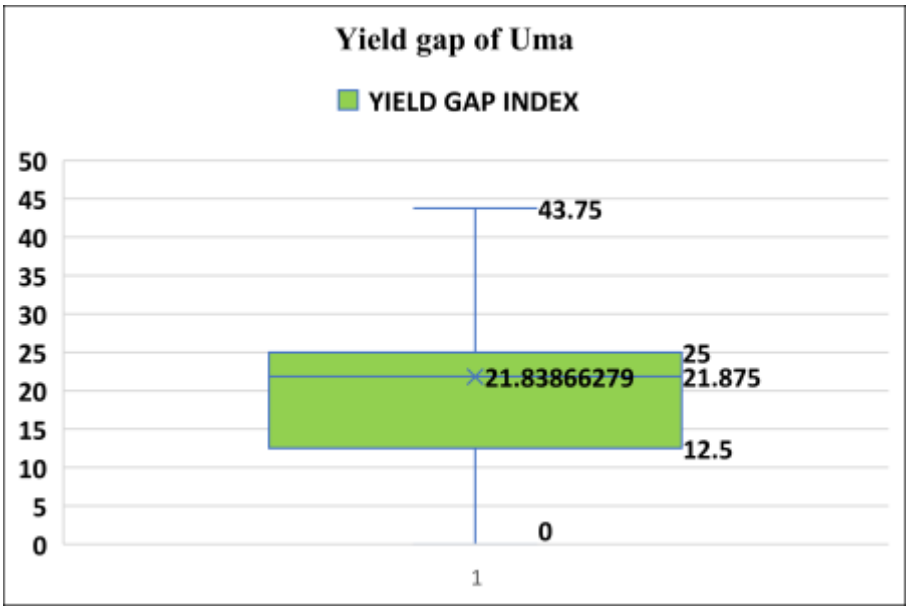
Yield gap and Yield Gap Index of Uma by the respondent farmers in South Kerala were found out and presented in Table 30.

| Rice variety | No. of Farmers | Research station yield (q/ac) | Average yield obtained by the rice growers (q/ac) | Yield Gap Average (q/ac) | Yield Gap Index |
|---|---|---|---|---|---|
| Uma | 86 | 32 | 25.01 | 6.988 | 21.838 |

The result in Table 30 showed that, 32 q/ac is the potential yield of Uma variety and recorded 25.01 q/ac as the average yield of 86 rice farmers surveyed from all the seven districts except Idukki, with a mean yield gap of 6.988 q/ac and yield gap index of 21.838 per cent.

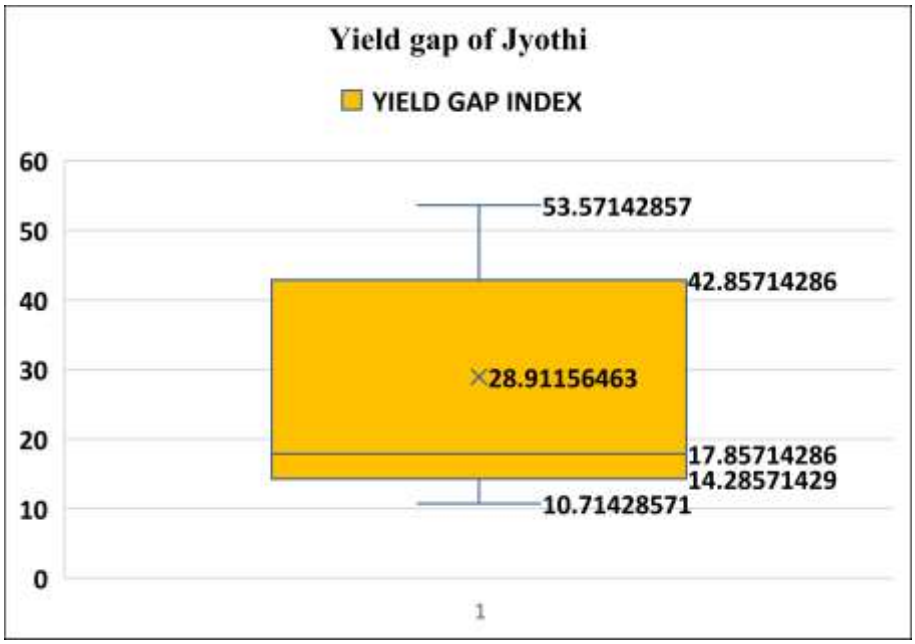
The yield gap index of Uma by the respondent farmers ranged from 0 to 43.75, as shown in Fig.27, which depicts the Boxplot for yield gap of Uma rice variety. As can be seen from the box plot, the maximum yield gap index value of Uma is 43.75 percent, while the minimum yield gap index value is 0 per cent. About 12.50 per cent farmers had low yield gap index, that is, they fall in the lower quartile range ($Q_1$), 21.87 per cent falls in the middle quartile region (Median/ $Q_2$), while 25.00 per cent of respondents had high yield gap index and they fall in the upper quartile region ($Q_3$).

The distribution of respondents based on yield gap index of Uma followed a negatively skewed distribution since the median (21.87 %) is closer to the upper or $Q_3$ quartile (25.00 %) which means the data constitute higher frequency of low valued scores.




| | |
|---|---|
| Sample size (n) | 86 |
| Minimum | 0 |
| Q1 | 12.5 |
| Median | 21.875 |
| Q3 | 25 |
| Maximum | 43.75 |
| Mean | 21.838 |

Fig. 25. Distribution of respondents based on yield gap of Uma (Box Plot)




| | |
|---|---|
| Sample size (n) | 21 |
| Minimum | 10.71 |
| Q1 | 14.29 |
| Median | 17.86 |
| Q3 | 42.86 |
| Maximum | 53.57 |
| Mean | 28.91 |

Fig. 26. Distribution of respondents based on yield gap of Jyothi (Box Plot)

### 4.5.2. Yield gap of Jyothi rice variety by the respondent farmers in South Kerala

Yield gap and Yield Gap Index of Jyothi by the respondent farmers in South Kerala were found out and presented in Table 31.

| Rice variety | No. of Farmers | Research station yield (q/ac) | Average yield obtained by the rice growers (q/ac) | Yield Gap Average (q/ac) | Yield Gap Index |
|---|---|---|---|---|---|
| Jyothi | 21 | 28 | 19.90 | 8.095 | 28.91 |

The result in Table 31 showed that, 28 q/ac is the potential yield of Jyothi variety and recorded 19.90 q/ac as the average yield of 21 rice farmers surveyed from all the seven districts with a mean yield gap of 8.095 q/ac and yield gap index of 28.91 per cent.

The yield gap index of Jyothi by the respondent farmers ranged from 10.71 to 53.57, as shown in Fig.28, which depicts the Boxplot for yield gap of Jyothi rice variety. As can be seen from the box plot, the maximum yield gap index value of Jyothi is 53.57 per cent, while the minimum yield gap index value is 10.71 per cent. About 14.29 per cent farmers had low yield gap index, that is, they fall in the lower quartile range ($Q_1$), 17.86 per cent falls in the middle quartile region (Median/ $Q_2$), while 42.86 per cent of respondents had high yield gap index and they fall in the upper quartile region ($Q_3$).

The distribution of respondents based on yield gap index of Jyothi followed a positively skewed distribution since the median (17.86 %) is closer to the lower or $Q_1$ quartile (14.29 %) which means the data constitute higher frequency of high valued scores.

### 4.5.3. Yield gap of Manurathna rice variety by the respondent farmers in South Kerala

Yield gap and Yield Gap Index of Manurathna by the respondent farmers in South Kerala were found out and presented in Table 32.

| Rice variety | No. of Farmers | Research station yield (q/ac) | Average yield obtained by the rice growers (q/ac) | Yield Gap Average (q/ac) | Yield Gap Index |
|---|---|---|---|---|---|
| Manurathna | 8 | 28 | 22.25 | 5.75 | 20.53 |

The result in Table 32 showed that, 28 q/ac is the potential yield of Manurathna variety and recorded 22.25 q/ac as the average yield of 8 rice farmers surveyed from Idukki district with a mean yield gap of 5.75 q/ac and yield gap index of 20.53 per cent.

Generally, the yield gap in case of Manurathna variety is less compared to others, but here it shows a large yield gap of 20.53 per cent due to less number of farmers cultivating this variety, which is assessed mostly in Idukki district.

### 4.5.4. Yield gap of Kanchana rice variety by the respondent farmers in South Kerala

Yield gap and Yield Gap Index of Kanchana by the respondent farmers in South Kerala were found out and presented in Table 33.

| Rice variety | No. of Farmers | Research station yield (q/ac) | Average yield obtained by the rice growers (q/ac) | Yield Gap Average (q/ac) | Yield Gap Index |
|---|---|---|---|---|---|
| Kanchana | 6 | 32 | 23.33 | 8.67 | 27.09 |

The result in Table 33 showed that, 32 q/ac is the potential yield of Kanchana variety and recorded 23.33 q/ac as the average yield of only 6 rice farmers surveyed from Ernakulam district with a mean yield gap of 8.67 q/ac and yield gap index of 27.09 per cent.

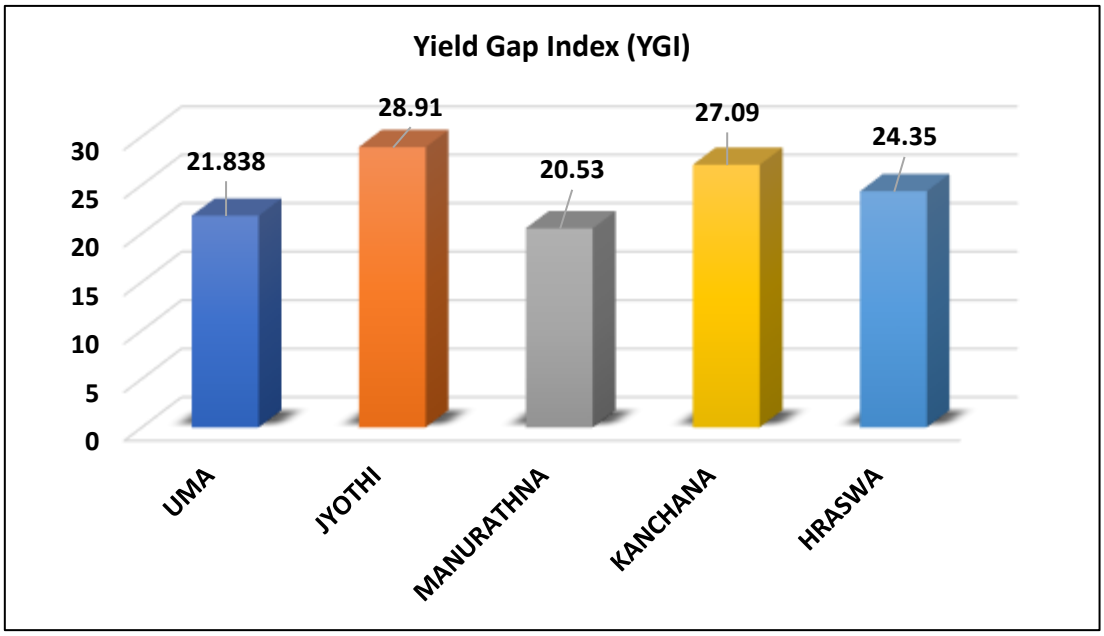



Fig 27: Distribution of KAU rice varieties by respondent farmers based on YGI

### 4.5.5. Yield gap of Hraswa rice variety by the respondent farmers in South Kerala

Yield gap and Yield Gap Index of Hraswa by the respondent farmers in South Kerala were found out and presented in Table 34.

| Rice variety | No. of Farmers | Research station yield (q/ac) | Average yield obtained by the rice growers (q/ac) | Yield Gap Average (q/ac) | Yield Gap Index |
|---|---|---|---|---|---|
| Hraswa | 5 | 23 | 17.4 | 5.6 | 24.35 |

The result in Table 34 showed that, 23 q/ac is the potential yield of Hraswa variety and recorded 17.40 q/ac as the average yield of only 5 rice farmers surveyed from Idukki district with a mean yield gap of 5.6 q/ac and yield gap index of 24.35 per cent.

## 4.6 COMPARATIVE ANALYSIS OF YIELD GAP OF KAU RICE VARIETIES BY RESPONDENT FARMERS IN SOUTH KERALA

The yield gap index data of five rice varieties put together in the following Table 35, which reveals the comparative analysis of yield gap of KAU rice varieties by farmers.

Table 35. Comparative analysis of yield gap of KAU rice varieties

| Rice Varieties | Research Station yield (q/ac) | Average yield obtained by the rice growers (q/ac) | Yield Gap Average (q/ac) | Yield Gap Index (YGI) |
|---|---|---|---|---|
| 1.Uma | 32 | 25.01 | 6.988 | 21.838 |
| 2.Jyothi | 28 | 19.90 | 8.095 | 28.91 |
| 3.Manurathna | 28 | 22.25 | 5.75 | 20.53 |
| 4.Kanchana | 32 | 23.33 | 8.67 | 27.09 |
| 5.Hraswa | 23 | 17.4 | 5.6 | 24.35 |

From the Table 35 it is evident that, Jyothi has the highest YGI with a value of 28.91 per cent, since it is more prone to seed shattering which results in large yield loss in Jyothi, and if harvesting is delayed, it will become dry and begin to regrow. Kanchana came in second with 27.09 per cent YGI, followed by Hraswa with 24.35 per

cent YGI, then Uma and Manurathna rice varieties with 21.83 and 20.53 per cent YGI, respectively.

For the reason, it suggests that at the grass-root level, technically competent, well-trained, and equipped extension staff should intervene to provide necessary support and services to the rice farmers, focusing on disseminating innovations and technologies in rice farming to bridge the yield gap. This is very important, as rice is a major economically dominant and stable food crop in Kerala.

## 4.7 ASSESSMENT OF THE FACTORS INFLUENCING YIELD GAP OF RICE VARIETIES

A total of 5 factors were analysed, all of which were seen by farmers as contributing to the rice yield gap and the influence of these factors on the rice yield gap was examined using the Friedman Test and the results are presented in Table 36 & 37.

### 4.7.1 Friedman test for factors affecting yield gap in Uma rice variety

H0: There is no significant difference between the factors affecting yield gap of Uma variety

H1: There is significant difference between the factors affecting yield gap of Uma variety

Table 36. Friedmann test for analysing the factors affecting yield gap in Uma

| **Factors affecting yield gap** | **Mean sum** |
|---|---|
| Biophysical factors | 2.51 |
| Climatic factors | 2.54 |
| Socio- economic factors | 3.91 |
| Institutional factors | 3.89 |
| Factors related to technology transfer | 2.15 |

| | |
|---|---|
| Sample size (n): | 86 |
| Degrees of freedom | 4 |
| Observed value ($\chi 2$) | 161.09 |
| Critical value | 9.49 |
| Asymp. Sig | <0.001 |
| $\alpha$ | 0.05 |

It could be seen from Table 36 that socio-economic factors (family size, education level of farmers, communication gap with extension agents, social and economic status of farmers) and institutional factors (Government policies, rice price, agricultural credit, input price, input supply & land tenure) were the most important

components affecting the yield gap of Uma rice variety with a mean sum of 3.91 and 3.89 respectively.

Here we reject the null hypothesis because the results of the Friedmann test revealed that the chi square value is greater than the critical value, indicating there is significant difference between the factors affecting yield gap of Uma variety. Thus, the yield gap in Uma can be considerably reduced by improving the socio-economic and institutional factors corresponding to the farmers.

### 4.7.2 Friedman test for factors affecting yield gap in Jyothi rice variety

H0: There is no significant difference between the factors affecting yield gap of Jyothi variety

H1: There is significant difference between the factors affecting yield gap of Jyothi variety

Table 37. Friedmann test for analysing the factors affecting yield gap in Jyothi

| **Factors affecting yield gap** | **Mean sum** |
|---|---|
| Biophysical factors | 3.79 |
| Climatic factors | 3.57 |
| Socio- economic factors | 3.50 |
| Institutional factors | 2.52 |
| Factors related to technology transfer | 1.62 |

| | |
|---|---|
| Sample size (n): | 21 |
| Degrees of freedom | 4 |
| Observed value ($\chi 2$) | 46.96 |
| Critical value | 9.49 |
| Asymp. Sig | <0.001 |
| $\alpha$ | 0.05 |

It could be seen from Table 37 that biophysical factors (soil fertility, post-harvest losses, seed shattering of variety, improper management practices) and climatic factors (flood, drought, salinity, poor irrigation facilities) were the most important components affecting the yield gap of Jyothi rice variety with a mean sum of 3.79 and 3.57 respectively.

Here we reject the null hypothesis because the results of the Friedmann test revealed that the chi square value is greater than the critical value, indicating there is significant difference between the factors affecting yield gap of Jyothi variety. Early flowering in Jyothi variety resulted in early grain maturing thereby leads to seed

shattering which results in large yield losses, explaining why it has a significantly greater yield gap than other varieties. Thus, the yield gap in Jyothi can be significantly reduced by improving the biophysical factors affecting farmers.

## 4.9 CONSTRAINTS EXPERIENCED BY RICE FARMERS IN SOUTH KERALA

Paddy growers face several challenges when it comes to rice cultivation. The rice farmers' constraints were analysed, ranked, and presented as a list. The constraint with the highest score was given the first rank. The constraints faced by the rice farmers are presented in Table 38.

Table 38. Constraints experienced by the rice farmers

| Sl. No | Constraints | Score | Rank over class | Rank over total |
|---|---|---|---|---|
| I. | Crop management constraints | | | |
| 1. | Non availability of timely inputs and labours | 357 | 1 | 2 |
| 2. | Flooding due to heavy rainfall | 351 | 2 | 3 |
| 3. | Pest and disease incidence | 337 | 3 | 4 |
| 4. | Lack of timely information and proper guidance from extension staff | 193 | 4 | 6 |
| 5. | Drought | 188 | 5 | 7 |
| 6. | Lack of storage facilities | 110 | 6 | 11 |
| II. | Economic constraints | | | |
| 1. | High labour charges (cultivation labour) | 402 | 1 | 1 |
| 2. | High loading charges (transportation labour) | 264 | 2 | 5 |
| 3. | Lack of credit facilities | 185 | 3 | 8 |
| 4. | Less profit | 164 | 4 | 9 |
| 5. | Price fluctuations | 151 | 5 | 10 |

A brief observation of Table 38 revealed that, among the crop management constraints, non-availability of timely inputs and labours ranked first followed by flooding due to heavy rainfall. Other major constraints as perceived by rice farmers included pest and disease incidence, lack of timely information and proper guidance

from extension staff, drought, and lack of storage facilities in the decreasing order of importance. Among the economic constraints, high labour charges and high loading charges top the list. Other constraints were lack of credit facilities, less profit and price fluctuations.

## 4.10 REASONS FOR CULTIVATION AND NOT CULTIVATION OF KAU RELEASED RICE VARIETIES

Rice varieties suggested and recommended by KAU are being cultivated and not cultivated for a variety of reasons. Based on discussions with the sample respondents, various general reasons were identified, and a list was created, which was distributed to the respondents for rating. The reasons were ranked from 10 to 1, with the most important reason receiving the highest score. For each reason, the average score was calculated and ranked from highest to lowest. Based on the mean score, the reasons were ranked. A high mean score indicates that it was the most important reason in deciding whether to cultivate KAU rice varieties.

The major reasons for cultivating or not cultivating KAU released rice varieties are presented in Table 39 & Table 40.

### 4.10.1 Reasons for cultivating KAU released rice varieties

Table 39. Reasons for cultivating KAU released rice varieties

| Sl. No | Reasons for cultivating KAU rice varieties | Mean score | Rank |
|---|---|---|---|
| 1. | High yield | 10 | 1 |
| 2. | Adequate support from extension agents | 9 | 2 |
| 3. | Continuous seed availability | 8 | 3.5 |
| 4. | Highly suitable to agro-climatic zones | 8 | 3.5 |
| 5. | Less pest & disease incidence | 6 | 5 |
| 6. | Consumer acceptability | 5 | 6 |
| 7. | Lodging resistance | 4 | 7 |
| 8. | High demand | 3 | 8 |
| 9. | Good profit | 2 | 9 |

| | | | |
|---|---|---|---|
| 10. | Popularity | 1 | 10 |

The reasons for cultivating KAU released rice varieties were reported in Table 39. High yield was ranked as the main reason for cultivating KAU varieties since the yield obtained by farmers from the KAU rice varieties are satisfiable for them as compared to any local & traditional rice varieties especially when there are no other constraints like natural calamities which disturbs the yield.

The second most important reason for cultivating KAU rice is adequate support from extension agents, which is attributed to the fact that agricultural extension agents provide farmers with appropriate technical advice on agriculture as well as necessary inputs and services to support their agricultural production. The next important reason mentioned was continuous seed availability since KAU rice variety seeds were made available in adequate quantities to farmers including those in remote places, through Krishibhavan and NSC.

The fourth main reason was that it was well-suited to agro-climatic zones, which mainly refers to soil types, rainfall, temperature, and water availability suitable for a certain range of crops and cultivars. The fifth reason was ‘less pest and disease incidence’ since the respondent farmers are mostly using KAU released rice varieties which are resistant to major insect pests and diseases of rice such as blast, sheath blight and ear bug. This was followed by the reason ‘consumer acceptability’ since the rice varieties released by KAU has an increased liking by consumers due to its taste and cooking quality. The seventh reason was found as 'lodging resistance’, since lodging in paddy cultivation due to strong winds often affects grain yield and quality by breaking or bending stems but some rice varieties exhibit resistance to lodging, preventing heavy loss and yield reduction.

High demand, good profit and popularity were also reported by farmers as the reasons for cultivating KAU released rice varieties which occupies the eighth, ninth & tenth position respectively.

### 4.10.2 Reasons for not cultivating KAU released rice varieties

Table 40. Reasons for not cultivating KAU released rice varieties

| Sl. No | Reasons for not cultivating KAU rice varieties | Mean score | Rank |
|---|---|---|---|
| 1. | High cost of cultivation | 10 | 1 |
| 2. | Lack of availability of good quality seeds | 9 | 2.5 |
| 3. | Not suitable to certain agro-climatic zones | 9 | 2.5 |
| 4. | Unacceptability by rice millers | 7 | 4 |
| 5. | Long duration | 6 | 5 |
| 6. | High seed cost | 5 | 6 |
| 7. | Shattering of seeds | 4 | 7 |
| 8. | Low market value among few varieties | 3 | 8 |
| 9. | Uncertainty in market prices | 2 | 9 |
| 10. | Lack of support from extension agents | 1 | 10 |

The reasons for not cultivating KAU released rice varieties were reported in Table 40. When compared to the cultivation cost of local varieties like Cheradi, Njavara etc., high cultivation costs were regarded as the main reason for non-cultivation of KAU varieties. This included high input costs such as pesticides for weeds, insects, and disease management.

Lack of availability of good quality seeds identified as the second most important reason for non-cultivation, was linked to the fact that the seeds provided by KB are of poor quality and do not germinate well, forcing farmers to purchase from outside private seed farms at a greater cost. The next major reason reported was non-suitability of certain varieties at particular agro-climatic zones since the results produced by the cultivation of certain varieties were not effective when tried over a small scale.

Unacceptability by rice millers is the fourth key cause, which has been documented mostly in the case of Uma, which has a high moisture content after harvest, making millers prefer any other variety over Uma. The fifth reason attributed to non-

cultivation is 'longer duration' in some varieties, such as Uma, which requires 120-135 days and Jyothi, which requires 110-115 days, but local variations such as Njavara, requires comparatively less duration (70-75 days). This was followed by the reason 'High seed cost' because obtaining seeds from outside private agencies and seed farms is more expensive than purchasing seeds from government institutions like NSC and Krishibhavan.

Easy seed shattering was identified as the seventh reason which leads to significant loss in Jyothi. If harvesting is delayed in case of Jyothi variety, it would become dry and touch the ground, and begin to regrow.

Low market value, uncertainty in market prices, and lack of support from extension agents especially from personals of agriculture department were also reported by farmers as the reasons for not cultivation, which occupies the eighth, ninth & tenth position respectively.

## 4.12 SUGGESTIONS FOR REFINEMENT AS PERCEIVED BY THE FARMERS

The major ways for refining the available recommendations as perceived by farmers and filtered after discussions with subject matter experts were presented in Table 41.

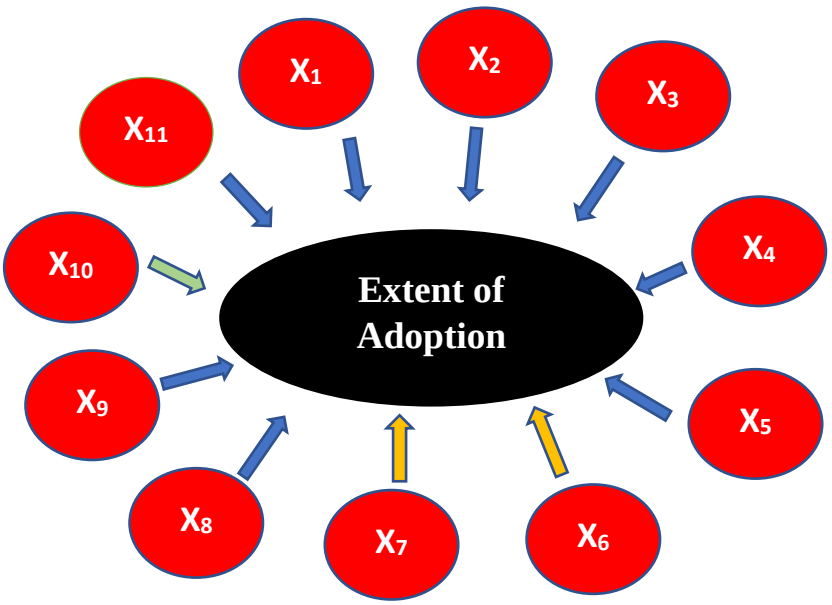
Table 41. indicated that majority of the respondents (93.33%) perceived 'Making provisions for constructing check dams and strengthening bunds' as the major strategy for refinement followed by 'Making available combine harvesters at less rent' (85.71%); 'Prioritization of agricultural activities in MGNREGA programme (*Thozhilurappu Padhathi*) by providing labours' (83.81%); 'Introducing farmer friendly implements so as to reduce the labour problem' (80.95 %); 'Making available timely and adequate information about availability of inputs, implements and prices' (78.09%); 'Increasing subsidies for rice farming' (71.42 %); 'Ensuring follow up and support by extension agents on the adoption of recommended practices' (68.57%); 'Adopting group farming approach in rice farming' (56.19%); 'Developing pest and disease resistant varieties' (52.38%) and 'Conducting farmer training programmes regarding processing and value-addition' (40.95%).

Hence in general, by implementing various soil and water conservation measures like earthen bunds, contour bunds, check dams etc to capture rainfall thus it helps to prevent the chances of runoff water from acquiring erosive velocities in the field and also reduce the impact of flood. Farmers have found that using a combine harvester for cutting and thrashing purposes has become more cost-effective due to the declining labour supply, but it should be easily accessible to them at lower rents. It is also essential to prioritize the agricultural activities in MGNREGA programme (*Thozhilurappu Padhathi*) by shifting the labourers into agricultural work and by developing farmer friendly implements also will help to alleviate the labour shortage problem.

Timely and adequate information regarding input availability & prices, increasing the subsidies for rice farming and frequent support by extension agents on the adoption of recommended practices were indicated by farmers as refinement suggestions. Adopting group farming approach in rice farming, developing pest and disease resistant varieties and conducting farmer training programmes regarding processing and value-addition were also recommended by farmers.

Table 41. Suggestions for refinement

| Sl. No | Suggestions | No. | % |
|---|---|---|---|
| 1. | Making provisions for constructing check dams and strengthening bunds | 98 | 93.33 |
| 2. | Making available of combine harvesters at less rent | 90 | 85.71 |
| 3. | Prioritization of agricultural activities in MGNREGA programme (*Thozhilurappu Padhathi*) by providing labours | 88 | 83.81 |
| 4. | Introducing farmer friendly implements to reduce the labour problem | 85 | 80.95 |
| 5. | Making available timely and adequate information about availability of inputs, implements and prices | 82 | 78.09 |
| 6. | Increasing subsidies for rice farming | 75 | 71.42 |
| 7. | Ensuring extension agents' follow-up and support in the adoption of recommended practices | 72 | 68.57 |
| 8. | Adopting group farming approach in rice farming | 59 | 56.19 |
| 9. | Developing pest and disease resistant varieties | 55 | 52.38 |
| 10. | Conducting farmer training programmes regarding processing and value-addition | 43 | 40.95 |




Significant @ 1% level

Significant @ 5% level

Non-Significant

X1- Age

X2- Farming experience

X3- Area under rice cultivation

X4- Annual income

X5- Mass media exposure

X6- Extension participation

X7- Achievement motivation

X8- Risk orientation

X9- Credit orientation

X10- Innovativeness

X11- Knowledge level

**Plate II: Empirical model of the study**

# *Summary*

## SUMMARY

Rice is a major staple food for over seventy percent of the world's population and ninety percent of Asians. It accounts for up to 75 per cent of the calories consumed by 2 billion people in Asia and up to 33% of the calories consumed by almost one billion people in Africa and Latin America. In Asia, rice is the most significant food, where population densities are the highest and overall dietary levels are the least adequate.

Due to farmers socioeconomic situation, they have various knowledge levels when it comes in adopting agricultural technologies at different stages. As a result, there emerges a gap between recommended practices and their application at the farmer's level. Therefore, the yield gap is a significant setback in efforts to increase agricultural productivity. The adoption of agricultural innovation on a large scale is an important aspect of agricultural progress. However, some farmers follow all of the recommended measures, some others follow them in a modified version that suits their local conditions, while some others do not. Farmers' personal, socioeconomic, and situational factors all have a part in their decision to adopt agricultural practices.

In these circumstances, a study on rice farmers' socioeconomic profiles, yield gaps, level of knowledge and adoption of recommended cultivation practices, constraints faced by rice growers, and farmer suggestions will be very useful in analysing in depth the farmers' needs as well as the crop's sustenance. This unique study provides information and support for policymakers, researchers, technocrats, and administrators as they devise strategies to address the rice farmers' requirements and limitations.

As a result, the current study was conducted to determine the existing yield gap, as well as the level of knowledge and adoption of recommended rice technologies by farmers in the districts of South Kerala. The objectives of the study were as follows:

1. To measure the of extent of popularity, acceptance and yield gap of rice varieties released by KAU among the rice farmers of South Kerala.

2. To measure the level of adoption of selected KAU technologies in rice varieties

3. To document the KAU rice varieties cultivated by farmers and sources of seeds

4. To determine the reasons for cultivating/not cultivating the variety

5. To study the personal and social characteristics of rice producing farmers

6. To identify the constraints experienced by the rice farmers with suggestions for refinement

The study was conducted during the year 2020-2021 in Thiruvananthapuram, Kollam, Alappuzha, Pathanamthitta, Kottayam, Ernakulam and Idukki districts representing the rice growing tract of Southern Kerala covering a sample of 105 farmers from seven Panchayats, namely, Ramankary, Karumalloor, Udumbanchola, Sooranad North, Thiruvarppu, Peringara and Nagaroor which were purposively selected on the basis of area of cultivation. Level of adoption of different recommended practices of rice included in the POP and the degree of yield gap in rice production among KAU released varieties were selected as the dependent variables and the independent variables were age, farming experience, area under rice cultivation, annual income, mass media exposure, extension participation, achievement motivation, risk orientation, credit orientation, innovativeness and knowledge level.

The study was conducted using an ex-post facto research design. Teacher-made test was used to assess respondents' knowledge regarding KAU scientific rice production practices as described in the POP. The adoption of these rice recommended practices were studied by computing adoption index. To understand the relationships between the dependent and independent variables simple correlation analysis was performed. Friedman test was adapted here to study the factors contributing the yield gap in Paddy. The data was collected by using a pre structured interview schedule. Statistical methods such as percentage analysis, mean and standard deviation, quartile deviation, simple correlation analysis, and friedman test were used to score, quantify, categorise, tabulate, and analyse the responses.

The salient features of the study were;

- Majority of the farmers belonged to middle aged category (53.33%) followed by young age (27.61%) and old age (19.05%).

- Majority of the farmers were experienced in farming. About 54.29 per cent of the farmers had between 20 to 40 years of farming experience followed by 32.38 per cent of respondents with 20 years of experience and only 13.33 per cent of farmers with more than 40 years of experience.
- Majority of the respondents cultivated rice in area between 1 to 5 acres (53.33%). Only 25.71 per cent of farmers cultivated rice in area less than 1 acre and 20.95 per cent farmers cultivated rice in area more than 5 acres.
- Majority of the farmer respondents (41.9 %) were having an annual income between 75,000 to 2.25 lakhs, 33.33 per cent of farmers with an annual income less than 75,000 and 24.76 per cent with more than 2.25 lakh.
- Majority of the farmers about 60.95 per cent had medium exposure to mass media followed by 36.19 per cent of farmers with low mass media exposure while only 2.86 per cent farmers had a high mass media exposure.
- Majority of the farmers about 57.14 per cent of the rice farmers had low extension participation followed by 24.76 per cent of farmers with medium extension participation and 18.09 per cent farmers had high extension participation.
- Majority of the farmers about 49.52 per cent of the rice farmers had medium achievement motivation followed by 36.19 per cent of farmers with low achievement motivation and 14.28 per cent farmers had high achievement motivation.
- Majority of the farmers about 46.67 per cent of the rice farmers had medium risk orientation followed by 45.71 per cent of farmers with low-risk orientation while only 7.62 per cent farmers had high risk orientation.
- Majority of the farmers about 46.67 per cent of the rice farmers had low credit orientation followed by 42.85 per cent of farmers with medium credit orientation and 10.48 per cent farmers had high credit orientation.

- Majority of the farmers about 60.95 per cent of the rice farmers had medium innovativeness followed by 28.57 per cent of farmers with low innovativeness and 10.48 per cent farmers had high innovativeness.
- Majority of the farmers about 60.00 per cent of the rice farmers had medium knowledge level in different scientific production practices followed by 33.33 per cent of farmers with low knowledge level and 6.67 per cent farmers had high knowledge level.
- Knowledge of respondents was maximum about the time of harvesting of paddy i.e., harvesting is done when 80% of grains in a panicle is mature and least for, maintaining water level @ 1.5 cm during transplanting (43.81%)
- Majority of the farmers about 59.04 per cent of the rice farmers depend on government institutions as their source of seed.
- Majority of the farmers about 78.09 per cent of the rice farmers used hired labour for rice cultivation
- Majority of the farmers about 40.95 per cent of the rice farmers had low popularity & 48.57 per cent of the rice farmers had low acceptance regarding KAU varieties
- Majority of the farmers about 71.42 per cent of the rice farmers cultivating on their ancestral property.
- Majority of the farmers about 72.36 per cent of the rice farmers supply the grains directly through civil supplies/ PDS immediately after harvesting
- Majority of the farmers about 60.00 per cent of respondent farmers undertaking value addition of rice & rice- based products.
- Majority of farmers fell under medium category with 50.47 per cent level of adoption followed by low and high category with 25.71 and 23.81 per cent level of adoption respectively.
- On analysing the percentage of adoption, about 94.28 per cent of farmers adopted suitable months for sowing in all 3 crop seasons, 90.47 per cent of

farmers adopted recommended varieties like Uma, Jyothi, Kanchana and Manurathna followed by the usage of recommended plant protection chemicals for P&D (74.28 %).

- The most adopted rice variety by the farmers of South Kerala was Uma (64.76%) followed by Jyothi variety (11.43 %).
- The yield gap was found to be the highest for Jyothi variety of rice (28.91%).
- Socio-economic factors and institutional factors were the most important components affecting the yield gap of Uma rice variety.
- Biophysical factors and climatic factors were the most important components affecting the yield gap of Jyothi rice variety.
- Farmers practices followed by the respondent rice farmers were the highest in Trivandrum district (53.33%) and least in Kottayam district (20 %).
- High labour charges ranked as the first and important constraint faced by rice farmers followed by non-availability of timely inputs and labours and flooding due to heavy rainfall.
- High yield was ranked as the main reason for cultivating KAU rice varieties followed by adequate support from extension agents
- High cost of cultivation was ranked as the main reason for non-cultivation of KAU varieties followed by lack of good quality seeds.
- The primary suggestion was to make provisions for constructing check dams and strengthening bunds (93.33%) followed by the availability of combine harvesters at less rent (85.71%)

**Suggestions for future research**

1. The study should be replicated in the rice growing tracts of the seven districts in South Kerala to arrive at more conclusive results.
2. Future research can be focussed on, evaluation studies on various extension activities undertaken by development departments and other agencies to popularise and persuade farmers to adopt improved recommended practices in rice cultivation.
3. Future research on possibilities of value addition and packaging of rice-based products as well as its marketing strategies can be undertaken

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# *Appendices*

**APPENDIX I**

**KERALA AGRICULTURAL UNIVERSITY**
**COLLEGE OF AGRICULTURE**
**Department of Agricultural Extension**
**Vellayani - 695 522**
**Thiruvananthapuram**

**Dr. B. Seema**
**Professor and Head, ADE(SZ)**

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Date: 11-3-2021

Sir/Madam,

Ms. SHANILA S (Ad. No. 2019-11-148), the post graduate scholar in the Department of Agricultural Extension, College of Agriculture, Vellayani is undertaking a research study entitled **"Research-extension gap in rice technology adoption among the farmers of South Kerala"** as part of her research work. Variables supposed to have close association with the study have been identified after extensive review of literature.

Considering your vast experience and knowledge on the subject, I request you to kindly spare some of your valuable time for examining the variables critically as a judge to rate the relevancy of them. Kindly return the list duly filled at the earliest in the self-addressed stamped envelope enclosed with this letter.

Thanking you,

Yours faithfully,
(Dr. B. Seema)

**Research-extension gap in rice technology adoption among the farmers of South Kerala**

**Objectives**

Measurement of extent of popularity, acceptance and yield gap of rice varieties released by KAU among the rice farmers of South Kerala. Documentation of KAU rice varieties cultivated by farmers, sources of seeds, reasons for cultivating/not cultivating the variety, technology standardized by KAU and constraints experienced.

**Personal, Social, Economic and Psychological variables taken for the study**

*Variables are given in bold cases and their respective meaning is explained for easy understanding of intended meaning. You may please rate the statement with a tick mark in the appropriate column against the statement with special reference to its importance to meet the objectives of the study.*

| Sl. No | Variable | Operational Definition | Relevancy rating (R - relevant) | | | | |
|---|---|---|---|---|---|---|---|
| | | | Most R | More R | R | Less R | Least R |
| 1. | **Age** | The number of chronological years respondents have completed at the time of study since birth | | | | | |
| 2. | **Education** | The extent of formal education achieved by the respondent | | | | | |
| 3. | **Occupation** | It refers to the involvement, connection and attachment of the respondents in various income generating activities | | | | | |
| 4. | **Size of land holding** | Land holding size refers to the area of land owned and leased in by the respondents | | | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 5. | **Farming experience** | Number of years since the farmer respondent was actually involved in the farming activities | | | | | |
| 6. | **Ancestral / Self-acquired property** | It means whether the property acquired by the respondents has been passed down from generations or the respondent have purchased/ acquired from their own income / resources | | | | | |
| 7. | **Area under rice cultivation** | It refers to the area under rice cultivation in acres by the respondents | | | | | |
| 8. | **Irrigated area to total rice cultivated area** | The proportion of irrigated area to total rice cultivated area of the respondents in acres is considered | | | | | |
| 9. | **Number of crops per year** | The total number of crops cultivated in an year on seasonal basis | | | | | |
| 10. | **Annual income** | It refers to the total annual earnings from the on farm and off farm activities of the farmer | | | | | |
| 11. | **Income from agriculture** | Yearly net income of the farmer from agricultural activities alone | | | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 12. | **Income from rice cultivation** | Yearly net income of the farmer from rice cultivation alone | | | | | |
| 13. | **Input availability** | Operationalised as the degree of relative availability of needed inputs of a farm enterprise | | | | | |
| 14. | **Source of rice seed** | It refers to the agency to which the respondents depended for purchasing seeds of the rice variety | | | | | |
| 15. | **Economic motivation** | It refers to the extent to which an individual is oriented towards achieving maximum economic ends such as maximization of the product | | | | | |
| 16. | **Extension orientation** | Extent of contact of a farmer with different extension agencies and also his participation in various extension activities conducted for the past one year | | | | | |
| 17. | **Scientific orientation** | The degree to which a farmer is oriented to the use of scientific methods in farming | | | | | |
| 18. | **Credit orientation** | It refers to the orientation to avail and utilize credit by | | | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | the respondent for paddy cultivation | | | | | |
| 19. | **Market orientation** | It is the degree to which farmers are oriented towards marketing to obtain reasonable gains from selling the produce | | | | | |
| 20. | **Progressiveness** | Relative receptivity of the farmer towards modern values and practices | | | | | |
| 21. | **Competitiveness** | The degree to which a farmer is oriented to place himself in a competitive situation for projecting his excellence in farming | | | | | |
| 22. | **Innovativeness** | The relative earliness in adopting an innovation | | | | | |
| 23. | **Achievement motivation** | It is the desire to do well, not so much for the sake of social recognition or prestige, but to attain an inner feeling of personal accomplishment | | | | | |
| 24. | **Social participation** | Degree of involvement of the respondent farmers in formal and informal organization either as a member or office bearer | | | | | |
| 25. | **Sources of information** | Sources through which farmers get information | | | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | about new idea or method of farming | | | | | |
| 26. | **Information seeking behaivour** | Extent to which a farmer seeks information regarding rice cultivation from different sources of communication | | | | | |
| 27. | **Decision making ability** | Ability of the respondents to select the most efficient means from among the available alternatives without depending on others | | | | | |
| 28. | **Cosmopoliteness** | The tendency of an individual to be in contact with outside of his own community based on the belief that all the needs of an individual cannot be satisfied within his own community | | | | | |
| 29. | **Communication behaviour** | The frequency of sharing of agricultural information by farmers with other fellow farmers and progressive farmers | | | | | |
| 30. | **Knowledge** | Level of understanding of different scientific production practices as stated in the recommended package of practices | | | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 31. | **Attitude of farmers towards scientific technologies** | It refers to the degree of favourableness or unfavourbleness of the respondents towards new technologies | | | | | |
| 32. | **Risk orientation** | It is the degree to which a farmer is oriented towards risk and uncertainty and has courage to face the problems in farming | | | | | |
| 33. | **Incentives received** | It is defined as the number of incentives received by the farmer from government and other agencies for promoting paddy cultivation | | | | | |
| 34. | **Storage facility** | It is the availability of any food storage facility, storing large amounts of food for either short or long periods, for distribution in normal food channels | | | | | |
| 35. | **Market perception** | It is defined as the capacity of the respondents to foresee the market trend to sell their produce for higher returns | | | | | |
| 36. | **Mass media exposure** | It is the extent of exposure of respondents to the mass media such as radio, | | | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | television, newspaper, farm magazines etc. | | | | | |
| 37. | **Farm power status** | The total number of farm machines owned by the respondents | | | | | |
| 38. | **Value addition of rice and rice-based products** | It is the extent to which rice and its byproducts when subjected to a change by means of packing, processing or upgrading the quality for higher monitory gains | | | | | |
| 39. | **Labour availability** | It is defined as the number of labourers available for the farm production process | | | | | |
| 40. | **Trainings undergone** | It is the total number of trainings undergone by the respondents in paddy cultivation during the last three years | | | | | |
| 41. | **Others if any, please specify** | | | | | | |

## APPENDIX II

## INTERVIEW SCHEDULE

### PART- I

Name of Block:

Name of Panchayat:

**1. GENERAL INFORMATION**

**a. Name of the farmer:**

**b. Address:**

**c. Mobile no:**

**2. PERSONAL AND SOCIO-PSYCHOLOGICAL CHARACTERISTICS:**

**a. Age:** ------- completed yrs

**b. Experience in farming (in yrs):**

**c. Area under rice cultivation:**

| Area owned (acres) | Leased in (acres) | Total area (acres) |
|---|---|---|
| **1.** | | |
| **2.** | | |

**d. Rice varieties cultivated:**

| Varieties of rice grown | Area (acres) | Total yield (q/ac) |
|---|---|---|
| 1. | | |
| 2. | | |
| 3. | | |

**e. Number of labourers involved in rice cultivation:**

| Categories | No. of labourers | |
|---|---|---|
| | Male | Female |
| Family labour | | |
| Hired labour | | |
| Family + hired labour | | |

**f. Annual Income:**

i) Income from rice cultivation Rs……

iii) Other means Rs……

Total Rs……

**g. Source of rice seed:**

| Agency / Source of rice seed cultivating | Yes | No |
|---|---|---|
| 5. Government institutions<br>f) KAU<br>g) KSSDA<br>h) NSC<br>i) State Seed Farms<br>j) Krishibhavan | | |
| 6. Fellow farmers | | |
| 7. Self- produced | | |
| 8. Others (specify) | | |

**h. Mass Media Exposure:**

**Please indicate ownership or subscription and frequency of use**

| Sl. No | Media | Frequency of use | | |
|---|---|---|---|---|
| a) | Possession of TV/Radio | Yes (1) | | No (0) |
| b) | Subscriber to newspaper | Yes (1) | | No (0) |
| c) | Subscriber to farm magazines | Yes (1) | | No (0) |
| d) | Others | Yes (1) | | No (0) |
| e) | Listening to radio | Regularly (2) | Occasionally (1) | Never (0) |
| f) | Viewing TV | Regularly (2) | Occasionally (1) | Never (0) |
| g) | Reading newspaper | Regularly (2) | Occasionally (1) | Never (0) |
| h) | Reading farm magazines | Regularly (2) | Occasionally (1) | Never (0) |
| i) | Others | Regularly (2) | Occasionally (1) | Never (0) |

**i. Achievement Motivation:**

**Please give your degree of agreement or disagreement about each of the following statements (SA-Strongly agree, A-Agree, UD-Undecided, DA-Disagree & SDA-Strongly disagree)**

| Sl. No | Statements | Response categories | | | | |
|---|---|---|---|---|---|---|
| | | SA | A | UD | DA | SDA |
| 1. | One should enjoy paddy cultivation as much as a play | | | | | |
| 2. | In paddy field, one should work like a servant at everything until he is satisfied with the results | | | | | |
| 3. | One should succeed in agriculture even if one has been neglectful to his family | | | | | |
| 4. | One should have determination and driving ambition to achieve certain things in life (even if these qualities make one unpopular) | | | | | |
| 5. | Agricultural work should come first even if one cannot take rest | | | | | |
| 6. | Even when one's interest is in danger, he should concentrate on his job and forget his obligations to others | | | | | |
| 7. | In agriculture, one should set difficult goals for oneself and try to accomplish them | | | | | |

**j. Risk Orientation:**

**Please indicate your responses in the appropriate alternative (SA- Strongly Agree, A-Agree, UD-Undecided & DA-Disagree, SDA- Strongly Disagree)**

| Sl. No | Statements | Response categories | | | | |
|---|---|---|---|---|---|---|
| | | SA | A | UD | DA | SDA |
| 1. | A farmer should grow large number of crops to avoid greater risk in involved in growing one or two crops | | | | | |
| 2. | A farmer should take more chance in making a big profit than to be content with smaller and less risky profit | | | | | |
| 3. | A farmer who is willing to take greater risk than the average farmer usually does better financially | | | | | |
| 4. | It is good for a farmer to take risk when he knows his chance of risk is high | | | | | |
| 5. | Trying an innovative organic method involves risk but it is worth | | | | | |
| 6. | It is better for a farmer not to follow the KAU recommended practices of rice unless most others in the locality have used it with success (-) | | | | | |

**k. Credit Orientation:**

| Sl. No | Statements | Response | | | |
|---|---|---|---|---|---|
| 1. | Do you think farmer like you should borrow credit from bank for agricultural purpose? | Yes | No | | |
| 2. | In your opinion, how difficult it is to secure credit for agriculture purpose? | Very difficult | Difficult | Easy | Very Easy |
| 3. | How a farmer is treated when he goes to secure credit from bank/ co-operative societies? | Very badly | Badly | Fair | Very Fair |
| 4. | There is nothing wrong in taking credit from institutional sources for increasing production. | SA | A | DA | SDA |
| 5. | Have you taken credit previously? | Yes | No | | |

**l. Extension Participation:**

**Please state your response for the following items**

| Sl. No | Extension Activity | Frequency of use | | |
|---|---|---|---|---|
| | | **Regular** | **Occasional** | **Never** |
| 1. | Method demonstration | | | |
| 2. | Result demonstration | | | |
| 3. | Farm and home visit | | | |
| 4. | Training programmes | | | |
| 5. | Krishimela | | | |
| 6. | Campaign | | | |
| 7. | Field day | | | |
| 8. | Field visit | | | |
| 9. | Group meeting/ Group discussion | | | |
| 10. | Others | | | |

**m. Innovativeness:**

**A set of statements are given below with respect to innovativeness. Please indicate the degree of agreement or disagreement on the three-point continuum**

| Sl. No | Statements | Response categories | | |
|---|---|---|---|---|
| | | **Yes (2)** | **Undecided (1)** | **No (0)** |
| 1. | Do you want to learn new ways of farming? | | | |

| | | | | |
|---|---|---|---|---|
| 2. | If the agricultural extension worker gives a talk on improved cultivation aspects, will you attend it? | | | |
| 3. | If the govt. helps you in establishing a farm elsewhere, will you accept the deal? | | | |
| 4. | Do you want a change in your life? | | | |
| 5. | A farmer should try to do farming the way his parents did (-) | | | |
| 6. | Do you want your sons to be farmers? (-) | | | |
| 7. | It is better to enjoy today and let tomorrow take care of itself (-) | | | |
| 8. | A man's future is in the hands of God (-) | | | |

**n. Reasons for cultivating/ not cultivating the KAU rice varieties:**

| **Sl. No** | **Reasons for cultivating KAU rice varieties** | **Reasons for not-cultivating KAU rice varieties** |
|---|---|---|
| 1. | High profit | Low profit |
| 2. | Higher yield | Low yield |
| 3. | Low cost of seeds | High cost of seeds |
| 4. | Continuous seed availability | Seeds are not easily available |
| 5. | Low cost of cultivation | High cost of cultivation |
| 6. | Consumer acceptability | Consumer unacceptability |
| 7. | Popularity | Not popular |
| 8. | Short duration | Long duration |
| 9. | Highly suitable to agro climatic conditions | Not suitable to agro climatic conditions |
| 10. | Good support from extension agents | Lack of support from extension agents |
| 11. | Others (specify if any) | Others (specify if any) |

**o. Farmers Practices:**

| **Sl. No** | **ITK / Farmers' practice** | **Effectiveness** | | |
|---|---|---|---|---|
| | | **E** | **NE** | **VE** |
| 1. | | | | |
| 2. | | | | |
| 3. | | | | |
| 4. | | | | |
| 5. | | | | |

**p. 1) Popularity & Acceptance of KAU rice varieties:**

| Sl. No | KAU rice varieties | Very popular | Popular | Unpopular |
|---|---|---|---|---|
| 1. | Uma | | | |
| 2. | Jaya | | | |
| 3. | Jyothi | | | |
| 4. | Sreyas | | | |
| 5. | Manupriya | | | |
| 6. | Kanchana | | | |
| 7. | Aiswarya | | | |
| 8. | Others (specify) | | | |

**2) Acceptance of KAU rice varieties**

| Sl. No | KAU rice varieties | High acceptance (2) | Acceptance (1) | No Acceptance (0) |
|---|---|---|---|---|
| 1. | Uma | | | |
| 2. | Jaya | | | |
| 3. | Jyothi | | | |
| 4. | Sreyas | | | |
| 5. | Manurathna | | | |
| 6. | Kanchana | | | |
| 7. | Aiswarya | | | |
| 8. | Others (specify) | | | |

**q. Is your land property is Self-acquired/ Ancestral/Both? Yes/ No**

**r. Is there any storage facilities available for keeping the bulk amounts of food grains produced?**

| Storage facility | Yes | No |
|---|---|---|
| 4. Bag storage (Gunny bags) | | |
| 5. Wooden bin (Pathayam) | | |
| 6. Metallic & concrete silos | | |
| 7. Granary room | | |
| 8. Warehouses / Civil supplies | | |
| 9. Others | | |

**s. Is there any value-added processing of rice and rice by-products?**

| Category | Yes | No |
|---|---|---|
| 1. Rice powder | | |
| 2. Rice bran oil | | |
| 3. Rice flakes | | |
| 4. Puffed rice | | |
| 5. Rice starch | | |
| 6. Liquid glucose from broken rice | | |

| | | |
|---|---|---|
| 7. Others | | |

**t. Factors affecting yield gap in rice varieties as perceived by the farmers**

| Sl.No. | Rice varieties | Factors affecting Yield gap | Response categories | | | | |
|---|---|---|---|---|---|---|---|
| | | | SA | A | UD | DA | SDA |
| 1. | | 1.Biophysical factors | | | | | |
| | | 2.Climatic factors | | | | | |
| | | 3.Socio-economic factors | | | | | |
| | | 4.Institutional factors | | | | | |
| | | 5.Factors related to technology transfer | | | | | |
| 2. | | 1.Biophysical factors | | | | | |
| | | 2.Climatic factors | | | | | |
| | | 3.Socio-economic factors | | | | | |
| | | 4.Institutional factors | | | | | |
| | | 5.Factors related to technology transfer | | | | | |

**u. Knowledge test about the KAU varieties and selected recommended practices of Rice.**

1. Do you know the recommended seed rate during transplanting

a) 80-100 Kg/ha b) 60-65 Kg/ha c) 80-90 Kg/ha d) 30-35 Kg/ha

2. Do you know the recommended spacing for short duration

a) 20cmx15cm b)15cm x 10cm c)20cm x 10cm d)25cm x 15cm

3. Do you know the recommended varieties for your area?

a) Uma i) Yes ii) No

b) Jaya i) Yes ii) No

c) Sreyas i) Yes ii) No

d) Jyothi i) Yes ii) No

e) Aiswarya i) Yes ii) No

4. Do you know the recommended dose of NPK for short duration rice [wetland]

a) 30:35:35 Kg/ha b) 90:45:45 Kg/ha c) 70:35:35 Kg/ha d) 45:45:45 Kg/ha

5. Do you know about the recommended bioagents used for seed treatment?

a) *Pseudomonas* i) Yes ii) No

b) *Trichoderma* i) Yes ii) No

6. Do you know about the cultural methods of weed management?

a) Hand weeding i) Yes ii) No

b) Flooding i) Yes ii) No

c) Stale seed bed technique i) Yes ii) No

d) Avoiding wider planting i) Yes ii) No

7. Do you know harvesting is done when 80% of grains in a panicle is mature? Yes / No.

8. Do you know rice seedlings should be transplanted from the nursery to main field after 20- 25 days? Yes / No.

9. Do you know the water level to be maintained @ 1.5cm during transplanting? Yes/ No.

10. Do you know the usage of trichocards to control rice yellow stem borer? Yes/ No.

## PART II

### I. Adoption of recommended cultivation practices of rice

| Sl. No | Particulars | Adoption | | |
|---|---|---|---|---|
| | | **Full Adoption** | **Partial Adoption** | **No Adoption** |
| 1. | Do you adopt the recommended KAU rice varieties for your area? | | | |
| | • Uma<br>• Jaya<br>• Jyothi<br>• Sreyas<br>• Manupriya<br>• Others | | | |
| 2. | Do you adopt the suitable months for sowing and have you sown in the same period? | | | |
| | • April- May (Virippu / I crop) | | | |
| | • Sept- Oct (Mundakan / II crop) | | | |
| | • Dec- Jan (Puncha / III crop) | | | |
| 3. | Do you adopt the recommended seed rate per hectare? | | | |
| | • Transplanting – 60-65 kg/ha | | | |
| | • Broadcasting – 80-100 kg/ha | | | |
| | • Dibbling – 80-90 kg/ha | | | |
| 4. | Do you adopt the recommended chemical/ bioagents used for seed treatment? | | | |
| | • *Pseudomonas* | | | |

| | | | | |
|---|---|---|---|---|
| | • *Trichoderma*<br>• Bavistin | | | |
| 5. | Do you adopt the recommended nursery management practices? | | | |
| | • Area – 1/ $10^{th}$ of the main field area | | | |
| | • FYM - 4000kg/ac | | | |
| | • Water management – sprinkling of water (2times/day) | | | |
| 6. | Do you adopt the recommended main field preparation practices before transplanting? | | | |
| | • 2-3 times of ploughing | | | |
| | • FYM @ 5t/ha | | | |
| | • Liming- 350kg/ha as basal dressing | | | |
| 7. | Do you adopt the recommended stages of seedlings transplanted from nursery to the main field? | | | |
| | • 18-21 days (Short duration) | | | |
| | • 20-25 days (Medium duration) | | | |
| 8. | Do you adopt the use of trichocards to control stem borer in paddy? | | | |
| | | | | |
| 9. | Do you adopt the recommended spacing? | | | |
| | • 15cmx10cm (Short duration) | | | |
| | • 20cmx15cm (Ist crop, Medium duration) | | | |
| | • 20cmx10cm (IInd crop, Medium duration) | | | |
| | • 20cmx10cm (IIIrd crop, Medium duration) | | | |
| 10. | Do you adopt the recommended quantity of fertilizers applied per hectare? | | | |
| | • NPK – 70:35:35 kg/ha (Short duration)<br>• NPK – 90:45:45 kg/ha (Medium duration) | | | |
| 11. | Do you adopt the recommended management of aged/over-raised seedlings? | | | |
| | • Follow the spacing recommended to medium and low fertility soil | | | |
| | • Avoid cluster planting of aged seedlings | | | |
| | • Enhance the basal N application by 50% from the recommended dose to encourage the tiller production | | | |
| 12. | Do you adopt the recommended frequency of irrigation to be maintained? | | | |
| | • Maintain water level at about 1.5cm during transplanting. Thereafter increase it gradually to about 5cm until maximum tillering stage. | | | |
| | • Drain out the impounded water from the fields 13 days before harvesting. | | | |
| 13. | Do you adopt the recommended frequency of weeding for the control of weeds? | | | |
| | • First weeding: 20 days after planting | | | |
| | • Second weeding: 40 days after planting | | | |
| 14. | Do you adopt the recommended cultural methods of weed management? | | | |
| | • Using seeds from weedy rice free areas | | | |
| | • Hand weeding | | | |
| | • Stale seed bed technique | | | |
| | • Flooding | | | |

| | | | | |
|---|---|---|---|---|
| | • Avoiding wider planting | | | |
| 15. | Do you adopt the recommended plant protection chemicals used for pests and diseases control? | | | |
| | **Pest control:**<br>a.<br>b.<br>c.<br>**Disease control:**<br>a.<br>b.<br>c. | | | |

**II. YIELD GAP:**

**Yield of rice crop for the last 3 seasons in 2019-2020.**

| Sl. No | Variety | Cultivated Area under Rice (ac) | Virippu/ I crop (q/ac) | Mundakan/ II crop (q/ac) | Puncha / III crop (q/ac) |
|---|---|---|---|---|---|
| 1. | | | | | |
| 2. | | | | | |
| 3. | | | | | |
| 4. | | | | | |

**III. Constraints in bridging the yield gap**

| Sl. No | Particulars | MI (4) | I (3) | LI (2) | Li (1) | Perceived solutions |
|---|---|---|---|---|---|---|
| 1. | Pest and disease incidence | | | | | |
| 2. | Non availability of timely inputs and labours | | | | | |
| 3. | Lack of timely information and proper guidance from extension staff | | | | | |
| 4. | Lack of credit facilities | | | | | |
| 5. | Drought | | | | | |
| 6. | Price fluctuations | | | | | |
| 7. | Lack of storage facilities | | | | | |
| 8. | High labour charges | | | | | |
| 9. | Floods | | | | | |
| 10. | Less profit | | | | | |
| 11. | High loading charges | | | | | |
| 12. | Others | | | | | |

**IV. Suggestions to reduce the yield gap and to enhance the rice productivity as perceived by the rice farmers.**

1.

## അഭിമുഖ പട്ടിക

ഒന്നാം ഭാഗം

ബ്ലോക്ക്:

പഞ്ചായത്ത്:

**1. പൊതുവായ വിവരം**

a. കൃഷിക്കാരന്റെ പേര്:

b. വിലാസം:

c. മൊബൈൽ നമ്പർ:

**2. വ്യക്തിഗത, സാമൂഹിക-സൈക്കോളജിക്കൽ സ്വഭാവഗുണങ്ങൾ:**

a. പ്രായം: ------- പൂർത്തിയാക്കിയ വർഷം

b. കൃഷിയിലുള്ള പരിചയം (വർഷത്തിൽ):

c. നെൽകൃഷി ചെയ്യുന്ന ഭൂമിയുടെ വിസ്തൃതി:

| സ്വന്തമായുള്ളത് (ഏക്കറിൽ) | പാട്ടത്തിനെടുത്തത് (ഏക്കറിൽ) | ആകെ വിസ്തൃതി (ഏക്കറിൽ) |
|---|---|---|
| **1.** | | |
| **2.** | | |

d. കൃഷി ചെയ്യുന്ന നെല്ല് ഇനങ്ങൾ:

| നെല്ലിന്റെ ഇനങ്ങൾ | വിസ്തൃതി (ഏക്കറിൽ) | ആകെ വിളവ് (ക്വിന്റൽ / ഏക്കർ) |
|---|---|---|
| 1. | | |
| 2. | | |
| 3. | | |

e. നെൽകൃഷിയിൽ ഏർപ്പെട്ടിരിക്കുന്ന തൊഴിലാളികളുടെ എണ്ണം:

| വിഭാഗങ്ങൾ | തൊഴിലാളികളുടെ എണ്ണം | |
|---|---|---|
| | പുരുഷന്മാർ | സ്ത്രീകൾ |
| a. കുടുംബത്തിൽ നിന്ന് ജോലിക്കായി എടുത്ത ആളുകളുടെ എണ്ണം | | |

| | | |
|---|---|---|
| b. പുറത്തുനിന്ന് ജോലിക്കായി എടുത്ത ആളുകളുടെ എണ്ണം | | |
| c. കുടുംബത്തിൽ നിന്ന് + പുറത്തുനിന്ന് | | |

**f. വാർഷിക വരുമാനം:**

i) നെൽകൃഷിയിലൂടെ ലഭിക്കുന്ന വരുമാനം .....

iii) മറ്റേതെങ്കിലും തൊഴിൽ വരുമാനം .....

ആകെ വരുമാനം .....

**g. നെല്ല് വിത്തിന്റെ ഉറവിടം:**

| **കൃഷിചെയ്യുന്നതിനായി നെല്ല് വിത്ത് എടുക്കുന്നതിന്റെ ഉറവിടം** | **അതെ** | **അല്ല** |
|---|---|---|
| 1. സർക്കാർ സ്ഥാപനങ്ങൾ<br>• കേരള കാർഷിക സർവകലാശാല<br>• കെ. എസ്.എസ്.ഡി.എ.<br>• എൻ.എസ്.സി<br>• സംസ്ഥാന വിത്ത് ഫാമുകൾ<br>• കൃഷിഭവൻ | | |
| 2. സഹ കർഷകർ | | |
| 3. സ്വയം നിർമ്മിക്കുന്നത് | | |
| 4. മറ്റുള്ളവ (വ്യക്തമാക്കുക) | | |

**h. ബഹുജന മാധ്യമങ്ങളുമായുള്ള ഇടപെടൽ:**

| **ക്രമനം:** | **ഉറവിടം** | **ആവർത്തന തോത്** | | |
|---|---|---|---|---|
| a) | ടെലിവിഷൻ/ റേഡിയോ | ഉണ്ട് (1) | | ഇല്ല (0) |
| b) | വർത്തമാന പത്രം | ഉണ്ട് (1) | | ഇല്ല (0) |
| c) | കാർഷിക മാസിക | ഉണ്ട് (1) | | ഇല്ല (0) |
| d) | മറ്റെന്തെങ്കിലും | ഉണ്ട് (1) | | ഇല്ല (0) |
| e)<br><br><br>f) | റേഡിയോ കേൾക്കാറുണ്ടോ | പതിവായി (2) | ഇടയ്ക്കിടെ (1) | ഒരിക്കലും ഇല്ല (0) |

| | | | | |
|---|---|---|---|---|
| g) | ടെലിവിഷൻ കാണാറുണ്ടോ | | | |
| h) | പത്രം വായിക്കാറുണ്ടോ | | | |
| i) | കാർഷിക മാസിക വായിക്കാറുണ്ടോ | | | |
| | മറ്റെന്തെങ്കിലും | | | |

**i. വിജയ സാധ്യത പ്രചോദനം:**

**താഴെപ്പറയുന്ന ഓരോ പ്രസ്താവനകളോടും എത്രമാത്രം താങ്കൾ യോജിക്കുന്നു അല്ലെങ്കിൽ വിയോജിക്കുന്നു എന്ന് വ്യതമാക്കുക (SA-ശക്തമായി സമ്മതിക്കുന്നു, A-സമ്മതിക്കുന്നു, UD-അഭിപ്രായമില്ല, DA-വിസമ്മതിക്കുന്നു, SDA- ശക്തമായി വിസമ്മതിക്കുന്നു)**

| ക്രമ നമ്പർ | പ്രസ്താവന | പ്രതികരണം | | | | |
|---|---|---|---|---|---|---|
| | | **SA** | **A** | **UD** | **DA** | **SDA** |
| 1. | ഒരു വിനോദം പോലെ നെല്ല് കൃഷി ആസ്വദിക്കാറുണ്ട് | | | | | |
| 2. | ഫലങ്ങളിൽ സംതൃപ്തനാകുന്നതുവരെ കർഷകൻ തന്റെ നെൽവയലിൽ സേവകനെപ്പോലെ പ്രവർത്തിക്കണം | | | | | |
| 3. | കാർഷിക മേഖലയിൽ വിജയിക്കുന്നതിനായി സ്വന്തം കുടുംബത്തെ വരെ അവഗണിച്ചിട്ടു പ്രവർത്തിക്കാറുണ്ട് | | | | | |
| 4. | ജീവിതത്തിലെ ലക്ഷ്യങ്ങൾ നേടിയെടുക്കാൻ ദൃഢനിശ്ചയവും അതിയായ ആഗ്രഹവും ഉണ്ടായിരിക്കണം | | | | | |
| 5. | കർഷകന് വിശ്രമിക്കാൻ കഴിഞ്ഞില്ലെങ്കിൽ പോലും കാർഷിക പ്രവർത്തനങ്ങൾക്ക് പ്രാധാന്യം കൊടുത്തിരിക്കണം | | | | | |
| 6. | മറ്റുള്ളവരോടുള്ള കടമകൾ മറന്നുകൊണ്ടുപോലും കർഷകൻ തൻറെ ബുദ്ധിമുട്ടുള്ള ആഗ്രഹം നിറവേറുന്നതിനായി ശ്രദ്ധകേന്ദ്രീകരിക്കണം | | | | | |
| 7. | കാർഷികമേഖലയിൽ സ്വയം പ്രയാസകരമായ ലക്ഷ്യങ്ങൾ കർഷകൻ വെയ്ക്കുകയും അവ നിറവേറാൻ പരിശ്രമിക്കുകയും വേണം | | | | | |

**j. നഷ്ട സാധ്യത അവബോധം:**

**താഴെപ്പറയുന്ന ഓരോ പ്രസ്താവനകളോടും എത്രമാത്രം താങ്കൾ യോജിക്കുന്നു അല്ലെങ്കിൽ വിയോജിക്കുന്നു എന്ന് വ്യതമാക്കുക (SA-ശക്തമായി സമ്മതിക്കുന്നു, A-സമ്മതിക്കുന്നു, UD-അഭിപ്രായമില്ല, DA-വിസമ്മതിക്കുന്നു, SDA- ശക്തമായി വിസമ്മതിക്കുന്നു)**

| ക്രമ നമ്പർ | പ്രസ്താവന | പ്രതികരണം | | | | |
|---|---|---|---|---|---|---|
| | | **SA** | **A** | **UD** | **DA** | **SDA** |
| 1. | ഒന്നോ രണ്ടോ വിളകൾ കൃഷി ചെയ്യുമ്പോൾ ഉള്ള അപകടം ഒഴിവാക്കുന്നതിനായി കർഷകൻ കൂടുതൽ വിളകൾ കൃഷി ചെയ്യണം | | | | | |
| 2. | നഷ്ട സാധ്യത കുറഞ്ഞതും കുറച്ചു ലഭിക്കുന്നതുമായ ലാഭത്തിനു പകരമായി കർഷകൻ കൂടുതൽ മാറ്റത്തിന് തയ്യാറായാൽ കൂടുതൽ ലാഭം നേടാം | | | | | |
| 3. | കൂടുതൽ വെല്ലുവിളികൾ ഏറ്റെടുക്കാൻ തയ്യാറായുള്ള കർഷകന് ഒരു ശരാശരി കർഷകനേക്കാൾ കൂടുതൽ സാമ്പത്തിക നേട്ടം ഉണ്ടാക്കാൻ സാധിക്കും | | | | | |
| 4. | വിജയസാധ്യത ഉറപ്പുണ്ടെങ്കിൽ കർഷകൻ വെല്ലുവിളികൾ ഏറ്റെടുക്കുന്നത് നല്ലതാണ് | | | | | |
| 5. | നൂതനമായ ഒരു കൃഷി രീതി സ്വീകരിക്കുന്നതിൽ നഷ്ട സാധ്യത ഉണ്ടെങ്കിലും ലാഭകരമാണ് | | | | | |
| 6. | കേരളം കാർഷിക സർവ്വകലാശാല നിർദ്ദേശിക്കുന്ന കൃഷിരീതികൾ കർഷകൻ തൻറെ ചുറ്റുപാടുള്ളവർ പ്രയോഗിച്ചു വിജയിച്ചിട്ടുണ്ടെങ്കിൽ മാത്രമേ സ്വീകരിക്കേണ്ടതുള്ളൂ(-) | | | | | |

**k. വായ്പ സാധ്യത അവബോധം:**

| ക്രമ നം: | പ്രസ്താവന | പ്രതികരണം | | | |
|---|---|---|---|---|---|
| 1. | നിങ്ങളെപ്പോലെയുള്ളൊരു കൃഷിക്കാരൻ കാർഷിക ആവശ്യങ്ങൾക്കായി ബാങ്കിൽ നിന്ന് വായ്പ വാങ്ങണമെന്ന് നിങ്ങൾ കരുതുന്നുണ്ടോ? | Yes | No | | |
| 2. | കാർഷിക ആവശ്യങ്ങൾക്കായി വായ്പ എടുക്കുന്നത് നിങ്ങളുടെ അഭിപ്രായത്തിൽ എത്രത്തോളം ബുദ്ധിമുട്ടാണ്? | Very difficult | Difficult | Easy | Very easy |
| 3. | ബാങ്ക് / സഹകരണ സംഘങ്ങളിൽ നിന്ന് വായ്പ നേടാൻ പോകുമ്പോൾ ഒരു കർഷകനോട് എങ്ങനെയാണ് പെരുമാറുന്നത്? | Very badly | Badly | Fair | Very Fair |
| 4. | ഉൽപാദനം വർദ്ധിപ്പിക്കുന്നതിനായി സ്ഥാപന സ്രോതസ്സുകളിൽനിന്നും വായ്പ എടുക്കുന്നതിൽ തെറ്റൊന്നുമില്ല. | SA | A | DA | SDA |
| 5. | നിങ്ങൾ മുമ്പ് ക്രെഡിറ്റ് എടുത്തിട്ടുണ്ടോ? | Yes | No | | |

- Yes-അതെ, No- അല്ല
- Very difficult- വളരെ ബുദ്ധിമുട്ടാണ്, Difficult-ബുദ്ധിമുട്ടാണ്, Easy-എളുപ്പമാണ്, Very easy- വളരെ എളുപ്പമാണ്
- Very badly- വളരെ മോശമായി, Badly- മോശമായി, Fair-തൃപ്തികരമായ്, Very fair- വളരെ തൃപ്തികരമായ്
- SA-ശക്തമായി സമ്മതിക്കുന്നു, A-സമ്മതിക്കുന്നു, DA-വിസമ്മതിക്കുന്നു, SDA- ശക്തമായി വിസമ്മതിക്കുന്നു

**l. വിജ്ഞാന വ്യാപന പ്രവർത്തനങ്ങളിലുള്ള പങ്കാളിത്തം:**

**താഴെപ്പറയുന്ന ഓരോ വാക്യങ്ങളോടും നിങ്ങളുടെ പ്രതികരണം ദയവായി പ്രസ്താവിക്കുക**

| ക്രമ നം: | വിജ്ഞാന വ്യാപന പ്രവർത്തനങ്ങൾ | ആവർത്തന തോത് | | |
|---|---|---|---|---|
| | | പതിവായി | ഇടയ്ക്കിടെ | ഒരിക്കലുമില്ല |
| 1. | രീതി പ്രകടനം | | | |
| 2. | ഫലം പ്രകടനം | | | |
| 3. | വീടും കൃഷിസ്ഥലവും | | | |

| | | | | |
|---|---|---|---|---|
| | സന്ദർശിക്കൽ | | | |
| 4. | പരിശീലന പരിപാടികൾ | | | |
| 5. | കൃഷിമേള | | | |
| 6. | പ്രചാരണ പ്രവർത്തനങ്ങൾ | | | |
| 7. | ഫീൽഡ് ഡേ | | | |
| 8. | ഫീൽഡ് സന്ദർശനം | | | |
| 9. | സമൂഹ സമ്മേളനം / ചർച്ച | | | |
| 10. | മറ്റുള്ളവ | | | |

**m. കേരള കാർഷിക സർവകലാശാലയുടെ നെൽ ഇനങ്ങൾ വളർത്തുന്നതിനോ വളർത്താതിരിക്കുന്നതിനോ ഉള്ള കാരണങ്ങൾ:**

| ക്രമ നം: | കെ.എ.യു നെല്ല് കൃഷി ചെയ്യുന്നതിനുള്ള കാരണങ്ങൾ | കെ.എ.യു നെല്ല് കൃഷി ചെയ്യാത്തതിന്റെ കാരണങ്ങൾ |
|---|---|---|
| 1. | ഉയർന്ന ലാഭം | കുറഞ്ഞ ലാഭം |
| 2. | ഉയർന്ന വിളവ് | കുറഞ്ഞ വിളവ് |
| 3. | വിത്തുകളുടെകുറഞ്ഞ വില | വിത്തുകളുടെ ഉയർന്ന വില |
| 4. | തുടർച്ചയായ വിത്ത് ലഭ്യത | തുടർച്ചയായ വിത്ത് ലഭ്യതയില്ല |
| 5. | കുറഞ്ഞ കൃഷി ചെലവ് | ഉയർന്ന കൃഷി ചെലവ് |
| 6. | ഉപഭോക്താക്കളുടെ സ്വീകാര്യത | ഉപഭോക്താക്കളുടെ അസ്വീകാര്യത |
| 7. | ജനപ്രീതി | ജനപ്രീതി ഇല്ല |
| 8. | കുറഞ്ഞ കാലയളവ് | ഉയർന്ന കാലയളവ് |
| 9. | കാർഷിക കാലാവസ്ഥയ്ക്ക് വളരെ അനുയോജ്യമാണ് | കാർഷിക കാലാവസ്ഥയ്ക്ക് അനുയോജ്യമല്ല |
| 10. | വിജ്ഞാന വ്യാപന ഉദ്യോഗസ്ഥരിൽ നിന്നും നല്ല പിന്തുണ | വിജ്ഞാന വ്യാപന ഉദ്യോഗസ്ഥരിൽ നിന്നും പിന്തുണ ഇല്ല |
| 11. | മറ്റുള്ളവ (എന്തെങ്കിലും ഉണ്ടെങ്കിൽ വ്യക്തമാക്കുക) | മറ്റുള്ളവ (എന്തെങ്കിലും ഉണ്ടെങ്കിൽ വ്യക്തമാക്കുക) |

**n. നൂതന ആശയങ്ങളോടുള്ള ആഭിമുഖ്യം:**

**നവീകരണവുമായി ബന്ധപ്പെട്ട് ഒരു കൂട്ടം പ്രസ്താവനകൾ ചുവടെ നൽകിയിരിക്കുന്നു. താഴെപ്പറയുന്ന ഓരോ പ്രസ്താവനകളോടും എത്രമാത്രം താങ്കൾ യോജിക്കുന്നു അല്ലെങ്കിൽ വിയോജിക്കുന്നു എന്ന് വ്യതമാക്കുക**

| ക്രമ നം: | പ്രസ്താവന | പ്രതികരണം | | |
|---|---|---|---|---|
| | | അതെ | തീരുമാനി-ച്ചിട്ടില്ല | അല്ല |
| 1. | പുതിയ കൃഷിരീതികൾ പഠിക്കാൻ നിങ്ങൾ ആഗ്രഹിക്കുന്നുണ്ടോ? | | | |
| 2. | കാർഷിക വിജ്ഞാന വ്യാപന തൊഴിലാളി മെച്ചപ്പെട്ട കൃഷി വശങ്ങളെക്കുറിച്ച് ഒരു പ്രഭാഷണം നടത്തുകയാണെങ്കിൽ, നിങ്ങൾ അതിൽ പങ്കെടുക്കുമോ? | | | |
| 3. | സർക്കാർ മറ്റെവിടെയെങ്കിലും ഒരു ഫാം സ്ഥാപിക്കാൻ നിങ്ങളെ സഹായിക്കുമെങ്കിൽ നിങ്ങൾ ആ ഇടപാട് സ്വീകരിക്കുമോ? | | | |
| 4. | നിങ്ങളുടെ ജീവിതത്തിൽ ഒരു മാറ്റം നിങ്ങൽ ആഗ്രഹിക്കുന്നുവോ? | | | |
| 5. | ഒരു കർഷകൻ തന്റെ മാതാപിതാക്കൾ ചെയ്തതുപോലെ കൃഷി ചെയ്യാൻ ശ്രമിക്കണം (-) | | | |
| 6. | നിങ്ങളുടെ മക്കൾ കൃഷിക്കാരാകാൻ നിങ്ങൾ ആഗ്രഹിക്കുന്നുണ്ടോ? (-) | | | |
| 7. | ഇന്ന് ആസ്വദിക്കുക നാളത്തെ പരിപാലനം പിന്നീട് ചെയ്യുന്നത് ആണ് നല്ലതാണ് (-) | | | |
| 8. | ഒരു മനുഷ്യന്റെ ഭാവി ദൈവത്തിന്റെ കൈകളിലാണ് (-) | | | |

**o. കർഷകരുടെ കൃഷി രീതികൾ:**

| ക്രമ നം: | തനതു സാങ്കേതിക അറിവുകൾ / കർഷകർ പരിശീലിക്കുന്ന രീതികൾ | ഫലപ്രാപ്തി | | |
|---|---|---|---|---|
| | | ഫലപ്രദം | ഫലപ്രദമല്ല | വളരെ ഫലപ്രദമാണ് |
| 1. | | | | |
| 2. | | | | |
| 3. | | | | |
| 4. | | | | |
| 5. | | | | |

**p. കെ.എ.യു നെല്ലിനങ്ങളുടെ ജനപ്രീതിയും സ്വീകാര്യതയും:**

**1) ജനപ്രീതി**

| ക്രമ നം: | കെ.എ.യു നെല്ലിനങ്ങൾ | വളരെ ജനപ്രിയമാണ് | ജനപ്രിയമാണ് | ജനപ്രിയമല്ലാത്തത് |
|---|---|---|---|---|
| 1. | ഉമാ | | | |
| 2. | ജയ | | | |
| 3. | ജ്യോതി | | | |
| 4. | ശ്രേയസ് | | | |
| 5. | മനുരത്ന | | | |
| 6. | കാഞ്ചന | | | |
| 7. | ഐശ്വര്യ | | | |
| 8. | മറ്റുള്ളവ (വ്യക്തമാക്കുക) | | | |

**2) സ്വീകാര്യത**

| ക്രമ നം: | കെ.എ.യു നെല്ലിനങ്ങൾ | ഉയർന്ന സ്വീകാര്യത | സ്വീകാര്യത | സ്വീകാര്യതയില്ല |
|---|---|---|---|---|
| 1. | ഉമാ | | | |
| 2. | ജയ | | | |
| 3. | ജ്യോതി | | | |
| 4. | ശ്രേയസ് | | | |
| 5. | മനുപ്രിയ | | | |
| 6. | കാഞ്ചന | | | |
| 7. | ഐശ്വര്യ | | | |
| 8. | മറ്റുള്ളവ (വ്യക്തമാക്കുക) | | | |

**q. നിങ്ങളുടെ കൃഷി ഭൂമി സ്വയം നേടിയതാണോ അതോ പൂർവ്വികരിൽ നിന്ന് കൈമാറികിട്ടിയതാണോ/ രണ്ടും? അതെ/ അല്ല**

**r. ഉൽപാദിപ്പിക്കുന്ന ഭക്ഷ്യധാന്യങ്ങൾ സൂക്ഷിക്കുന്നതിന് എന്തെങ്കിലും സൗകര്യങ്ങളുണ്ടോ?**

| സംഭരണ സൗകര്യം | ഉണ്ട് | ഇല്ല |
|---|---|---|
| 1.ചാക്ക്/ സഞ്ചി ഉപയോഗിച്ചുള്ള സംഭരണം | | |
| 2. പത്തായം | | |
| 3. നിലവറ/ കോൺക്രീറ്റ് മുറി | | |
| 4. പത്തായപ്പുര/ നെൽപ്പുര | | |
| 5. ഗോഡൗൺ / പൊതുവിതരണശാല | | |
| 6.മറ്റുള്ളവ (വ്യക്തമാക്കുക) | | |

**s. നെല്ലിന്റെയോ നെല്ലുൽപന്നങ്ങളുടെയോ മൂല്യവർദ്ധിത സംസ്കരണം ഉണ്ടോ?**

| ഇനങ്ങൾ | ഉണ്ട് | ഇല്ല |
|---|---|---|
| 8. അരിപ്പൊടി | | |
| 9. തവിടെണ്ണ | | |
| 10. അവൽ | | |
| 11. മലര്/ പൊരി | | |
| 12. അന്നജം (കഞ്ഞിപ്പശ) | | |
| 13. തകർന്ന അരിയിൽനിന്നും ഉണ്ടാക്കുന്ന ഗ്ളൂക്കോസ് പോലെയുള്ള ദ്രാവകം | | |
| 14. മറ്റുള്ളവ (വ്യക്തമാക്കുക) | | |

**t. നെല്ലിന്റെ ഇനങ്ങളിലെ വിളവ് വ്യത്യാസത്തെ ബാധിക്കുന്ന ഘടകങ്ങൾ**

| ക്രമ നം: | നെല്ലിനങ്ങൾ | വിളവ് വിടവിനെ ബാധിക്കുന്ന ഘടകങ്ങൾ | പ്രതികരണം | | | | |
|---|---|---|---|---|---|---|---|
| | | | **SA** | **A** | **UD** | **DA** | **SDA** |
| 1. | | ബയോഫിസിക്കൽ ഘടകങ്ങൾ | | | | | |
| 2. | | കാലാവസ്ഥാ ഘടകങ്ങൾ | | | | | |
| 3. | | സാമൂഹിക-സാമ്പത്തിക ഘടകങ്ങൾ | | | | | |
| 4. | | സ്ഥാപന ഘടകങ്ങൾ | | | | | |
| 5. | | സാങ്കേതിക കൈമാറ്റവുമായി ബന്ധപ്പെട്ട ഘടകങ്ങൾ | | | | | |

**u. കെ.എ. യു നെല്ലിനങ്ങളെക്കുറിച്ചും അവയുടെ കാർഷിക സർവകലാശാല ശുപാർശ ചെയ്യുന്ന രീതികളെക്കുറിച്ചുമുള്ള അറിവ് പരിശോധന.**

1. നടീൽ സമയത്ത് ശുപാർശ ചെയ്യുന്ന വിത്ത് നിരക്ക് നിങ്ങൾക്ക് അറിയാമോ?

a) 80-100 കിലോഗ്രാം / ഹെക്ടർ b) 60-65 കിലോഗ്രാം / ഹെക്ടർ c) 80-90 കിലോഗ്രാം / ഹെക്ടർ d) 30-35 കിലോഗ്രാം / ഹെക്ടർ

2. നെല്ലിന്റെ ഹ്രസ്വകാല ഇനങ്ങൾക്ക് നടാൻ ശുപാർശ ചെയ്യുന്ന അകലം നിങ്ങൾക്കറിയാമോ

a) 20cmx15cm b) 15cm x 10cm c) 20cm x 10cm d) 25cm x 15cm

3. നിങ്ങളുടെ പ്രദേശത്ത് ശുപാർശ ചെയ്യുന്ന നെല്ലിനങ്ങൾ നിങ്ങൾക്ക് അറിയാമോ?

a) ഉമാ i) അറിയാം ii) ഇല്ല

b) ജയ i) അറിയാം ii) ഇല്ല

c) ശ്രേയസ് i) അറിയാം ii) ഇല്ല

d) ജ്യോതി i) അറിയാംii) ഇല്ല

e) ഐശ്വര്യ i) അറിയാം ii) ഇല്ല

4. ഹ്രസ്വകാല നെല്ലിന് ശുപാർശ ചെയ്യുന്ന N.P.K-യുടെ അളവ് നിങ്ങൾക്കറിയാമോ?

a) 30:35:35 Kg / ha b) 90:45:45 Kg / ha c) 70:35:35 Kg / ha d) 45:45:45 Kg / ha

5. വിത്ത് സംസ്കരണത്തിന് ഉപയോഗിക്കാനായി ശുപാർശ ചെയ്യുന്ന ബയോ ഏജന്റുകളെക്കുറിച്ച് നിങ്ങൾക്കറിയാമോ?

a) സ്യൂഡോമോണസ് i) അറിയാം ii) ഇല്ല

b) ട്രൈക്കോഡെർമ i) അറിയാം ii) ഇല്ല

6. കള പരിപാലനത്തിന്റെ സാംസ്കാരിക രീതികളെക്കുറിച്ച് നിങ്ങൾക്കറിയാമോ?

a) കൈകൊണ്ടുള്ള കളനിയന്ത്രണം i) അറിയാം ii) ഇല്ല

b) നെല്ല് നടുന്ന സ്ഥലത്തു അധികമായി വെള്ളം നിറയ്ക്കുക i) അറിയാം ii) ഇല്ല

c) സ്റ്റയിൽ സീഡ് ബെഡ് ടെക്നിക് i) അറിയാം ii) ഇല്ല

d) വിശാലമായ നടീൽ ഒഴിവാക്കുക i) അറിയാം ii) ഇല്ല

7. നെൽക്കതിരിലെ 80% ധാന്യങ്ങൾ പക്വത പ്രാപിക്കുമ്പോളാണ് വിളവെടുപ്പ് നടക്കുന്നതെന്ന് നിങ്ങൾക്കറിയാമോ? അറിയാം / ഇല്ല.

8. നെല്ല് തൈകൾ 20-25 ദിവസത്തിനുശേഷം നഴ്സറിയിൽ നിന്ന് പ്രധാന വയലിലേക്ക് മാറ്റി നടണമെന്ന് നിങ്ങൾക്കറിയാമോ? അറിയാം / ഇല്ല

9. നടീൽ സമയത്ത് 1.5 സെന്റിമീറ്റർ ജലനിരപ്പ് നിലനിർത്തണമെന്ന് നിങ്ങൾക്കറിയാമോ? അറിയാം / ഇല്ല

10. നെല്ലിലെ തണ്ടുതുരപ്പൻപുഴുവിനെ നിയന്ത്രിക്കാൻ ട്രൈക്കോകാർഡുകൾ ഉപയോഗിക്കാറുണ്ടെന്നു നിങ്ങൾക്കറിയാമോ? അറിയാം / ഇല്ല

**ഭാഗം II**

## I. നെല്ല് കൃഷിയിൽ കാർഷിക സർവകലാശാല നിർദ്ദേശിക്കുന്ന സാങ്കേതിക വിദ്യകളുടെ സ്വീകാര്യത

| ക്രമ നം: | വിവരണങ്ങൾ | സ്വീകാര്യത | | |
|---|---|---|---|---|
| | | പൂർണ്ണ സ്വീകാര്യത | ഭാഗിക സ്വീകാര്യത | സ്വീകാര്യതയില്ല |
| 1. | നിങ്ങളുടെ പ്രദേശത്തിനായി ശുപാർശ ചെയ്യുന്ന കെ.എ.യു നെല്ലിനങ്ങൾ നിങ്ങൾ സ്വീകരിക്കുന്നുണ്ടോ? | | | |
| | ഉമാ<br>ജയ<br>ജ്യോതി<br>ശ്രേയസ്<br>മനുപ്രിയ<br>മറ്റുള്ളവ | | | |
| 2. | വിതയ്ക്കുന്നതിന് അനുയോജ്യമായി പറയുന്ന സമയമാണോ നിങ്ങൾ സ്വീകരിക്കുന്നത്, അതേ കാലയളവിൽ നിങ്ങൾ വിതച്ചിട്ടുണ്ടോ? | | | |
| | ഏപ്രിൽ- മെയ് (വിരിപ്പ്) | | | |
| | സെപ്റ്റംബർ- ഒക്ടോബർ (മുണ്ടകൻ) | | | |
| | ഡിസംബർ- ജനുവരി (പുഞ്ച) | | | |
| 3. | ഒരു ഹെക്ടറിന് ശുപാർശ ചെയ്യുന്ന വിത്ത് നിരക്ക് നിങ്ങൾ സ്വീകരിക്കുന്നുണ്ടോ? | | | |
| | മാറ്റിനടീൽ -ഹെക്ടറിന് 60-65 കിലോഗ്രാം | | | |
| | വിത്ത് വിതയ്ക്കൽ – ഹെക്ടറിന് 80-100 കിലോഗ്രാം | | | |
| | വിത്ത്കുഴിച്ചിടൽ – ഹെക്ടറിന് 80-90 കിലോഗ്രാം | | | |
| 4. | വിത്ത് സംസ്കരണത്തിന് ഉപയോഗിക്കാൻ ശുപാർശ ചെയ്യുന്ന ബയോ ഏജന്റുകൾ നിങ്ങൾ സ്വീകരിക്കുന്നുണ്ടോ? | | | |
| | • സ്യൂഡോമോണസ്<br>• ട്രൈക്കോഡെർമ<br>• ബവിസ്റ്റിൻ | | | |
| 5. | കാർഷിക സർവകലാശാല ശുപാർശ ചെയ്യുന്ന ഞാറ്റടി പരിപാലന രീതികൾ നിങ്ങൾ സ്വീകരിക്കുന്നുണ്ടോ? | | | |
| | പ്രധാന വയലിന്റെ 10 ഇൽ 1 ശതമാനം സ്ഥലം ഞാറ്റടിക്കായി എടുക്കാറുണ്ട് | | | |

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| | FYM - 4000 കിലോഗ്രാം/ ഏക്കർ | | | |
| | വെള്ളം തളിക്കൽ (ഒരു ദിവസം രണ്ടു നേരം) | | | |
| 6. | നടുന്നതിന് മുമ്പ് നിങ്ങൾ കെ.എ.യു ശുപാർശ ചെയ്യുന്ന പ്രധാന വയൽ തയ്യാറാക്കൽ രീതികൾ സ്വീകരിക്കുന്നുണ്ടോ? | | | |
| | വയൽ ഉഴുതുമറിക്കുക: 2-3 തവണ | | | |
| | FYM – ഹെക്ടറിന് 5 ടൺ | | | |
| | കുമ്മായം ഇടീൽ- ഹെക്ടറിന് 350 കിലോഗ്രാം (ആദ്യതവണ) | | | |
| 7. | നഴ്സറിയിൽ നിന്ന് പ്രധാന വയലിലേക്ക് തൈകൾ പറിച്ചു നടാൻ കെ.എ.യു ശുപാർശിക്കുന്ന ഘട്ടങ്ങൾ നിങ്ങൾ സ്വീകരിക്കുന്നുണ്ടോ? | | | |
| | 18-21 ദിവസം (ഹ്രസ്വകാല ദൈർഘ്യമുള്ളതിനു) | | | |
| | 20-25 ദിവസം (ഇടത്തരം ദൈർഘ്യമുള്ളതിനു) | | | |
| 8. | നെല്ലിലെ തണ്ടുതുരപ്പൻപുഴുവിനെ നിയന്ത്രിക്കാൻ ട്രൈക്കോകാർഡുകളുടെ ഉപയോഗം നിങ്ങൾ സ്വീകരിക്കുന്നുണ്ടോ? | | | |
| | | | | |
| 9. | നെല്ലിനങ്ങൾ നടാൻ, ശുപാർശ ചെയ്യുന്ന അകലം സ്വീകരിക്കുന്നുണ്ടോ? | | | |
| | 15cmx10cm (ഹ്രസ്വകാല ദൈർഘ്യമുള്ളതിന്) | | | |
| | 20cmx15cm (ഇടത്തരം ദൈർഘ്യമുള്ളതിന്റെ ആദ്യത്തെ വിളയ്ക്ക്) | | | |
| | 20cmx10cm (ഇടത്തരം ദൈർഘ്യമുള്ളതിന്റെ രണ്ടാമത്തെ വിളയ്ക്ക്) | | | |
| | 20cmx10cm (ഇടത്തരം ദൈർഘ്യമുള്ളതിന്റെ മൂന്നാമത്തെ വിളയ്ക്ക്) | | | |
| 10. | ഒരു ഹെക്ടറിന് ശുപാർശ ചെയ്യുന്ന രാസവളങ്ങളുടെ കൃത്യമായ അളവ് നിങ്ങൾ സ്വീകരിക്കുന്നുണ്ടോ? | | | |
| | • NPK - ഹെക്ടറിന് 70:35:35 കിലോഗ്രാം (ഹ്രസ്വകാല ദൈർഘ്യമുള്ളതിന്)<br>• NPK - ഹെക്ടറിന് 90:45:45 കിലോഗ്രാം | | | |

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| | (ഇടത്തരം ദൈർഘ്യമുള്ളതിന്) | | | |
| 11. | അമിതമായി വളർന്ന തൈകളുടെ നിയന്ത്രണത്തിനായി ശുപാർശ ചെയ്യപ്പെടുന്ന പരിപാലന രീതികൾ നിങ്ങൾ സ്വീകരിക്കുന്നുണ്ടോ? | | | |
| | ഇടത്തരം അല്ലെങ്കിൽ കുറഞ്ഞ ഫലഭൂഷ്ഠിതയുള്ള മണ്ണിലേക്ക് ശുപാർശ ചെയ്യുന്ന നടീൽ അകലം പിന്തുടരുക | | | |
| | അധിക വളർച്ചയെത്തിയ (പ്രായമായ) തൈകൾ കൂട്ടമായി നടുന്നത് ഒഴിവാക്കുക | | | |
| | നെൽക്കതിരിന്റെ ഉൽപ്പാദനം കൂട്ടുന്നതിനായി ശുപാർശ ചെയ്യപ്പെടുന്ന നൈട്രജന്റെ അളവിൽ നിന്ന് 50% വർദ്ധിപ്പിക്കുക | | | |
| 12. | ജലസേചനത്തിന് ശുപാർശ ചെയ്യുന്ന രീതികൾ കൃത്യമായ ആവൃത്തിയിൽ നിങ്ങൾ സ്വീകരിക്കുന്നുണ്ടോ? | | | |
| | പറിച്ചു നടുമ്പോൾ 1.5 സെന്റിമീറ്റർ വരെ ജലനിരപ്പ് നിലനിർത്തുക. അതിനുശേഷം ഇത് ക്രമേണ 5 സെ.മീറ്ററായി ഉയർത്തുക കൂടുതൽ നെൽനാമ്പ് മുളക്കുന്ന ഘട്ടം വരെ | | | |
| | വിളവെടുപ്പിന് 13 ദിവസം മുമ്പ് വയലിൽ നിന്ന് വെള്ളം ഒഴിവാക്കുക | | | |
| 13. | കളകളെ നിയന്ത്രിക്കുന്നതിന് കളനിയന്ത്രണത്തിന് ശുപാർശ ചെയ്യുന്ന കൃത്യമായ ആവൃത്തി നിങ്ങൾ സ്വീകരിക്കുന്നുണ്ടോ? | | | |
| | ആദ്യത്തെ കളനിയന്ത്രണം: നടീലിനു 20 ദിവസത്തിനുശേഷം | | | |
| | രണ്ടാമത്തെ കളനിയന്ത്രണം: നടീലിനു 40 ദിവസത്തിനുശേഷം | | | |
| 14. | കള പരിപാലനത്തിന്റെ ശുപാർശിത സാംസ്കാരിക രീതികൾ നിങ്ങൾ സ്വീകരിക്കുന്നുണ്ടോ? | | | |
| | കള നെല്ലില്ലാത്ത പ്രദേശങ്ങളിൽ നിന്നുള്ള വിത്തുകൾ ഉപയോഗിക്കുന്നു | | | |

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| | കൈകൊണ്ടുള്ള കളനിയന്ത്രണം | | | |
| | സ്ട്രയിൽ സീഡ്ബെഡ് ടെക്നിക് | | | |
| | നെല്ല് നടുന്ന സ്ഥലത്തു അധികമായി വെള്ളം നിറച്ച് കള നിയന്ത്രിക്കുക | | | |
| | വിശാലമായ നടീൽ ഒഴിവാക്കുക | | | |
| 15. | കീടങ്ങൾക്കും രോഗ നിയന്ത്രണത്തിനും ഉപയോഗിക്കുന്ന സസ്യ സംരക്ഷണ രാസവസ്തുക്കളുടെ ഉപയോഗം നിങ്ങൾ സ്വീകരിക്കുന്നുണ്ടോ? | | | |
| | **കീട നിയന്ത്രണം:**<br>a…….. b……. c……<br>**രോഗ നിയന്ത്രണം:**<br>a……. b……. c…..... | | | |

**II. നെല്ലുവിളവിലുണ്ടാകുന്ന വിടവ്:**

**2019-2020 ലെ അവസാന 3 സീസണുകളിലുള്ള നെൽകൃഷിയുടെ വിളവ്.**

| ക്രമ നം: | നെല്ലിന്റെ ഇനങ്ങൾ | നെല്ലിന് കീഴിലുള്ള കൃഷിസ്ഥലം (ഏക്കർ) | വിരിപ്പ് / ആദ്യ വിള(ക്വിന്റൽ/ ഏക്കർ) | മുണ്ടകൻ/ രണ്ടാമത്തെ വിള (ക്വിന്റൽ/ഏക്കർ) | പുഞ്ച / മൂന്നാമത്തെ വിള(ക്വിന്റൽ /ഏക്കർ) |
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| 1. | | | | | |
| 2. | | | | | |
| 3. | | | | | |
| 4. | | | | | |

**III. നെല്ലിന്റെ വിളവ് വിടവ് നികത്തുന്നതിനുള്ള തടസ്സങ്ങൾ:**

| ക്രമ നം: | വിവരണങ്ങൾ | MI | I | LI | Li | തിരിച്ചറിഞ്ഞ പരിഹാരങ്ങൾ |
|---|---|---|---|---|---|---|
| 1. | കീടങ്ങളും രോഗങ്ങളും | | | | | |
| 2. | കൃത്യസമയത്തു കൃഷിക്കായുള്ള ഉപകരണങ്ങളും തൊഴിലാളികളും ലഭിക്കാതിരിക്കുക | | | | | |
| 3. | കൃത്യസമയത്തു വിജ്ഞാന വ്യാപന ഉദ്യോഗസ്ഥരിൽ നിന്നും ശരിയായ മാർഗ്ഗനിർദ്ദേശവും വിവരങ്ങളും കിട്ടാതിരിക്കുക | | | | | |

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| 4. | വായ്പാ സൗകര്യങ്ങളുടെ അഭാവം | | | | | |
| 5. | വരൾച്ച | | | | | |
| 6. | വിലയിലെ ഏറ്റക്കുറച്ചിലുകൾ | | | | | |
| 7. | സംഭരണ സൗകര്യങ്ങളുടെ അഭാവം | | | | | |
| 8. | ഉയർന്ന തൊഴിൽ നിരക്കുകൾ | | | | | |
| 9. | പ്രളയം | | | | | |
| 10. | കുറഞ്ഞ ലാഭം | | | | | |
| 11. | ഉയർന്ന ലോഡിംഗ് ചാർജ് | | | | | |
| 12. | മറ്റുള്ളവ | | | | | |

**MI-**ഏറ്റവും പ്രധാനം, **I-**പ്രധാനം, **LI-**പ്രാധാന്യംകുറവാണ്, **Li-**ഒട്ടും പ്രാധാന്യമില്ല

**IV.** <u>നെല്ലുവിളവിലുണ്ടാകുന്ന വിടവ് കുറയ്ക്കുന്നതിനും കർഷകർ ആഗ്രഹിക്കുംവിധം നെല്ലിന്റെ ഉൽപാദനക്ഷമത വർദ്ധിപ്പിക്കുന്നതിനുമുള്ള നിർദ്ദേശങ്ങൾ.</u>

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**2.**

**3.**

# *Abstract*

# RESEARCH-EXTENSION GAP IN RICE TECHNOLOGY ADOPTION AMONG THE FARMERS OF SOUTH KERALA

*by*

**SHANILA S**
**(2019-11-148)**

**Abstract of Thesis**

**Submitted in partial fulfilment of**

**the requirements for the degree of**

**MASTER OF SCIENCE IN AGRICULTURE**

**Faculty of Agriculture**

**Kerala Agricultural University**


**DEPARTMENT OF AGRICULTURAL EXTENSION**

**COLLEGE OF AGRICULTURE**

**VELLAYANI, THIRUVANANTHAPURAM- 695 522**

**KERALA, INDIA**

**2021**

**KERALA AGRICULTURAL UNIVERSITY**
**COLLEGE OF AGRICULTURE, VELLAYANI**
**Department of Agricultural Extension**

# Research-Extension Gap in Rice Technology Adoption among the farmers of South Kerala

## ABSTRACT

The study entitled 'Research-Extension Gap in Rice Technology Adoption among the farmers of South Kerala' was undertaken during the year 2020-2021 in Thiruvananthapuram, Kollam, Alappuzha, Pathanamthitta, Kottayam, Ernakulam and Idukki districts representing the rice growing tract of South Kerala. From each of the seven districts one panchayat with maximum rice farmers were selected in consultation with the PAO office and 15 farmers were selected from each panchayath, thus making a total of 105 respondents. The study was done to determine the extent of yield gap in rice production, level of adoption of selected KAU technologies in rice varieties, personal and social characteristics of rice producing farmers, its relation with level of adoption and constraints experienced by the rice growing farmers with suggestions for refinement.

Eleven independent variables, namely, age, farming experience, area under rice cultivation, annual income, mass media exposure, extension participation, achievement motivation, risk orientation, credit orientation, innovativeness and knowledge level were selected through judges rating. Along with the selected variables, six additional variables like source of rice seed, labour utilization, popularity & acceptance of KAU varieties, ownership status, storage facility and value addition of rice & rice-based products were also included in the study. The level of adoption and yield gap in rice production were the dependent variables. Fifteen recommended practices in rice were selected from the package of practices of KAU by consulting the subject matter specialists to measure the extent of adoption.

On analysis, it was found that 53.33 per cent of rice farmers belonged to middle age (48-65) category and 41.9 per cent of the rice farmers had medium level of annual income. Majority of the respondents (53.33%) belonged to medium category of area

under rice cultivation with medium farming experience (54.29 %). About 57.14 % & 46.67 % of rice farmers belonged to low category of extension participation and credit orientation. Majority of the respondent rice farmers belonged to the medium category of mass media exposure (60.95%), achievement motivation (49.52%), innovativeness (60.95%) and risk orientation (46.67%).

Extent of knowledge about KAU rice technologies among farmers was medium for 60.00 per cent of farmers, low for 33.33 per cent and high for only for 6.67 per cent of farmers.

The analysis of respondent rice farmers based on their yield gap in rice production revealed that Jyothi rice variety had a higher yield gap index of 28.91 per cent followed by 27.09 per cent in Kanchana, 24.35 per cent in Hraswa, 21.83 per cent in Uma and 20.53 per cent in Manurathna and it can be deduced from the Friedmann test results that socio-economic factors and institutional factors were the most important components affecting the yield gap of Uma rice variety whereas, biophysical and climatic factors were the most key factors influencing the Jyothi rice variety's yield gap. Thus, the higher yield gap in Jyothi can be significantly reduced by improving the biophysical and climatic factors corresponding to the farmers.

The results of the adoption quotient revealed that, majority of rice farmers i.e., 50.47 per cent belonged to medium category of adoption, followed by 25.71 and 23.81 per cent in low and high category of adoption. The mean adoption quotient (AQ) was 61.77 per cent with a maximum and minimum AQ of 93.77 and 28 per cent respectively. In case of the recommended practices, six out of fifteen practices had an overall adoption percentage greater than 50 per cent. In the case of recommended varieties, adoption was higher for the variety Uma (64.76 %) followed by Jyothi (11.43%), Manurathna (7.62%), Kanchana (5.71%) and Hraswa (3.81%).

According to Rogers (1982), farmer respondents were divided into different adopter categories. As per the findings, the late majority (42.86 %) category were the major portion of respondent farmers, followed by the early majority (28.57 %) and about 1.90 per cent of respondents were innovators.

The results of the correlation revealed that out of 11 independent variables selected for the study, 3 variables were positively and significantly related to the dependent variable adoption of recommended practices by rice farmers. The main factors that influence technology adoption of recommended practices were extension participation and achievement motivation at 1% significance followed by innovativeness at 5% significance and the remaining variables namely; age, farming experience, area under rice cultivation, annual income, mass media exposure, risk orientation and knowledge level possessed a non-significant relation with the extent of adoption.

Farmer practices were documented, it showed that the number of farmer practices adopted were the highest in Trivandrum (53.33%) followed by Kollam (40%) and Pathanamthitta (40%) districts and farmer practices adopted least in the district of Kottayam (20%). The three major constraints faced by the rice farmers were high labour charges, non-availability of timely inputs and labours and flooding due to heavy rainfall. The major reason identified for cultivating KAU released rice variety was high yield whereas the major reason for not cultivating KAU variety was high cost of cultivation. The primary suggestion for refinement by the farmers were to make provisions for constructing check dams and strengthening bunds (93.33 %) and making available combines and harvesters at less rent (85.71 %).

The findings of the study indicated that the extent of total adoption of recommended cultivation practices was medium (50.47%) among the rice farmers of Southern Kerala. An inquiry in to the yield gap of KAU released rice varieties among the farmers revealed that Jyothi rice variety had a higher yield gap index of 28.91 per cent. Hence, an extension focus must be given for making available location specific agricultural inputs and management strategies to bridge the yield gap.

കേരള കാർഷിക സർവ്വകലാശാല
കോളേജ് ഓഫ് അഗ്രിക്കൾച്ചർ, വെള്ളായണി
വിജ്ഞാന വ്യാപന വിഭാഗം

# തെക്കൻ കേരളത്തിലെ കർഷകർക്കിടയിൽ നെല്ല് സാങ്കേതികവിദ്യ സ്വീകരിക്കുന്നതിലെ ഗവേഷണ-വിപുലീകരണ വിടവ്

## സംഗ്രഹം

തെക്കൻ കേരളത്തിലെനെല്ലുൽപ്പാദന മേഖലയെ പ്രതിനിധീകരിച്ച് തിരുവനന്തപുരം, കൊല്ലം, ആലപ്പുഴ, പത്തനംതിട്ട, കോട്ടയം, എറണാകുളം, ഇടുക്കി എന്നീ ജില്ലകളിൽ 2020-2021 വർഷത്തിൽ 'തെക്കൻ കേരളത്തിലെ കർഷകർക്കിടയിലെ നെല്ല് സാങ്കേതികവിദ്യ സ്വീകരിക്കുന്നതിലെ ഗവേഷണ-വിപുലീകരണ വിടവ്'എന്ന തലക്കെട്ടിൽ 105 കർഷകർക്കിടയിൽ പഠനം നടത്തുക ഉണ്ടായി. നെല്ലുൽപ്പാദനത്തിലെ വിളവിലെ വിടവിനുണ്ടാകുന്ന അളവ്, നെല്ലിനങ്ങളിൽ തിരഞ്ഞെടുത്ത കേരള കാർഷിക സർവ്വകലാശാലയുടെ സാങ്കേതികവിദ്യകളുടെ അവലംബത്തിന്റെ തോത്, നെല്ലുൽപാദിപ്പിക്കുന്ന കർഷകരുടെ വ്യക്തിപരവും സാമൂഹികവുമായ വിവരങ്ങൾ, അവർ അനുഭവിക്കുന്ന പ്രശ്നങ്ങൾ എന്നിവയാണ് പ്രധാനമായും ഈ പഠനത്തിൽ നിന്നും സ്വീകരിച്ച വിവരങ്ങൾ.

പ്രായം, കൃഷി പരിചയം, നെൽകൃഷി ചെയ്യുന്ന വിസ്തീർണ്ണം, വാർഷിക വരുമാനം, ബഹുജന മാധ്യമങ്ങളുമായുള്ള ഇടപെടൽ, വിജ്ഞാന വ്യാപന പ്രവർത്തനങ്ങളിലുള്ള പങ്കാളിത്തം, നേട്ടങ്ങളുടെ പ്രചോദനം, നഷ്ട സാധ്യത അവബോധം, വായ്പ സാധ്യത അവബോധം, നൂതന ആശയങ്ങളോടുള്ള ആഭിമുഖ്യം, നെല്ലിനങ്ങളിൽ തിരഞ്ഞെടുത്ത കേരള കാർഷിക സർവ്വകലാശാലയുടെ സാങ്കേതികവിദ്യകളുടെ വിജ്ഞാന നിലവാരം എന്നി 11 ഇനങ്ങളെയാണ് ജഡ്ജസ് റേറ്റിംഗ് മുഖാന്തിരം തിരഞ്ഞെടുത്തിട്ടുള്ളത്. കൂടാതെ, നെൽവിത്തിന്റെ ഉറവിടം, തൊഴിൽ വിനിയോഗം, കെ.എ.യു നെല്ലിനങ്ങളുടെ ജനപ്രീതിയും സ്വീകാര്യതയും, ഉടമസ്ഥാവകാശം, സംഭരണ സൗകര്യം, നെല്ലിന്റെയോ നെല്ലുൽപന്നങ്ങളുടെയോ മൂല്യവർദ്ധിത സംസ്കരണം തുടങ്ങിയ 6 അധിക വേരിയബിളുകളും പഠനത്തിൽ ഉൾപ്പെടുത്തിയിട്ടുണ്ട്.

വിശകലനത്തിൽ, നെൽകർഷകരിൽ 53.33% മധ്യവയസ് (48-65) വിഭാഗത്തിൽ പെട്ടവരാണെന്നും, 41.9% നെൽകർഷകർക്ക് ഇടത്തരം വാർഷിക വരുമാനമുള്ളവരാണെന്നും പ്രതികരിച്ചവരിൽ ഭൂരിഭാഗവും (54.29 %) ഇടത്തരം കൃഷി പരിചയമുള്ളവരാണെന്നും, നെൽകൃഷി ചെയ്യുന്ന വിസ്തീർണ്ണം (53.33%) ഭൂരിഭാഗം ആളുകളിൽ ഇടത്തരമാണെന്നും കണ്ടെത്തി. നെൽകർഷകരിൽ ഏകദേശം 57.14 % & 46.67 % വിജ്ഞാന വ്യാപന പ്രവർത്തനങ്ങളിലുള്ള പങ്കാളിത്തവും വായ്പ സാധ്യത അവബോധവും കുറഞ്ഞ വിഭാഗത്തിൽ പെട്ടവരാണ്. പ്രതികരിച്ച നെൽകർഷകരിൽ

ഭൂരിഭാഗവും ബഹുജന മാധ്യമങ്ങളുമായുള്ള ഇടപെടൽ (60.95%), നേട്ടങ്ങളുടെ പ്രചോദനം (49.52%), നൂതന ആശയങ്ങളോടുള്ള ആഭിമുഖ്യം(60.95%), നഷ്ട സാധ്യത അവബോധം (46.67%) എന്നിവയിൽ ഇടത്തരം വിഭാഗത്തിൽ പെടുന്നവരാണ്.

കർഷകർക്കിടയിൽകെ.എ.യുനെല്ല്സാങ്കേതികവിദ്യയെക്കുറിച്ചുള്ള അറിവിന്റെ വ്യാപ്തി 60.00 ശതമാനം കർഷകർക്ക് ഇടത്തരവും 33.33 ശതമാനം പേർക്ക് കുറഞ്ഞതും 6.67 ശതമാനം കർഷകർക്ക് മാത്രം ഉയർന്നതുമായാണ് കാണപ്പെട്ടത്.

നെല്ലുൽപ്പാദനത്തിലെ വിളവിലുണ്ടാകുന്ന വിടവ് അടിസ്ഥാനമാക്കി പ്രതികരിച്ച നെൽകർഷകരുടെ വിശകലനത്തിൽ ജ്യോതി നെല്ലിനത്തിന് 28.91 ശതമാനവും, തുടർന്ന് കാഞ്ചനയിൽ 27.09 ശതമാനവും, ഹ്രസ്വയിൽ 24.35 ശതമാനവും, ഉമയിൽ 21.83 ശതമാനവും, മനുരത്നയിൽ 20.53 ശതമാനവും ഉയർന്ന വിളവ് വിടവ് സൂചികയുണ്ടെന്ന് കണ്ടെത്തി. ഫ്രീഡ്മാൻ ടെസ്റ്റിന്റെ ഫലങ്ങളിൽ നിന്നും ഉമ നെല്ലിന്റെ വിളവ് വിടവിനെ ബാധിക്കുന്ന ഏറ്റവും പ്രധാനപ്പെട്ട ഘടകങ്ങൾ സാമൂഹിക-സാമ്പത്തിക ഘടകങ്ങളും സ്ഥാപനപരമായ ഘടകങ്ങളും ആണെന്ന് അനുമാനിക്കപ്പെടുന്നു, അതേസമയം ജൈവഭൗതികവും കാലാവസ്ഥാ ഘടകങ്ങളും ജ്യോതി നെല്ലിനത്തിന്റെ വിളവ് വിടവിനെ ബാധിക്കുന്ന പ്രധാന ഘടകങ്ങളാണ്. കർഷകർക്ക് അനുയോജ്യമായി ജൈവഭൗതികവും കാലാവസ്ഥാ ഘടകങ്ങളും മെച്ചപ്പെടുത്തുന്നതിലൂടെ ജ്യോതിയിലെ ഉയർന്ന വിളവ് വിടവ് ഗണ്യമായി കുറയ്ക്കാനാകും എന്നാണ്കാണാൻ കഴിഞ്ഞത്.

കാർഷിക സർവ്വകലാശാല തയ്യാറാക്കിയ കൃഷിമുറകളിലെ സാങ്കേതിക വിദ്യയുടെ സ്വീകാര്യത പരിശോധിച്ചതിൽ 50 .47 % കർഷകർ കൃഷിമുറ സ്വീകരിക്കുന്നതിൽ ശരാശരി നിലവാരം പുലർത്തുകയും 25 .71 % പേര് തീരെ താഴ്ന്ന രീതിയിലും, 23 .81 % കർഷകർ ഉയർന്ന രീതിയിൽ സാങ്കേതിക വിദ്യ സ്വീകരിക്കുന്നവരുമായാണ് കാണാൻ കഴിഞ്ഞത്. പരിശോധിച്ചതിൽ ശരാശരി സ്വീകാര്യത ഘടകം (എക്യു) 61.77 ശതമാനവും, യഥാക്രമം പരമാവധിഎക്യു 93.77%-വും, കുറഞ്ഞഎക്യു 28%-വും, എന്നിങ്ങനെയായി കാണപ്പെട്ടു. ശുപാർശ ചെയ്യപ്പെട്ട കൃഷിമുറകൾ സ്വീകരിക്കുന്നതിൽ, പതിനഞ്ചിൽ ആറെണ്ണത്തിനും മൊത്തത്തിലുള്ള സ്വീകാര്യത ശതമാനം **50** ശതമാനത്തിൽ കൂടുതലാണ്. നെല്ലിനങ്ങളിൽ, **64.76%** കർഷകർ ഉപയോഗിച്ചിരിക്കുന്നത് ഉമ എന്ന വിത്തും തുടർന്ന് ജ്യോതി (11.43%), മനുരത്ന (7.62%), കാഞ്ചന (5.71%), ഹ്രസ്വ (3.81%), എന്നി നെൽ വിത്തുകളുമാണ്.

പഠനത്തിനായി തിരഞ്ഞെടുത്ത 11 സ്വതന്ത്ര വേരിയബിളുകളിൽ 3 വേരിയബിളുകളും, കെ.എ.യു ശുപാർശ ചെയ്യുന്ന രീതികൾ സ്വീകരിക്കുന്നതിന്റെ ആശ്രിത വേരിയബിളുമായി ബന്ധപ്പെട്ടിരിക്കുന്നുവെന്ന്, പരസ്പര ബന്ധത്തിന്റെ ഫലങ്ങൾ വെളിപ്പെടുത്തി. അവയിൽ, കെ.എ.യുവിന്റെ സാങ്കേതികവിദ്യ സ്വീകരിക്കുന്നതിനെ സ്വാധീനിക്കുന്ന പ്രധാന ഘടകങ്ങൾ, 1% പ്രാധാന്യത്തിൽ വിജ്ഞാന വ്യാപന

പ്രവർത്തനങ്ങളിലുള്ള പങ്കാളിത്തവും, നേട്ടങ്ങളുടെ പ്രചോദനവുമാണെന്നും, തുടർന്ന് 5% പ്രാധാന്യത്തിൽ നൂതന ആശയങ്ങളോടുള്ള ആഭിമുഖ്യവുമാണെന്നു കണ്ടെത്തി.

കർഷക സമ്പ്രദായങ്ങൾ രേഖപ്പെടുത്തിയതിൽ ഏറ്റവും കൂടുതൽ കർഷക സമ്പ്രദായങ്ങൾ സ്വീകരിച്ചതായി കാണപ്പെട്ടത് തിരുവനന്തപുരം (53.33%), കൊല്ലം (40%), പത്തനംതിട്ട (40%) എന്നി ജില്ലകളിലും, ഏറ്റവും കുറവ് കോട്ടയം (20%) ജില്ലയിലുമായാണ് കാണപ്പെട്ടത്. നെൽകർഷകർ നേരിട്ട മൂന്ന് പ്രധാന പരിമിതികൾ ഉയർന്ന കൂലി, യഥാസമയം ആവശ്യമായ സാധനങ്ങളും തൊഴിലാളികളും ലഭ്യമല്ലാത്തതും, കനത്ത മഴയെ തുടർന്നുണ്ടായ വെള്ളപ്പൊക്കവുമായിരുന്നു. കെ.എ.യു റിലീസ് ചെയ്ത നെല്ലിനം കൃഷി ചെയ്യുന്നതിനുള്ള പ്രധാന കാരണം ഉയർന്ന വിളവ് ആയിരുന്നു, എന്നാൽ കെ.എ.യു നെല്ലിനം കൃഷി ചെയ്യാത്തതിന്റെ പ്രധാന കാരണം കൃഷിയുടെ ഉയർന്ന ചിലവാണ്. ചെക്ക് ഡാമുകൾ നിർമ്മിക്കുന്നതിനും ബണ്ടുകൾ ബലപ്പെടുത്തുന്നതിനും (93.33 %) വ്യവസ്ഥകൾ ഉണ്ടാക്കുക, കുറഞ്ഞ വാടകയ്ക്ക് (85.71 %) കമ്പൈനുകളും കൊയ്ത്തുയന്ത്രങ്ങളും ലഭ്യമാക്കുക എന്നതായിരുന്നു കർഷകരുടെ പ്രാഥമിക നിർദ്ദേശം.

തെക്കൻ കേരളത്തിലെ നെൽകർഷകർക്കിടയിൽ ശുപാർശ ചെയ്യുന്ന കൃഷിരീതികളുടെ ആകെ അവലംബത്തിന്റെ അളവ് ഇടത്തരം (50.47%) ആണെന്നും, കെ.എ.യു പുറത്തിറക്കിയ നെല്ലിനങ്ങളിലെ വിളവ് വിടവ് സംബന്ധിച്ച് നടത്തിയ അന്വേഷണത്തിൽ, ജ്യോതി നെല്ലിനത്തിന് 28.91% ഉയർന്ന വിളവ് വിടവ് സൂചികയുണ്ടെന്നും പഠനത്തിന്റെ കണ്ടെത്തലുകൾ വെളിപ്പെടുത്തി. അതിനാൽ, വിളവ് വിടവ് നികത്തുന്നതിനുള്ള സ്ഥാന നിർദ്ദിഷ്ട കാർഷിക ഉൽപന്നങ്ങളും മാനേജ്മെന്റ് തന്ത്രങ്ങളും ലഭ്യമാക്കുന്നതിനും വേണ്ടി വിജ്ഞാന വ്യാപന വിഭാഗം കൂടുതൽ ഊന്നൽ നൽകണം.