IMPACT OF INSTITUTIONAL INTERVENTIONS FOR PROMOTION OF RICE FARMING IN THRISSUR DISTRICT

By

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THESIS

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DECLARATION

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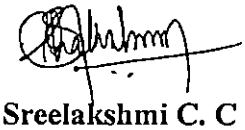
I, hereby declare that the thesis entitled **"Impact of institutional interventions for promotion of rice farming in Thrissur district"** is a bonafide record of research work done by me during the course of research and that the thesis has not previously formed the basis for the award to me of any degree, diploma, fellowship or other similar title, of any other university or society.



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Sreelakshmi C.C

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AICRIP : All India Coordinated Rice Improvement Project

AMOSC : Agro Machinery Operation Service Centre

ANOVA : Analysis of Variance

ARD : Autherised Retail Dealer

ARDB : Agriculture and Rural Development Bank

ARS : Agricultural Research Station

ATMA : Agricultural Technology Management Agency

CGIAR : Consultative Group on International Agricultural Research

CRRI : Central Rice Research Institute

DRR : Directorate of Rice Research

FAO : Food and Agriculture Organisation

FMFC : Farm Machinery Facilitation Centre

FSS : Farmer Service Societies

GCA : Gross Cropped Area

GFA : Group Farming Agencies

GOI : Government of India

GOK : Government of Kerala

GRiSP : Global Rice Science Partnership

Ha : Hectare

HYV : High Yielding Varieties

ICAR : Indian Council of Agricultural Research

ICDP : Integrated Cereals Development Programme

IPM : Integrated Pest Management

IPRD : Integrated Programme for Rice Development

IRRI : International Rice Research Institute

KAU : Kerala Agricultural University

KCC : Kisan Credit Card

KVK : Krishi Vigyan Kendra

LAMPS : Large Size Adivasi Multi-Purpose Society

LG : Local Government

LMB : Land Mortgage Banks

LSGD : Local Self-Government Department

MSP : Minimum Support Price

NABARD : National Bank for Agriculture and Rural Development

NCDC : National Co-operative Development Corporation

NFSM : National Food Security Mission

NGO : Non Governmental Organisations

NREGS : National Rural Employment Guarantee Programme

PACS : Primary Agricultural Credit Societies

PRI : Panchayati Raj Institution

RBI : Reserve Bank of India

RKVY : Rashtriya Krishi Vikas Yojna

RRB : Regional Rural Bank

SAUs : State Agricultural Universities

SC : Scheduled Caste

SDR : Sustainable Development of Rice

SFPP : Special Food-grains Production Programme

SHG : Self Help Group

SRI : System of Rice Intensification

SRPP : Special Rice Production Programme

ST : Scheduled Tribes

UNDP : United Nation's Development Programme

INTRODUCTION

CHAPTER 1

INTRODUCTION

Rice is a celestial grain. It is a food to mankind, feed to animals and seed to posterity. As a major crop it is cultivated everywhere as a semi aquatic plant and occupies a prominent role in the foodgrain supply of the world. However, ecological and economic pressures put rice cultivation in a dilemma in all the cultivating areas.

Paddy cultivation was part of the proud culture of Kerala State. Rice is the most important cereal and staple food produced and consumed in Kerala. Kuttanadu, Thrissur and Palakad are the major areas where large scale paddy cultivation is done in the State. Rice is a supreme commodity to mankind, because rice is truly life, culture, tradition and a means of livelihood to millions. So the promotion and protection of rice farming is essential for the food security of society as well as for improving the livelihood of rice farmers. The area under paddy cultivation during the year 1980-81 was 8.02 lakh hectares (ha) and the production accounted to 12.72 lakh tonnes. During 1990-91 the cultivated area decreased to 5.59 lakh ha and production to 10.87 lakh tonnes. This was again reduced to 2.13 lakh ha and 5.22 lakh tonnes respectively in the year 2010-11. In the year 2012-13, the area under paddy cultivation was 1.97 lakh ha with a total production of 5.08 lakh tonnes (GOK, 2013). The above statistics clearly reveal that area and production of paddy cultivation in Kerala has a declining trend over the last four decades. One of the major reasons for the reduction in area and production of paddy is the non-remunerative returns owing to high input costs. The net income of the farmer primarily depends on the output, price and cost of cultivation. It is difficult to do rice cultivation in the State due to higher labour cost, shortage of basic inputs and government negligence. Ultimately it leads to reduction in the net income which forces the farmers to get away from the rice cultivation. The reduction in the area of paddy field is a threat to the ecological

system of the State. So rice farmers as a group of producers should be saved. The government and other agencies should find solutions to the problem of how the rice farmers can be protected and promoted. The present study is an attempt in this direction and seeks to examine the impact of various institutional interventions for the promotion of rice farming.

1.1 Statement of the problem

Innovative institutional arrangements are essential to the design and adoption of ecologically and socially sustainable agricultural systems. Institution is an effective instrument for economic development. Institution as an input effectively insulates economy for impressive impact. Rice being the staple food and rice farming as the livelihood of sizeable number of people, deteriorating rice cultivation demands immediate institutional intervention in the State. Input supply system, production process and marketing can be positively promoted and protected by institutional support system. Due to increasing cost of inputs and labour, people are reluctant to do rice cultivation. If the farmer gets reasonable income from rice farming, more and more people will enter into rice cultivation. So it is necessary to provide adequate assistance in the form of effective interventions. Institutional support system is a crucial and significant factor of production which can highly influence and promote the production and income of rice farmers. Various institutions and agencies involved in rice farming are assisting rice farmers in different ways and manners. Hence the problem of the present study is to assess the impact of institutional interventions as inputs in the production and marketing of rice farming so as to increase the net income of the rice farmers.

1.2 Objectives of the study

The objectives of the study are

(i) To examine the developmental programmes/ schemes of various governmental and other institutions for the promotion of rice farming in Kerala

(ii) To analyse the impact of developmental schemes of various institutions on the net income of the farmers

(iii) To analyse the constraints of rice farmers so as to suggest policy measures for the promotion of rice farming.

1.3 Utility, scope and limitations of the study

Theoretically the study has enabled to assess the impact of institutional interventions on rice development. More importantly, rice farmers can be ensured better income and better standard of living by effective institutional intervention. By encouraging rice farming through better institutional support system, food security can be ensured in the country. The study has identified the constraints of rice farmers, so that the planners can formulate policies with regard to rice development. Extent and use of existing schemes by beneficiaries have policy implications. Government can reduce ecological imbalances in conversion of paddy fields for other purposes and finally, consumers will be ensured better products at reasonable prices.

The major limitation of the study is that schemes and functions of all rice related institutions at national or state level were not available in the study area. Many projects and assistances are not directly contributing to the net income but create an environment for better production. Amount of assistance may be trivial to make any impact on income. It was difficult to analyse the impact of all schemes and programmes of all institutions. Hence the impacts of major institutions and their

schemes in the study area were analysed. While fitting the Cobb-Douglas production model for net income and assistance through schemes, there were problems of auto correlation and multi-co-linearity. Hence the impact was found on rice production. Treatment of subsidised input as cost or income was a methodological problem. Some of the incentives could not be measured in quantifiable terms. For instance, assured price influences the market price quoted by the other agents and intermediaries who are marketing the product. Price of the product in the absence of assured price could not be assumed and compared. In general, production function approach enabled to understand the role of various interventions of institutions like inputs, credit and price (procurement price) on net income. With regard to facilities at house and assets created, most of the farmers were not ready to reveal the exact details. Hence these variables could not form part of the analysis.

1.4 Organisation of the thesis

The report of the study is presented in five chapters. The first chapter discusses the statement of the problem, objectives, scope, utility and limitations of the study. The second chapter deals with the review of available studies with respect to rice farming and impact of institutional interventions on rice farming. The third chapter details the methodology adopted in the process of investigation and analysis. The fourth chapter is earmarked for results and discussion of the study. The last chapter highlights the summary of findings and conclusions followed by references, appendices and abstract of the thesis.

REVIEW OF LITERATURE

CHAPTER 2
REVIEW OF LITERATURE

Rice is a staple food crop which holds a dominant share in Indian agriculture. The Indian rice farming sector provides ample employment opportunities and is an inevitable part of the food security programme. Kerala is also not an exception to this. But the area under rice cultivation and production of rice in Kerala show a declining trend over the last four decades. Hence government, commercial banks, co-operatives and agencies like Non-Governmental Organisations (NGOs) are supporting rice cultivation and rice farmers through their interventions.

Review of literature provides a background for all scientific investigations. Reviews help to identify the research gap and justify the study. Hence any research begins with an inquiry into the related previous studies. This chapter discusses the available literature related to rice production, institutional interventions and their impact on agriculture in general and rice farming in particular, and the constraints faced by rice farmers so as to provide and establish a theoretical framework for the study, as well as develop analytical tools based on the ideas, concepts and methods of various researchers. The review of literature is organised under four sections as given below.

2.1 Trends in rice production and consumption
2.2 Institutional interventions in agriculture
2.3 Impact of institutional interventions on rice farming
2.4 Constraints of rice farmers

2.1 Trends in rice production and consumption

About three billion people, nearly half of the world's population, depend on rice for survival. In Asia as a whole, a considerable share of the population consumes rice in every meal. Rice is one of the most important food crops of India in terms of area, production and consumer preference. India is the second largest producer and consumer of rice in the world. Rice production in India crossed the mark of 100 million MT in 2011-12, accounting for 22.81per cent of global production in that year (Agricoop, 2013). Studies which focus on the trends in rice production, factors affecting rice production and the present status of rice farming are reviewed in this section.

United Nations Conference on Trade and Development (1995) found that there is generally limited scope for more extensive cultivation of rice in Asia, a continent already heavily populated. More intensive farming would require massive investment in complementary infrastructure and extension services, including another bio - engineering - based green revolution. The productivity growth associated with the earlier revolution has slowed down or stagnated, because of the declining resources base. There is eroding comparative advantage of agriculture, including rice farming, as economies grow and change structurally. The new, relatively large access to East Asian markets could be highly significant in the long run. Its impact on the rice economy tends to be outweighed by such more mundane factors such as unexpected output variations due to weather conditions, population growth and urbanisation patterns, economic expansion and restructuring, and ongoing improvements in policy incentives and support infrastructure.

Reddy *et al.* (2001) made a case study on participatory research in paddy cultivation in Kasaragod district of Kerala. The study covered 710 contiguous farm families located in three villages namely Edneer, Pady and Nekhraje of Kasaragod district in Kerala. The authors have analysed the problem-cause relationship through farmer participatory approach and found that paddy cultivation in Kerala is declining due to non-remunerative returns owing to high cost of labour combined with poor productivity. The study also revealed that low profitability was mainly due to the reasons of unavailability of quality seed, imbalanced use of fertilizers, improper plant protection measures, weed menace and high labour cost.

Sachchamarga and Williams (2004) studied the economic factors affecting Thai rice producer planting decisions using an econometric model of the area planted to rice in Thailand. The study revealed that the area planted to rice adjusts relatively slowly from year to year which is consistent with the fact that Thai rice farmers face numerous infrastructure, technology, credit, and other factors that constrain annual rice production decisions. The rice area planted is also found to be marginally more sensitive to current market price than to the price of rice in the period just prior to planting. This might be due to the guaranteed rice price policy operated by the Thai government. The area planted to rice in Thailand is also found to be positively and significantly related to nominal rice prices but not significantly related to real, deflated prices of rice. Farmers rely on their rice production for household consumption and sell any excess. Thus, from the Thai farmers' perspective, there are virtually no substitutes for rice and a few variable inputs other than family labour which is consistent with the finding that nominal rather than deflated prices, are most relevant in Thai rice producer decisions regarding adjustments in the area planted to rice.

Barah (2005) focused on the dynamics of rice economy in India and analysed the spatio-temporal rice related data from secondary sources pertaining to rice growing areas and also studied the trend and growth pattern over the decades 1950-51 to 2001-2002. It covered the information at country level, state level as well as at the disaggregate district level. A historical analysis showed that over the decades, the phenomenal pace in increase in rice production has been uneven and the regional disparity highly pervasive among the states as well as across the diverse ecosystems. The gain due to modern rice technology has been clearly discriminatory against the resource poor areas, which is also dominated by small and marginal farmers. Focusing on the rice productivity at disaggregate district level, the analysis showed a clear productivity divide with a sharp contrast between the prosperous areas on the one hand and lesser developed areas on the other. These disconnect between irrigated area and rain fed areas, has direct implication on future food security, according to the author.

Norman and Kebe (2006) opined that due to the increasing demand for rice and the potential of rice to improve the rural lives of farming communities, regional strategies should be developed for well-coordinated integrated interventions to promote increased and sustainable rice production in smallholder farming systems. The application of scientific research for generation and effective dissemination of appropriate rice production technologies should be an important component of this strategy. Other components of this strategy include adoption of national rice policies, coordinated access to credit, restoration of farm input subsidies, improvement of crop production and post-harvest technologies, strengthening of national agricultural extension services, formation/strengthening of rice farmers' associations, restoration of guaranteed rice prices, research support, aggressive marketing of locally produced rice, and collaboration among rice stakeholders.

Royal Government of Cambodia (2010) made a policy paper on promotion of paddy production and rice export in Cambodia. The Government has launched a policy on paddy rice production and promotion of milled rice export to pave the way for the implementation of medium and long term measures in order to ensure sustainability and progress in processing and exporting Cambodian milled rice. The basic objective of this policy paper is to diversify Cambodia's sources of growth by increasing paddy rice production and milled rice export in order to complement growth in garment and other sectors. The measures related to paddy rice production were to increase paddy rice productivity by using high yield seed and modern farming techniques; promote and establish farmer organization; encourage participation of the private sector in paddy rice processing and milled rice export; continue financing for paddy rice collection; provide support and strengthen the Rice Miller Association; and to consider the establishment of the Export Import Bank (Exim Bank) to support the export of rice and other produces. The policy makers opine that, the success of this policy depends on actual implementation; and the task is complex and hard to achieve, yet it really requires cooperation, coordination and strong commitment especially by way of improving the leadership and management of all concerned ministries/agencies and stakeholders.

Adjao (2011) conducted a study on the topic 'Analysis of the competitiveness of the rice sub sector in Mali: The case of gravitational irrigation and Bas- fonds production systems'. The major objectives of the study were to identify the key domestic and regional end markets for high-quality irrigated rice and lower-quality lowland rice at the national level within the West Africa region ; to carry out a more up-to-date financial and economic analysis using standard budgeting techniques and domestic resource cost (DRC) analysis to assess the competitiveness of Mali in producing and marketing both irrigated and bas-fonds rice compared to importing Asian rice; to identify and examine the constraints to the competitiveness of locally

grown Malian rice; and to provide recommendations about how to improve the competitiveness of that key staple food. The study used both standard budgeting techniques and domestic resource cost analysis to assess the competitiveness and the comparative advantage of bas-fonds (marginal lands such as inland valley swamps) and ON (public-led investments in large-scale gravity fed irrigation infrastructure in the Office du Niger) rice in selected domestic and West-African markets with the aim to provide empirical analysis for supporting further investment decisions in the rice subsector in Mali. The results showed that Mali has a very pronounced comparative advantage in the production and marketing of rice on its national territory, with ON rice being more competitive than bas-fonds rice in most markets. Despite numerous constraints that hinder the comparative advantage of Malian rice in sub regional markets, the prospects for Malian rice exports seem encouraging, given the high likely payoffs for improving the productivity and post-harvest handling of rice.

Mohanty (2012) conducted a case study on "Rice self-sufficiency: the renewed mantra of domestic food security". He pointed out that higher government support and relaxation of India's export ban on non-basmati rice have eased the market situation and stabilized prices because of an adequate rice supply in the market. However, in the long run, major rice-consuming countries that pursue self-sufficiency may cause danger to the rice exporting countries. If these rice consuming countries achieved self-sufficiency, import demand for rice would fall. This would push exporters, such as Thailand, Vietnam, and Pakistan, to cut back on their production to reduce exportable surplus and use their lands in planting other profitable crops. The study suggested that a strong global market is essential to achieve global food security for rice. This does not mean that countries should give up rice production and depend on foreign rice. Every country has the basic right to produce enough food for its citizens and this is particularly true for rice, a staple for the world's poorest of the poor. However, countries might be wiser to try to increase

production by improving yield in a sustainable manner rather than pursuing self-sufficiency at any cost.

Mohanty (2013) also studied the global trends in rice consumption. According to him, income growth, urbanisation, and other long-term social and economic transformations are factors that would influence the composition of the food basket in distribution. India is a good example where the government has rolled out an elaborate food subsidy program to provide highly subsidised food grains, namely, rice and wheat, for 65 million below-poverty-line households, including nearly free food grains to 20 million Antyodaya Anna Yojana households, the poorest of the poor households. Outside Asia, the current upward trend in rice consumption would continue in the future, with Sub-Saharan Africa (SSA) leading the pack. The growth in rice consumption in SSA has primarily come from growing preference for rice among urban consumers with rising income. The preference for rice would inevitably begin to grow among the rural population as it becomes wealthier. If this happens, consumption growth for rice would be even stronger in the future than what has been witnessed in the past two decades. The author concluded that if diversification in Asia is slow and not widespread, then it is almost certain that this would be offset by rising per capita consumption in Africa and the rest of the world and the global population and total global consumption would continue to rise. However, if Asian countries follow rapid diversification path, the opposite would be true and total global consumption would start declining.

Researchers have found that paddy cultivation in Kerala is declining due to non-remunerative returns resulting from high cost of labour combined with poor productivity. Low profitability is mainly due to unavailability of quality seed, imbalanced use of fertilisers, improper plant protection measures, weed menace and high labour cost. The gain due to modern rice technology has been clearly

discriminatory against the resource poor areas, which is also dominated by small and marginal farmers. With rising income the preference for rice among urban and rural population would grow, which implies that growth in consumption of rice would be stronger in the future. However, it would be wiser for the countries to try to increase rice production by improving yield in a sustainable manner rather than pursuing self-sufficiency at any cost.

2.2 Institutional interventions in agriculture

The review of available literature on institutional interventions in agriculture, farm production, adoption of new technologies, and crops other than paddy and rice and their impact are discussed in this section. Studies conducted by individuals, international organisations like World Bank and Asian Development Bank, Government Departments and NGOs are included. Efforts have been taken to review studies conducted in India as well as abroad and hence comprises of studies carried out in India as a whole, specific states of India, and abroad, including Malawi, Kenya, Netherlands, Zimbabwe, Bangladesh, United States of America and Pakistan.

Amitabha (1993) attempted to study institutional impact on farm production, investment and income through a field study in one of the districts of West Bengal. Three credit societies and three service societies were randomly chosen from the fourteen cooperative societies in the sample village. Twenty-five member cultivators and non-member cultivators were selected following random sampling method. Information was gathered by questionnaire and direct interview method. Co-operatives are expected to provide credit to the rural people so that they are in a position to increase their farm investment, output and income. The study revealed that farm production, investment and income of members of the cooperatives are higher than the non-members which indicate there is an institutional positive impact

on farm production, investment and income. Therefore as a policy prescription, the study emphasised that the Indian planners and policy makers interested in increasing farm production, investment and income may well think of utilizing the talents and potentialities of the rural institutions in the greater context of India's rapid agricultural development and economic development.

Chaudhry and Sahibzada (1995) looked into the problems of subsidisation of agricultural inputs and its removal in Pakistan. It has been argued that Pakistan has had a history of agricultural input subsidies beginning with the 1950s. Despite the commitment to their removal, subsidies on agricultural inputs have tended to persist. If there were open subsidies in the 1950s and 1960s, they have become increasingly implicit in the recent years. As a result, many of them may not accrue to the farm sector but are eaten up by the inefficiencies of the production and distribution systems. Input price increases as a means of eliminating subsidies tend to add to the inefficiency of input use in agriculture and also provide support to the inefficient production and distribution systems of inputs outside the agriculture sector. Unbridled increases in input prices are particularly harmful to the cause of small farmers, income distribution, and rural poverty. The study recommended that the strategy of removal of subsidies should be based on cost savings and low prices of inputs in agriculture.

Evenson and Mwabu (1998) examined effects of agricultural extension on crop yields in Kenya. The sample used for the estimation contains information about crop production, agricultural extension workers, educational attainment of farmers, and usage of farm inputs, among others. A quantile regression technique was used to investigate productivity effects of agricultural extension and other farm inputs over the entire conditional distribution of farm yield residuals. Adopting a simple Cobb-Douglas function for the farm productivity function, they estimated equation using a

quantile regression technique. The mean effects of productivity determinants i.e., the average effects of these determinants at all levels of the farm yield were also estimated with ordinary least squares (OLS) and reported along with the quantile estimates for comparison purposes. The study observed that productivity effect of agricultural extension was the highest at the extreme ends of distribution of yield residuals. Complementarities of unobserved farmer ability with extension service at higher yield residuals and the diminishing returns to the extension input, which were uncompensated for by ability at the lower tail of the distribution, were hypothesized to account for the U-shaped pattern of the productivity effect of extension across yield quintiles. This finding suggested that for a given level of extension input, unobserved factors such as farm management abilities affect crop yields differently.

Bhaskar and Geethakutty (2001) analysed the role of non-governmental organizations (NGOs) in rural development through a case study conducted on two NGOs in Thrissur District of Kerala State. They selected two well-established NGOs of Thrissur District, Kuriakose Elias Service Society (KESS) and Apex Voluntary Agency for Rural Development (AVARD). A sample of 50 beneficiaries from each of the organisations was selected through proportionate random sampling procedure. They analysed the effectiveness by using Evaluative Perception Index. The index was formulated and standardised through identifying the major components of the programmes of NGOs, which consisted of 120 statements on five point continuum - very strong, strong, neutral, week and very weak, reflecting the components of the programme. The scores obtained by each respondent were summed to get the individuals' overall evaluation. It was found that agricultural programmes, health programmes, human resource development programmes, community development and industrial and trade programmes were the major rural development programmes of the NGOs. Majority of the beneficiaries, non-beneficiaries, workers of NGOs and workers of other development agencies considered rural development works of the

NGOs as effective for rural development. The study indicated that majority of the programme activities ultimately lead to progress in health and hygiene, education, technology transfer, employment generation, self-reliance, economic development and behavioural changes.

Owens *et al.* (2001) studied the impact of farmer contact with agricultural extension services on farm productivity, drawing on a unique panel sample of households residing in three resettlement areas of rural Zimbabwe. The study exploited the longitudinal nature of the data to estimate the impact of extension on the value of crop production per hectare, with and without controls for unobservable household level fixed effects. The sampling frame consisted of all resettlement schemes established in the first two years of the programme in Zimbabwe's three agriculturally most important agro-climatic zones. One scheme was selected randomly from each zone and random sampling was used to select villages within schemes and in each selected village. The authors found that after controlling for innate productivity characteristics and farmer ability either using household fixed effects estimation, or by including a measure of farmer ability and village fixed effects, access to agricultural extension services, defined as receiving one or two visits per agricultural year, has raised the value of crop production by about 15 per cent. This parameter estimate was statistically significant. The results suggested that although access to farm-level extension visits does increase productivity even after controlling for innate productivity characteristics and farmer ability, results from single-year cross-sectional studies should be treated with caution.

Deshpande and Raveendra (2002) examined the impact of Minimum Support Price (MSP) in agriculture economy with the help of correlation and regression equation. The study was based on time series data of Minimum Support Prices and overall analysis of the price situation in the State was done with the help of data on

wholesale prices and farm harvest prices at the State level. Availability of markets and other infrastructure, market arrivals, procurement of food grains, the operations of public distribution system, use of inputs and changes in input prices, changes in the cropping pattern were the major components of the Study. The analysis was also supported with the primary data collected from a micro-level survey. The correlation between Farm Harvest Prices and Minimum Support Prices indicated the effectiveness of Minimum Support Prices to be associated with market prices. It serves as an indicator of MSP leading the trends in the market prices of the commodities. A simple time-series one variable regression equation was used to find out the area response to lagged Minimum Support Prices. The regression coefficients pertaining to MSP were all statistically not significant even at 20 per cent level except for tur, and groundnut and it is clear that MSP does not help in deciding the area allocation under the crop during the next season. The study revealed that high correlation between farm harvest price and MSP and adjusted R Square, which indicated the effectiveness of MSP to be associated with the market prices.

Berti *et al.* (2003) reviewed the impact of agriculture interventions on nutritional status in participating households, and analysed the characteristics of interventions that improve nutrition outcomes. They identified and reviewed reports describing 30 agriculture interventions that measured impact on nutritional status. The interventions reviewed included home gardening, livestock, mixed garden and livestock, cash cropping, and irrigation. The authors examined the reports for the scientific quality of the research design and treatment of the data and assessed the projects invested in five types of 'capital' - physical, natural, financial, human and social, as defined in the Sustainable Livelihoods Framework, a conceptual map of major factors that affect people's livelihoods. They found that those agriculture interventions that invested broadly in different types of capital were more likely to improve nutrition outcomes. Those projects which invested in human capital,

especially nutrition education and consideration of gender issues, and other types of capital, had a greater likelihood of effecting positive nutritional change, but such investment is neither sufficient nor always necessary to effect change.

Mayrand *et al.* (2003) conducted a study on the topic 'Economic and environmental impacts of agricultural subsidies: An assessment of the 2002 US Farm Bill and Doha Round' with the major objective of assessing the environmental impact of agricultural subsidies, using wheat as an illustrative example. This was done through an analysis of the economic impact generated by the quantitative and qualitative shifts in agricultural subsidies introduced by the 2002 US Farm Bill and the Doha Round. The study was completed by an analysis of the environmental impact associated with various forms of agricultural subsidies. The study revealed that the reform of agricultural domestic support policies generated significant economic and environmental impact. While the overall level of subsidies had significant impact on the price of commodities, farm revenues, production and trade, the form that agricultural support takes was also significant in determining the economic and environmental impact of domestic support. It also recommended that more focus should be given to qualitative aspect of subsidies rather than on their quantitative aspects.

Koudal and Mahajanashetti (2005) analysed the Market Intervention Scheme (MIS) and its usefulness to the farmers in Karnataka State. The study was undertaken in Dharwad and Gadag districts of Karnataka, to analyse the coverage of farmers, extent of production procured, socio-economic factors of farmers and constraints faced by them. 60 farmers, 30 availing MIS benefits and 30 not availing MIS benefits were selected from four Taluks based on maximum procurement of maize and onion. The study employed the tabular presentation and Discriminant Function Analysis. The study found that the net price received by the farmers was higher in case of

procurement centers compared to that of open market sales and fair average quality (FAQ) standards, procedural problems and delayed payments were the major constraints in availing MIS benefits.

Dorward *et al.* (2004) studied about the institutions and policies for pro-poor agricultural growth. The study emphasised the importance of small holder agriculture development, with institutional support for labour-demanding technical change, for driving growth in poor rural areas. According to the authors, necessary conditions for policies Promoting Pro-poor Agricultural Growth (PPAG) are improved market access, technical change and transmission of the benefits of such change to the poor through production and consumption linkages that tighten labour markets. Policies promoting these conditions must stimulate structural change in relations between the farm and non-farm sectors and adapt to encourage different forms of institutional development appropriate to different stages of growth. Careful sequencing, design and implementation of investments are also needed to install critical basic conditions, such as infrastructure, technology, and equitable and secure access to land; to ensure that complementary markets, services and conditions develop together; and to prevent policy implementation and benefits being subverted and captured by special interest groups.

Franks *et al.* (2004) enquired about the institutional impact of sustainable livelihood approaches on development interventions through an audit of sustainable livelihood 'principles'. The major tools used were stakeholder analysis, various approaches to participatory assessment, and a range of analytical methods and models. The analysis of Goodbye to Projects has indicated that new skills and tools are needed for effective interventions. All partners need to rethink the issue of power and power relationships, particularly in relation to addressing the needs of the poorest and excluded. The goals of participation and empowerment are not easily achieved

under project formats which vest key decision-making power in the hands of project funders and implementers.

Fan *et al.* (2007) conducted a study on investment, subsidies, and pro-poor growth in rural India with three major objectives of reviewing the trends in government subsidies and investments in/for Indian agriculture and empirically estimate the relative impact of various subsidies and investments on agricultural growth and poverty reduction. A multi-equation system was employed to estimate the effects of government investment and subsidies on poverty, and a full information maximum likelihood method for the estimation technique. There were three major findings. First, initial subsidies in credit, fertilizer, and irrigation have been crucial for small farmers to adopt new technologies. Small farms are often losers in the initial adoption stage of a new technology since prices of the agricultural products are typically being pushed down by greater supply of products from large farms, which adopted the new technology. But as more and more farmers have adopted HYV, continued subsidies have led to inefficiency of the overall economy. Second, agricultural research, education, and rural roads were the three most effective public spending items in promoting agricultural growth and poverty reduction during all periods. Finally, the trade-off between agricultural growth and poverty reduction was generally small among different types of investments. As for agricultural research, education, and infrastructure development, they have large growth impact and a large poverty reduction impact. The study recommended for the reforming of institutions which can have an equal, if not larger, impact on future agricultural and rural growth and rural poverty reduction.

Herath (2007) assessed the performance of the Asian Development Bank assistance in policy reform in the Sri Lankan domestic agricultural sector and agriculture-related areas in the natural resource sector. The major objectives of the

study were, highlighting the type of agricultural policies that ADB has supported; assessing the consistency and effectiveness of ADB programmes in advocating the policies; ascertaining whether ADB's policy advocacy has adequately facilitated the Government of Sri Lanka (GOSL) policy reform process; and assessing the impact on the poor of the policies supported by ADB in the agricultural sector. The evaluation methodology followed a three-stage approach. The first stage focused on the major policy thrusts of the Government in the domestic agriculture sector while the second stage assessed the ADB involvement with these policies. The third stage focused on the impact of policy on the performance of the agricultural sector, the impact on poverty and the sector's constraints in sustaining ADB-supported polices. The analyses were based on an extensive literature review and a series of semi-structured interviews with professionals, private-sector representatives and other beneficiaries. The study concluded that ADB interventions during the period of analysis could not reform Government of Sri Lanka policies such as changing interest rates, application of interest rates lower than market rates and credit guarantees that distorted rural financial markets, and this prevented a sustainable growth of credit institutions. The analyses also showed that the ADB interventions were ineffective in developing the rural credit market in the domestic agriculture sector and did not disburse credit with a view to targeting poverty.

Acuna (2008) examined the effect of agricultural subsidies on farm labour, capital expenses and the market for agricultural labour, specifically immigrant agricultural labour. The analysis used confidential data of the United States Department of Agriculture, viz., Agricultural Resource Management Survey, the Current Population Survey, and the National Agricultural Statistics Service Quick Stats database. Farm and state-level data before and after the enactment of the 1996 Farm Bill were used to identify the effect of subsidies on farm expenses and the labour market. The 1996 Farm Bill separated production decisions and prices from

subsidy payments. The farm-level analysis indicated that farm subsidies increased farm labour and capital expenses. The study found that subsidies have a larger impact on labour expenses for farms that produce relatively more labour intensive commodities such as rice and sorghum. The state-level results indicated that agricultural subsidies have a positive effect on the hours worked by immigrant agricultural labour. The author concluded that agricultural subsidies increase the immigrant agricultural labour force.

Kirwan (2008) examined the effects of U.S Agricultural subsidies on farm land rental rates. Stratified sample was used to draw the sample of 59934 farmers who were paying cash rent. A fixed effect estimation equation was used to examine the effect of subsidies. Total amount paid in cash as rent and the total acres rented on cash, share, or free basis were selected as the dependent variables and subsidy was the independent variable. The analysis demonstrated that landlords capture about one-fifth of the marginal subsidy dollar through higher rental rates. Seventy of the remaining 80 per cent are accounted for in the tenant's net returns. Approximately, 25:75 ratio holds between landlord and tenant with respect to subsidy across farm sizes and across regions in the U.S. The same pattern holds immediately following a subsidy change and in the medium to long-run. The farm policy appears to accomplish its stated purpose to increase farmers' income. This effect occurs directly, rather than indirectly through increased asset values, thereby benefitting all farmers, tenants and owner-operators alike.

Rupasena *et al.* (2008) reviewed the government intervention policies on rice marketing since independence in 1948 to 2005 with a view to identify policy changes made in pre and post liberalisation period in Sri Lanka. Various marketing policies were grouped into procurement policy, distribution policy, buffer-stock policy, trade policy and market regulation policy. Major changes made in post-liberalisation period

were closing down of paddy marketing board, along with guaranteed price scheme, promotion of forward trading, replacement of universal rice rationing scheme into targeted food stamp scheme, price stabilization through trade instead of maintaining buffer stock, liberalisation of rice imports and establishment of food supply monitoring system. These policy changes indicated that focus on government intervention in rice marketing shifted from direct intervention to indirect intervention during post liberalisation period. Two major weaknesses found in the study were lack of public - private partnership and absence of think tank institute responsible for marketing. The study, therefore stressed the need to set up a marketing organisation for agribusiness promotion. It is essential to have a strong institutional mechanism to realize the benefit of liberalisation, globalisation, and privatisation.

Catalyst Management Society (2009) conducted a study on impact assessment of agricultural intervention in the tribal areas of Madhya Pradesh with the objectives of understanding and assessing the impact and sustainability of agriculture intervention in the State. The study covered 200 villages in twelve districts and the agriculture interventions in the tribal areas were analysed from four key dimensions – economic, political and institutional, socio-cultural and environmental. There were two level of changes measured in the impact assessment study – primary (impact) and intermediate (outcomes and results). Overall, the study answered five primary ultimate impact indicators and thirteen intermediate impact indicators. The major findings of the study were that agriculture was showing signs of becoming not a very viable economic enterprise, beyond subsistence, for vast majority of farmers in tribal areas and the reach of agriculture interventions in tribal areas was very weak. At best, an agriculture development scheme has reached five to ten percent of villages or benefitted 10 to 15 per cent of farmer households in tribal areas. The study suggested that, improving reach and program efficiency required addressing the delivery constraints, community based institutional mechanism for delivery of agriculture

interventions, capacity building of tribal leadership, improving planning systems, establishing performance and accountability systems and using different models of extension including private and NGO driven.

Dorward (2009) opined that there should be a rethinking about agriculture subsidies in rural economics. Conventional wisdom on difficulties with input subsidies are that their costs are very difficult to control. This depends partly on the way that subsidies are delivered, and is particularly the case with general subsidies for particular types of input, for example, fertiliser production or import subsidies. Targeting of input subsidies to particular farmer types is very difficult, with problems of diversion and leakage – for example from small holder to large scale farmers, and across borders to neighboring countries. These problems both expand the cost of a subsidy programme and reduce its efficiency. Subsidy benefits may also be regressive in that they tend to benefit larger farmers who can afford subsidised inputs, whereas the poorest farmers may not be able to afford even inputs even where they are subsidised. Finally the market distortions introduced by subsidies, and particularly parastatal involvement in subsidised input delivery, also tend to crowd out and inhibit private sector investment in input markets and provide opportunities for corruption, and hence impede sustainable development.

The World Bank (2009) in its Policy Note on 'Belarus agricultural productivity and competitiveness: Impact of state support and market intervention' analysed the productivity and competitiveness of agriculture in Belarus and how sector performance is influenced by state interventions. Tabular and graphical trend analysis was used to analyse the productivity and structural trends. Evolution of policy and institutional framework was studied by qualitative analysis based on the review of governmental policies and other relevant documents. State support for agriculture was investigated by diagnostic analysis of agricultural public

expenditures, including WTO boxes decomposition. Overall sector performance was measured by calculation of key parameters such as output growth, land and labour productivity, and yields, based on official statistics. Farm level performance indicators were used for disaggregated calculation and presentation of distributions – of Total Factor Productivity (TFP) change and Private and Social Cost Benefit (PCB, SCB) ratios at farm level, based on the Belarusian farm database comprising panel data for all large commercial farms. The links between TFP change and a set of explanatory variables describing the farms, including the subsidies received, were analyzed using regression methods. The PCB ratio is a measure of profitability at financial prices and the SCB ratio is a measure of competitiveness at economic prices. The study concluded that through a re-orientation of the agricultural policy framework towards less distortive measures, Belarus could achieve higher efficiency, competitiveness and growth without compromising on its food security and rural incomes objectives, and could possibly even reduce budgetary expenditures.

Chibwana *et al.* (2010) measured the impact of Malawi's 2009 Farm Input Subsidy Program (FISP) on fertilizer use and maize yields in Central and Southern Malawi. The first estimation strategy used was a Multi Nominal Logistic (MNL) regression to predict the probability of participation in mutually exclusive categories of the Programme. The second strategy relied on computing the aggregate value of all coupons received by a household. This constructed variable had the virtue of providing a household-specific, scalar measure of the magnitude of the Programme treatment. Using three rounds of panel data and instrumental variables regression strategies to control for endogenous selection into the subsidy program the authors found positive and statistically significant correlation between participation in the FISP and fertilizer use intensity. Fertilizer use was found to be higher among households that planted improved maize varieties than among those that planted traditional varieties. Results were broadly robust to the inclusion of fertilizer intensity

to control for household-specific differences in fertilizer use. Nevertheless, the results revealed that the subsidy program for maize had helped increased fertilizer use among benefiting households.

Wiggins (2010) studied the use of input subsidies in developing countries. The broad argument that input subsidies can lead to higher incomes, reduced poverty and improved food security is based on specific claims with respect to a range of underlying objectives. Most of these underlying objectives have either an economic efficiency rationale or are concerned with reallocating income to a particular constituency. The main economic objectives of these subsidies were to stimulate agricultural production, compensate for high costs of transport from port or factory to farms that raise costs of inputs, improve soil quality and combat soil degradation in the case of fertilizer, offset high costs of supplying inputs when markets have low volumes, and economies of scale in logistics cannot be achieved and make inputs affordable to farmers who cannot buy them, owing to poverty, lack of access to credit, and inability to insure against crop losses. But this Programme is criticized on the ground that subsidies may be ineffective in raising use of inputs and increasing yields. The study suggested that input subsidies need to be contemplated with caution, with a clear consideration of the costs and benefits compared with conventional best practice of addressing market failures directly and using social policies to address social objectives with respect to poverty and food insecurity.

Badiani and Jessoe (2011) developed and empirically tested a model that describes the channels through which electricity subsidies impact agricultural productivity. To isolate the impact of electricity prices on groundwater extraction and agricultural revenues, the study exploited year-to-year variation in state electricity prices across districts that differ in hydro-geological characteristics. It was found that a ten percent decrease in subsidies would reduce groundwater extraction by 4.3

percent, costing farmers thirteen percent in agricultural revenues. Electricity subsidies increased agricultural productivity along with both, intensive crop yields and extensive crop acreage margins. According to the authors, in India, expenditure on electricity subsidies for agriculture, an input subsidy aimed at improving agricultural productivity and the incomes of the agricultural work force, exceeds that spent on health or education. Yet the benefits and beneficiaries of these policies have remained unexplored. If the Government of India implemented these subsidies simply to transfer money to agricultural users, then this policy might be effective to redistribute income. The authors concluded that it remains to be explored which agricultural users actually benefit from this policy.

Bardhan and Mookherjee (2011) examined the role of delivery of subsidised seeds and fertilisers in the form of agricultural minikits by local governments in three successive farm panels in West Bengal spanning 1982-95. The paper provides empirical estimates of the effectiveness of subsidized farm input programs, based on the experience of the Indian state of West Bengal during the last two decades of the 20th century when it witnessed rapid growth in foodgrains production and yields. The study was based on data from cost of cultivation surveys carried out by the Department of Agriculture of the state government. The farm data were complemented by village data on landholding, cultivation, caste, literacy and occupation of all households collected from a variety of sources. Ordinary Least Squares was used to analyse the effectiveness of programmes on productivity and farm income. The estimates were robust to possible endogeneity of programme placement, controls for farm and year effects, and other programmes of agricultural development, local weather and price shocks. The effects were uniform across farms of varying size, and raised farm employment of hired workers. The kits delivery programme significantly raised farm value added per acre, accounting for almost two – third of the observed growth. The effects of the programme overshadowed the

effects of other rural development programs including the tenancy registration programme of the State.

Chirwa *et al.* (2011) analysed the factors that influence access to agricultural input subsidies in Malawi using the Probit Model. The study used data for the period 2007- 08 to 2008 -09 of the Malawi Agricultural Input Subsidy Programme collected from 1,982 rural households drawn from all livelihood zones in the country, covering 14 of the 29 districts. The dependent variables in the model were access to fertilizer coupons and quantity of subsidized fertilizers acquired by the households. The explanatory variables included household characteristics, farmer characteristics, poverty and vulnerability variables and other control variables. The results showed that vulnerable households such as the poor and elderly-headed are less likely to receive fertiliser coupons and receive less of the subsidised fertilisers. A positive relation between participation in other social safety networks and access to subsidised fertiliser coupons was found implying that households with multiple accesses to different types of social protection programmes were not excluded from the MAISP by virtue of benefiting from other social protection programmes.

Dorward and Chirwa (2011) reviewed the background, processes, achievements and outcomes of the Malawi Agricultural Input Subsidy Programme (MAISP) over the period 2005- 06 to 2008 -09. The very large scale disbursement of heavily subsidised fertilisers and seed to very large numbers of beneficiaries across the country represents a significant logistical achievement and led to significant increases in national maize production and productivity, which has contributed to increased food availability, higher real wages and wider economic growth and poverty reduction. However the latter years of the Programme have also been accompanied by very high international fertiliser prices and costs and by high maize prices, the latter undermining the programme's food security, poverty reduction and

growth benefits for the majority of Malawian farmers, who are very poor and rely on purchased maize for significant amounts of their staple food requirements. Estimated economic returns to the Programme have been satisfactory, given other benefits of the programme not captured in cost benefit analysis. The authors suggested that any application of Malawi's subsidy experience to other countries needs to take account of the special characteristics of the Malawian maize economy and of the measures needed to raise such programmes' effectiveness and efficiency and ensure their best fit with and contribution to sustainable development policies.

Independent Evaluation Group (2011) of the World Bank Group conducted a study on the topic 'Impact evaluations in agriculture: an assessment of the evidence'. The study described the state of impact evaluation literature in agriculture, provided taxonomy of agricultural interventions to organize results, and examined discernable performance patterns for lessons to inform the design of future interventions. The interventions covered by agriculture, Impact Evaluations (IE) were grouped into eight categories, such as land tenancy and titling, extension services, irrigation, natural resource management, input technology, marketing arrangements, microfinance and others including rural roads or infrastructure, community driven development and safety net programmes. The evaluations of agricultural interventions use a counterfactual, to measure the change resulting from the intervention - the majority relies on quasi-experimental or non-experimental methods. The only common denominator for comparing results was whether an intervention has a positive impact on the targeted outcomes. More than half of all intervention types covered in the analysis had positive impacts on various agricultural outcome indicators, mostly yields, income, or input use. Interventions that sought to improve yields or farm income by addressing market-linkage failures, easing access to technologically enhanced inputs, and promoting farmer knowledge through advisory services had the highest share of positive impacts.

The Policy and Operations Evaluation Department of the Ministry of Foreign Affairs, Netherlands (2011) made a systematic review on the topic 'Improving food security: A systematic review of the impact of interventions in agricultural production, value chains, market regulation, and land security' with a research question of seeking the evidence for, and nature of, the impact of development interventions on food security in developing countries. Interventions aimed at increasing agricultural production, developing value chains, reforming market regulation, and enhancing land tenure security were selected as the impact path ways. The study focused on food access and access stability as impact indicators, household income and food security as proxy-impact indicators, while each of the four different impact pathways have their own specific outcome indicators. It was concluded that one particular pathway will be more likely than another to have an impact on food security - for two reasons. First, not all impact pathways to food security were included in this review, and some included pathways were underrepresented by the lack of good evaluations. Secondly, improvements in food security were often the result of synergies between different interventions and pre-conditions: production, markets and land security.

Quisumbing *et al.* (2011) evaluated the long-term impact of antipoverty interventions in Bangladesh. The author provides an overview of a research project that assessed the long-term impact of three antipoverty interventions in Bangladesh - the introduction of new agricultural technologies, educational transfers, and microfinance - on monetary and non-monetary measures of well-being. The core of the evaluation problem was how to assess the counterfactual i.e., what would have happened to the beneficiaries in the absence of the intervention or treatment. Random assignment of the treatment to a pool of equally eligible individuals or households followed by a comparison of outcomes for the treatment and control groups before

and after treatment was used to solve the evaluation problem. The quantitative methodology used was an observational approach, which constructed comparable treatment and comparison groups using a type of covariate matching, Nearest Neighbor Matching (NNM). NNM estimated the counterfactual outcomes for the treatment group by constructing a statistical comparison group of households that did not get the treatment with similar observable characteristics in the baseline survey round, which in this case is after the intervention started. The study found that both government and civil society interventions have the potential to reduce poverty in Bangladesh, but that their household-level and individual impacts differ in the short- and the long-term because of differences in the time path of net benefits from the interventions and spillover effects.

Kaur and Sharma (2012) made a study on agricultural subsidies in India from 1980-81 to 2008-09. In this study agriculture subsidies of fertilisers, electricity, irrigation, seeds and machinery were discussed during pre-liberalisation period (1980-81 to 1985-86), first phase of liberalisation period (1990-91 to 1996-97) as well as during second phase of liberalisation period (2000-01 to 2008-09). For analysing the growth and distribution pattern of agriculture subsidies, five zones i.e. south, west zone, east zone, north zone and north-east zone were taken as sample areas. The study concluded that in India, the total subsidies of fertilizers, electricity and of irrigation have increased in terms of per hectare during pre, first as well as second liberalisation periods, whereas the increasing rate is higher in 1985-86 among all the other years and lowest rate in 2000-01. Productivity has declined in the year 1996-97 at country as well as zonal level. The findings indicate that the increasing rate of total subsidies, viz., fertilizers, electricity and irrigation is higher than that of Gross Cropped Area (GCA) during pre, first as well as second phase of liberalisation periods. The study suggested that Government should keep aside its motive to please voters or strengthen the vote bank; it should frame rational policies in which small

size category farmers, who are not actual beneficiaries of subsidies, could get more, and subsides which they do not want should be withdrawn.

Masset *et al.* (2012) made a systematic review with the objective of assessing the effectiveness of agricultural interventions in improving the nutritional status of children in developing countries. The review included 23 studies, mostly evaluating home garden interventions that assessed effects of agricultural interventions aiming at improving the nutritional status of children, viz., bio-fortification, home gardens, small scale fisheries and aquaculture, dairy development, animal husbandry and poultry development. Analysis for four intermediate outcomes - programme participation, income, dietary diversity and micronutrient intake, and one final outcome - prevalence of under-nutrition were carried out. Analysis was by summary tables of mean effects and by meta-analysis for vitamin A absorption. The authors opined that the interventions were successful in promoting the consumption of food, rich in protein and micronutrients, but the effect on the overall diet of poor people remained unclear. The study was concluded with the poor effect of interventions on nutritional status, but methodological weaknesses of the studies casts serious doubts on the validity of these results.

Salunkhe and Deshmush (2012) had an overview of government subsidies to agriculture sector in India with the help of provisions of funds for agriculture in Five Year Plans and Annual Budget. The authors also studied different types of agriculture subsidies and their distribution criteria in India. Secondary data on total subsidies and gross cropped area in India, plan expenditure on agriculture and allied sectors, and irrigation for the period 1980-81 to 2008-09were used for the analysis. The amount of agricultural subsidies is increasing year by year in India. But there is large amount of decrement in the provision of funds towards agriculture sector in Five Years Plan and Annual Budgets. This is responsible for slow growth of agriculture in India and less

contribution in GDP of country. The Government of India has taken serious measures for development of agriculture sector and agriculture subsidies are one of vital tools to help the growth of agriculture sector in India.

The review indicates that there is a positive impact on farm production, investment and income through interventions. Many researchers have found that subsidies are having significant impact on the price of commodities, farm revenues, production and trade. Initial subsidies in credit, fertiliser and irrigation have been crucial for small farmers to adopt new technologies. Some of the authors have also been doubtful about the benefits of institutional interventions accruing to the small and marginal farmers. According to them, subsidy benefits may also be regressive in that they tend to benefit larger farmers who can afford subsidised inputs, whereas the poorest farmers may not be able to afford even inputs even where they are subsidised. It is recommended that more focus should be given to qualitative aspect of subsidies rather than on their quantitative aspects.

2.3 Impact of institutional interventions on rice farming

In international development, impact evaluation is principally concerned with final results of interventions, programmes, projects, policy measures and reforms, on the welfare of communities, households, and individuals, including taxpayers and voters (Leeuw and Vaessen, 2009). Impact evaluation is one tool within the larger toolkit of monitoring and evaluation including broad programme evaluations, process evaluations, ex ante studies etc. No single method is the best for addressing the variety of questions and aspects that might be part of impact evaluations. However, depending on the specific questions or objectives of a given impact evaluation, some methods have a comparative advantage over others in analysing a particular question

or objective. Hence, the available impact studies on rice / paddy farming are reviewed in this section so as to improve and sharpen the methodology of the present study.

Martinez *et al.* (1998) examined the relationship between government buffer-stock programmes and the level and variability of rice prices in the Philippines. To assess the impact of government interventions on prices, data on regionally-weighted aggregate prices and National Food Authority (NFA) activities over the period 1974-1992, monthly NFA stock-level changes and data on production were collected. Producer and consumer prices were used to estimate two econometric models to test the relationship between price changes and government stock actions over the period 1974-1990. Significant correlation was observed between NFA stock changes and price changes, and stock changes did provide some seasonal and inter-annual stabilization, but the effect was very small and was not statistically significant. Hence, arguments that NFA actions altered the seasonal pattern of prices or its inter-annual variability are valid but not compelling. The study suggested that future NFA actions should be weighed against alternative use of resources that might prove more effective in protecting consumer and farmer incomes.

Ramos (2000) in his paper analysed private and public sector participation in Philippine rice marketing. He examined state intervention in unmilled and milled rice marketing in terms of investments, pricing policy, information dissemination, and other regulatory functions. He also analysed the private sector in the unmilled and milled rice trading and marketing in terms of their investments, organization, strategies, and sources of information. The study identified that government intervention in rice markets is premised on two goals: food security, i.e., to protect the food security of the country in times of calamity or crisis, and price stabilization, i.e., to stabilize prices at levels that would help attain the contradictory goals of assuring farmers reasonable returns on their investments and, consumers, affordable

prices. To pursue these ends the NFA administers buffer stocks and a subsidy scheme that allows it to purchase paddy at a high price while selling milled rice at a low price. Of the government's direct market intervention tools, it was found that NFA's import operations have the most impact on the rice market. While the infusion of imports into the domestic market has helped stabilize retail prices, millers, traders and farmers are one in bewailing the impact of such intervention, especially when ill-timed, on their livelihood. Farmers and small-scale traders stand to lose most as their entitlements do not afford them to shift industries easily or without cost. On the other hand, the impact of government intervention on farm gate prices range from insignificant to nil. NFA's paddy procurement operations have been declining and largely unable to influence farm gate prices with the subsidized government prices falling below market rates in a number of years. The universal retail price subsidy, in conjunction with an ineffective farm gate support, program has neither been efficient nor egalitarian.

Suresh (2000) studied the Group Farming Management Approach in rice farming with the major objectives of measuring material benefits of Group Farming in rice cultivation in Kerala in terms of change in production, productivity, financial assistance, cost of cultivation and net returns and to bring out the dynamics of group farming in terms of joint operations undertaken by farmers, extent of participation of various participants in the programme, attitude of farmers and opinions retained by farmer members about group farming. The sample size of the study was 1330 farmers, 236 leaders and 75 officers from 133 group farms under 70 Krishibhavans from seven districts which occupied 82 percent of the gross cropped area in rice. Data were analysed with simple statistical tools of mean, index, four point scale technique, and Scheffe method. The study revealed that Group Farming could not control the deteriorating conditions of rice farming, though marginal benefits were in initial period. The author concluded that, rice farming can be saved only by bold steps like

procuring rice at a premium price without affecting the consumer price, establishment of Paddy Board, revamping of group farm committees, streamlining of agriculture administration and change in legal frame work.

Najafi and Bakhshoodeh (2002) studied the effectiveness of Government Protective Policies on Rice Production in Iran. To evaluate the government intervention effects on growth of rice production in Iran, the nominal protective rate was calculated and a Nerlove Supply Model was applied to a time series of 1983-1998. The negative Nominal Protection Rate (NPR) for the majority of the studied years indicated that rice producers have not been really supported by the Government. The results showed in general, that the implemented policies for supporting rice producers in order to achieve a stable price and income, has ended up with unwanted outcomes mainly against the general objective of self-sufficiency in agricultural products. In the majority of these years, producers have not been supported and therefore, redirecting the rice market was recommended. In order to get more efficient approach than the government intervention, diminishing the share of the Government in the market and strengthening the private sector was recommended on the top of a list that could be regarded as a plan for making rice production profitable.

Wang (2005) examined the US rice export promotion programmes with the main objective of analyzing the effect of promotion programmes and exchange rates on rice exports to the three major US grown long grain rough rice importers in Latin America: Mexico, Costa Rica and Honduras. A single equation framework was specified to estimate the rice import demand model. Promotion programmes and the competitors' exchange rate as primary explanatory variables for the US rice import demand in the targeted markets has been evaluated in the study. Ordinary Least Square (OLS) estimation was employed to observe the relationship between

explanatory variables and dependent variables. The co - linearity test, heteroscedasticity test, and autocorrelation test were used to analyse the efficiency of the single equation system result. A Generalized Method of Moments (GMM) fitness test was conducted to correct the efficiency problem caused by heteroscedasticity in the OLS result. It was found that promotion programmes were effective in Mexico and Honduras, with an average return of $10 and $40 per dollar during 1989-2003. However, promotion programmes were not significant for Costa Rica. Estimated own price elasticity was considerably less elastic in the Mexico and Honduras market than in the Costa Rica market.

Yao *et al.* (2005) investigated Philippine government's price stabilization policy for rice. The aim of the study was to measure the impact of National Food Authority activities on rice prices and three queries were addressed, viz, whether NFA interventions are associated with price stabilization; whether NFA interventions are associated with higher producer prices; and whether NFA interventions are associated with lower consumer prices. Regressions were used to examine the effectiveness of the program at regional and national levels over a 21-year period. Dependent variables for the regression models were farm gate and retail prices and independent variables included NFA producer and consumer support prices. The study revealed that NFA stock releases did not correlate strongly with retail prices at the national level. Although the NFA support price appeared to have been moderately successful in increasing producer prices at a national level, on average, the support price led to an increase in consumer prices in ten regions and contributed little to price stabilization. Overall, therefore, the results indicated very limited success on the part of the NFA to achieve its major objectives at either regional or national level. The author suggested that the NFA should concentrate its resources in the poorest areas of the country, where it might exert greater and more useful influence in smaller and locally thin rice markets.

Ekanayake (2006) studied the impact of fertiliser subsidies with reference to paddy cultivation in Sri Lanka. The objectives of the study were to analyse factors affecting fertiliser demand and to investigate the impact of fertiliser subsidy on paddy cultivation. The issue was analysed by employing three separate demand functions for major fertilisers by using simple regression model. Regression models were specified for annual issues of fertilizer at the national level as dependent variable and current fertilizer price and lagged nominal farm gate price and extent under irrigation schemes as independent variables assuming that all other factors that influence fertilizer use were remaining unchanged. Dummy variables were used to interpret policy changes. Further, it was also assumed that the total quantities of different fertilizers issued for paddy cultivation during the given year were utilised fully for paddy during the year and no carryover stocks. This assumption was made due to lack of information regarding quantities of paddy fertilizers that were used for the cultivation of other food crops. Own price and cross price elasticity of demand were obtained from estimated demand function and those elasticity explained the sensitivity or elasticity of fertiliser demand to change in fertiliser prices and paddy prices which implied the impact of fertiliser subsidy policy on paddy cultivation. Regression results indicated that changes in the prices of fertiliser and paddy did not have a significant effect on fertiliser usage, which points to the fact that the fertiliser subsidy is not a key determinant of the use of fertiliser in paddy cultivation. The study also found that there is a relatively higher correlation between fertiliser usage and paddy price than between fertiliser usage and fertiliser price.

Suresh and Reddy (2006) focused on the resource productivity and the technical efficiency of paddy production. The study used primary data collected from 71 rice farmers of the Peechi command area using the stratified random sampling. The production function approach was used to find out the productivity of resources

used in paddy cultivation. For this purpose, the Cobb-Douglas production function was employed. The single most advantage of this production function was that the input coefficients constituted the respective elasticities. Area under paddy cultivation (ha), value of seed, tractor charges, cost on human labour used in paddy cultivation, cost on chemical fertilizers, cost on farmyard manure, cost on plant protection chemicals, amount of water applied, dummy of water stress days and availability of supplementary irrigation were the explanatory variables of the production function. Allocative efficiency (AE) was determined by calculating the ratio of the marginal value product (MVP) to the marginal factor cost (MFC). The cost of cultivation of paddy in the command area was found to be Rs 21603/ha, resulting in a BC ratio of 1.34. The elasticity coefficients for chemical fertilizers, farmyard manure and human labour were found to be significant and positive. The allocative efficiency indicated that marginal return per one rupee increase under these heads were Rs 2.83, Rs 1.57 and Rs 1.17, respectively. Education of the farmer and supplementary irrigation provided during the water-stress days were identified as the factors which could enhance the technical efficiency. The study called for an equitable distribution of canal water and enhanced extension services for resource management in the area.

Integrated Research and Action for Development (2007) studied the impact of a hypothetically extended procurement system i.e., bringing new states and more districts of existing states under procurement net of food grains at both macro and micro levels - on the level of procurement, the consequent changes in fiscal outlay, impact on local mandi price or retail price, and consequently change in producers' income and consumers' expenditure on food grains, under ceteris paribus. District wise procurement of rice and wheat quantity and farm harvest price along with market price were analysed to see the likely impact of extended procurement system on the volume of procurement and local market price. Unit value i.e., ratio of household monthly consumption expenditure on wheat and rice and their respective

quantity consumed, obtained from NSS 55th (FY 1999-00) and 60th (FY 2004) round survey data was taken as proxy for the market prices of wheat and rice. The market price was related as a function of per capita production and farm harvest price. The implication of extended procurement regime was worked out. Change in procurement quantity, change in market price, and consequent change in gains or loss to producers of rice and wheat and consumers were calculated under ceteris paribus. Fiscal outlay in terms of subsidy which is the difference between procurement, including operational cost and transport cost, and Public Distribution System (PDS) price was calculated. The important fact that emerged from the study was that the fiscal support extended to carry out extended procurement is translating into a gain to a large section of poor farmers. But Government subsidy is benefiting only small pockets of farmers residing in the areas covered under procurement operation throughout the State.

Jha and Mehta (2008) studied the effectiveness of public spending for rice subsidies in the Philippines. The Rice Subsidy Program run by the National Food Authority (NFA) is an important safety net in the Philippines, receiving the largest share of government subsidy among all government corporations. The authors analysed crucial economic aspects of the programme, including its economic efficiency, reach to and support for the poor and targeting effectiveness. Ordinary Least Squares was used to analyse the effectiveness. It was found that the programme fared well in successfully and efficiently reaching the poor. Its cost was low as share of GDP, except for the steep hike in 2008, implying sustainability. It also revealed that households in better-governed regions have a higher propensity to participate in the programme, which makes sense if poor governance leads to reduced access to the NFA program. The authors opined that the NFA rice program could better reach the poor if its inclusion and exclusion errors were reduced, its access and availability to the poor improved, and the quality of governance bolstered. In times of volatile and

unprecedented food price increases, strengthening food-based safety nets for a more effective and efficient role in shielding the poor is more important than ever.

Prasanna *et al.* (2009) examined input-use pattern in rice production. The hypothesised relationship tested in this study was that land inequality influences access to/ use of resources in rice production and in-turn influences productivity. Results showed that market imperfections aggravate the negative effect of land inequity on productivity. Smallholders' share in inputs like fertilizers, and irrigation has increased over time, but a large number of smallholders still do not have access to these resources. Study has demonstrated that policies like fertilizer subsidy, agricultural credit, and minimum support prices are able to address market imperfections only partially. Hence, for improving productivity and profitability of rice production of smallholders in particular and other farmers in general, addressing of structural inequity needs attention besides a focus on technology development.

A study by Sahu, *et al.* (2009) examined the determinants of access to institutional credit and distress sales in Eastern India with the help of Ordinary Least Square Method. Data from the service area of four different bank branches from two regions were analysed in order to identify patterns of access to credit and distress sales. The level of technology has been used as a proxy variable to define and differentiate the advanced and backward regions. A Probability model was employed to study the determinants of access to credit involving estimation of the probability of access to credit (y) as a function of a vector of explanatory variables (x). The authors found that inadequate and poor access to institutional credit forced those farmers excluded from this source to depend on the informal credit market to meet the costs of agricultural production. Such dependence resulted in turn, not only to interlocked transactions and distress sales of paddy but also results in substantial income loss to

small peasants. This loss of income was also due to the non-implementation by the government of its supposedly pro-poor policy of minimum support price for paddy.

Weerahewa *et al.* (2010) made a case study on the Fertilizer Subsidy Program in Sri Lanka. The fertiliser subsidy program is one of the longest lasting, most expensive and most politically sensitive policies implemented to promote rice cultivation in Sri Lanka. It was initiated in 1962, at the onset of the Green Revolution, with the main objective of encouraging farmers to switch from traditional rice varieties to high-yielding varieties (HYVs) that are highly responsive to chemical fertilizers. Since then, however, the provision of the subsidy has become customary, and successive governments have been under tremendous pressure to continue the subsidy despite budgetary constraints. The fertiliser subsidy has led to increased land productivity and encouraged farmers to expand the land under paddy cultivation (Central Bank of Sri Lanka, various years). It has, however, resulted in certain policy failures too. Once purchased, fertiliser is also applied to paddy that is cultivated on lands without legal titles as well as to crops other than paddy. Furthermore, the media often report on inefficiencies associated with the distribution of fertiliser by the Agrarian Services Centers (ASCs) of the Ministry of Agricultural Development and Agrarian Services. Paddy cultivation provides livelihood opportunities for more than 1.8 million farmers in the country, and hence the government has been under constant pressure to continue the fertilizer subsidy.

Afolami *et al.* (2011) examined the impact of farmers' membership of cooperative societies on rice production, against the backdrop that the promotion of membership of cooperative society among farmers would give them better access to agricultural inputs and consequently improve their income. Multistage sampling technique was employed to select a total of 310 rice farmers. Data collected were analysed using descriptive statistics, budgetary technique and inferential statistics.

Budgetary analysis was used to determine the profitability of rice production by both co-operative and non-co-operative members. The Probit regression analysis was used to determine the factors that influence farmers' membership of a rice production group. Farmer's production was the dependent variable and the independent variables include socio economic factors, accessibility of inputs, credit and extension services. The study revealed that cooperative members were more intensive users of purchased inputs like fertiliser and pesticides as compared to the non-cooperative members. Further revelation from the study was the fact that membership of cooperative society was found to be influenced by household size, access to extension services, number of rice farms owned, access of rice farmers to herbicide and quantity of rice output. The non-significant difference in the gross margin of cooperative and non-cooperative members despite the greater intensity of use of purchased inputs viz., fertilizer and pesticide by cooperative members suggests the need for monitoring of rice farmers who are cooperators in order to ensure that the substantial inputs are rightly channelled.

Awotide *et al.* (2011) assessed the impact of access to Subsidised Certified Improved Rice Seed (SCIRS) on rice farmers' income in Nigeria. The study adopted Randomised Control Trial (RCT) approach, which is the simplest method to analyse the impact by taking the differences of mean outcomes. However, given the fact that conducting a perfect randomisation is an almost impossible task in developing countries like Nigeria and also due to the problem of non-compliance often associated with RCT approach the authors adopted the Local Average Treatment Effect (LATE) estimation techniques to provide a consistent estimate of the impact of access to SCIRS on farmers' income. In addition, the LARF (Local Average Treatment Effect) was adopted to account for other factors that could affect the farmers' income. The result of the analysis revealed that access to SCIRS increased the income of the farmers significantly. The authors proved further that access to SCIRS had a higher

impact on the poor farmers' income. The result of the poverty measurement further confirmed that access to SCIRS has a poverty reducing effect and poverty could be kept away if well implemented and monitored.

Terwase *et al.* (2011) measured the economic impact of Olam Out-Grower program on rice farming to help improve rice production in Benue State of Nigeria with a sample size of 184 rice farmers comprising of 116 participating rice farmers of the programme and 68 non-participating rice farmers. Data obtained from the field observation and questionnaire survey included, size of rice farms, rice yield, income, and cost of farm inputs such as fertiliser, pesticide/herbicide, seeds, labour and capital and also economic benefits derived by farmers. Using a 'before' and 'during' project approach the study has determined the change in farm yield and income of rice farmers. The research concluded that, Olam Out-Grower programme has impacted positively on the productivity of participating rice farmers, but the farmers do not benefit much from the economic value of their farm output. Therefore, the study recommended that Olam out-grower programme should shift its extensive rice farming approach to intensive rice farming approach in order to improve on value addition of rice farming in the area.

Thomas (2011) prepared a field report by reviewing the policy initiatives of the State and local governments over the last few years that have helped to revive rice cultivation in Kerala. The report was based on interviews with farmers, government officials and leaders of mass organisations in Palakkad. The study reviewed the price and procurement policy, processing supports, support of local institutions like Padasekhara Samithis and also the long term challenges to paddy cultivation. The author found that farmers have benefited greatly from the procurement of paddy by Supplyco. Based on the receipt of paddy issued by the agents, Supplyco transfers money to the farmer's bank account. Public sector banks provide loans to farmers

based on deposits made by Supplyco or its agents. State government policies on prices and procurement have helped farmers receive steady prices. Similar interventions by the public or cooperative sectors in rice-processing can provide greater security to farmers' incomes.

Ali *et al.* (2012) observed the effectiveness of Minimum Support Price (MSP) policy for paddy and its role and contribution towards production in surplus states like Punjab. The study was based on the secondary data on farm harvest prices and minimum support prices of paddy for various paddy-producing states. To study the effectiveness of the price policy during the harvest periods, the deviations of farm harvest prices (FHP) from the minimum support prices were worked out and divided into negative and positive deviations to examine whether market prices ruled lower or higher over the minimum support prices. A Three Stage Least Square (3SLS) method using STATA software was employed to examine the impact of prices and technology on productivity and production. The study found that while the MSP policy was very effective in surplus producing states like Punjab and Andhra Pradesh, it was not so effective in the deficit states. In Punjab, the effective implementation of the price policy helped in improving the production and productivity of rice. Non-price factors such as use of improved varieties, availability of assured irrigation at subsidised rates and high fertiliser-use were found to be significant determinants of growth in rice production. The study suggested that without losing sight of the environmental concerns, the Punjab model could be used for increasing the production of rice in other potential areas of the country.

Dano and Samonte (2012) reviewed public sector interventions in Malaysian rice industry. The three primary objectives of the different policies on rice are to ensure food security, raise farm income and productivity, and ensure food supply to consumers at reasonable costs. In Malaysia, the government intervenes in the rice

market through its production policy and subsidisation policy by providing guaranteed minimum price, fertilizer subsidy programme, paddy rice subsidy scheme, credit program, and also through its trade policy and price stabilisation policy. The Malaysian Government has adopted price stabilisation schemes as its major platform in balancing the potential trade-offs between protecting small rice producers and attaining food security for the populace.

Pangaribowo (2012) investigated the impact of the 'Rice for the Poor' programme - an almost universal program of Indonesian Social Safety Net (SSN) Programmes launched in 1998. The sample was restricted to 7178 households of the Indonesia Family Life Survey (IFLS) which captured periods before and after economic crisis and the implementation of the 'Rice for the Poor' program. To assess the impact of the 'Rice for the Poor' programme, certain outcomes, such as household food and non food expenditures were used. Using the Indonesian Family Life Survey, the researcher implemented propensity score matching combined with difference - indifference method. The matching estimators showed that the programme had reached its target. Propensity score matching indicated that 'Rice for the Poor' program had positive impact on selected food and non food expenditures. The program also had positive impact on health expenditures. The impact of 'Rice for the Poor' program on adult goods expenditure was even more substantial than meat, fish and dairy products expenditure.

Ramli *et al.* (2012) attempted to simulate the impact of changes in government intervention policy, namely, the fertiliser subsidy, on the Malaysian paddy and rice industry using System Dynamics Model. System dynamics is a methodology for analysing complex systems and problems with the aid of computer simulation software. In this study, the scenario of the impact of fertilizer subsidy was simulated. Simulation result indicated that fertilizer subsidy does give a significant

impact to the paddy and rice industry. Fertilizer subsidy increases the yield obtained and hence increase paddy production. The removal of fertilizer subsidy decreased the paddy production and consequently, decreased the self-sufficiency level (SSL). With the removal of fertilizer subsidy the import of rice was inevitable due to the reduction in production. Meantime the growth in population will further put a pressure to the government to increase import and to find alternative policies to sustain production and to increase yield.

Guptha (2013) reviewed the rice procurement operations of the Government of India from the standpoint of cost of procurement as well as effectiveness in supporting farmers' income. The two channels used for procuring rice are custom-milling of rice and levy. In the first, the government buys paddy directly from the farmers at the minimum support price (MSP) and gets it milled through private millers; while in the second, it purchases rice from private millers at a pre-announced levy price thus providing indirect price support to farmers. The study used semi-non parametric estimates of millers' values to simulate farmers' expected revenues and found these to be rather close to the MSP. Secondary data revealed that although levy imposes a lower unit cost per quintal of paddy procured, over the last decade, custom-milling has become predominant, partly on the argument that it provides minimum price support to farmers. The study also quantified impact of change in levy price on farmers' revenues through its effect on millers' values and competition. It was found that a higher levy price can incentivize millers into purchasing on their private account and at the same time, sales through auctions can ensure that competition among millers drives up the prices close to the MSP. The study concluded that if the Government is a large purchaser of levy rice, then that itself can, in the presence of functioning grain auction markets, provide price support to farmers at levels that it desires.

Shadfar and Malekmohammadi (2013) examined the state intervention policies to boost rice production in Iran by using multinomial logistic and ordinal regression application and multicollinearity cautiousness so as to re-structure them in a more effective and competent form. Ordinal and multinomial logistic regression applications were applied to test the model by predictor variables. To measure effects of the super-variables of the model on rice production in Iran, all rice farmers in the state of Mazandaran were studied. To collect the data, questionnaire with different type of statements were developed in Likert Scale. The dependent variable of the study was rice production development and the independent variables were market regulations, farming technologies, infrastructure development, trade and marketing, and financial support. The authors concluded that there is association between the dependent and independent variables.

The review has made it clear that government interventions in rice markets is mainly for achieving two goals – food security and price stabilisation. The loss of income to the farmers by way of distress sales was identified as due to the non – implementation of Minimum Support Prices. MSP Policy was found to be very effective in surplus producing states, while it was not so effective in the deficit states. Non price factors such as use of improved varieties, availability of assured irrigation at subsidised rates and high fertiliser use were found to be significant determinants of growth in rice production. Government subsidy benefited only small pockets of farmers residing in the areas covered under the procurement operation of the government, while certain authors pointed out that fertiliser subsidy is not a key determinant of the use of fertiliser in paddy cultivation. Still others found that fertiliser subsidy led to increased land productivity and encouraged farmers to expand the land under paddy cultivation and increase paddy production. Farmers have greatly benefited from the procurement of paddy by Supplyco. Many of the researchers studied pre and post effects of subsidies and programmes to examine the impact of these interventions. Multilogistic Regression Models, Ordinary Least Square Method,

Randomnised Control Trial Approach and Nerlove Supply Model were mainly used for analysing the impact of interventions.

2.4 Constraints of rice farmers

Paddy cultivation in Kerala has witnessed a steady decline since the 1980s. The sharp fall in the area under paddy cultivation as well as in the quantity of rice produced in the State has had important implications on Kerala's economic, ecological and social development. Hence the problems faced by farmers with respect to paddy cultivation, institutional support and their socio-economic problems are reviewed in this section as part of the last objective of the study.

Bangura (2002) investigated the constraints underlying the decline in rice production in Sierra Leone. The trends behind the decline were explored with the aim of explaining the factors that emerge therein. The tools employed for analyzing the problem involved thorough descriptive statistical analysis, coefficients of protection analysis using nominal protection coefficient, and a supply response analysis using a time series regression framework for the period 1964-1998, within the context of the Nerlovian supply response approach. Major constraints found negatively impacting on output of rice were price disincentives to farmers, negative coefficient of public investment, concentration of public expenditure on providing social infrastructure that are limited to urban areas which serves to attract rural labour; problem of disproportionate attention on traditional upland farming system which is less productive compared to lowlands, the macroeconomic environment which has not been conducive, weak market institutions, modern farming implements and fertilizers which were in low use, and non-appropriate rice technological approach .

Thomas (2002) analysed the problems and prospects of paddy cultivation in Kuttanad region with the objectives of examining the salient features in the transformation of the rice economy of Kuttanad region, understanding the socio-economic profile of paddy farmers, analysing the changes in the paddy farming operations, and also for suggesting appropriate measures for the development of paddy farming sector in the study area. From among different categories of farmers, 90 farmers were selected as the sample units for a detailed survey on the basis of stratified sampling method. Participatory research appraisal, focused group discussions and pre structured interview schedules were used for data collection. The major constraints faced by the paddy farmers included labour shortage, low profitability, lack of proper marketing system, high rate of crop failures, and inadequate research and extension service. The author suggested encouragement of private investments in farm mechanization by attracting agricultural entrepreneurs to the area, enhancement and timely disbursement of production bonus, reduction in power tariffs and introduction of old age pension scheme for farmers.

Thanh and Singh (2006) studied the constraints faced by the farmers in rice production and exports with the objective of proposing Government's policies to overcome the constraints of rice production promotion and export in India and Vietnam. The study surveyed 100 farmers in Punjab and West Bengal states of India and An Giang and Vinh Long provinces of Vietnam. The information on constraints faced in rice production and export by farmers was collected with the help of interview schedules. The major constraints identified were technical, socio-economic and agro-ecological. They found that poor infrastructures, high cost of inputs, credit problems, low rice price, inadequate inputs and lack of trainings were the most important socio- economic constraints as perceived by large percentage of farmers. The agro-ecological constraints faced by farmers, ranked from more to less serious were related to dependence on monsoon, land/soil problems, environmental pollution,

lack of water and small land holdings. Under technical constraints, it was found that diseases, viz., sheath blight, blast and stem rot; pests, lack of proper varieties, post-harvest technology constraint and storage problems were the most serious constraints perceived by large percentage of respondents. Fertilizer problems, plant protection constraints, weed problems, lack of labourers and poor processing were found to be other constraints as perceived by farmers. The constraints as perceived by lower percentages of farmers were poor extension services, lack of information and lack of help from local authorities/governments.

Wilfred (2006) in his survey analysed the constraints faced by rice industry in Uganda with the help of a focus group discussion using weighted scoring. According to him, the major constraints faced by rice farmers were, inadequate knowledge in rice farming especially for upland rice; strenuous and time consuming rice farm operations; lack of appropriate farm implements for rice farming, post-harvest processing, value-addition, and lack of rural transportation; high crop damage/loss caused by rice diseases and pests including weeds, and by poor crop handling and processing; high cost and often scarcity of farm inputs like improved seeds, farm implements and equipment, fertilizers, herbicides and pesticides; generally poor and often unreliable quality of rice seed in the market with no clear policy on rice seed production, lack of quality assurance and marketing; inadequate options of rice varieties that meet biological attributes of early maturing, high yielding, resistance to drought, diseases and pests; absence of viable options to mitigate drought and floods in rice production; inefficient marketing system as reflected by low farm-gate and fluctuating commodity prices. The study suggested Government intervention to sensitize and train increased contact with extension services, establishment of cooperative and marketing societies, support of Government and NGOs and improve farmers' access to credit institutions, to solve the problems of farmers.

Khattak and Hussain (2008) conducted a study in Swat district of Pakistan to investigate the socio economic profile of rural rice farmers which revealed some of the constraints of rice farmers. Primary data were collected through structured questionnaire using a sample of one hundred, allocated to three tehsils selected purposively, each comprising three villages selected on the basis of proportional sampling technique. Simple averages, classification and tabulation were used for the analysis of the data. Income and consumption pattern of rice farmers were found substandard. Most of the rice farmers were found uneducated and tenants. The major sources of income were farm incomes and foreign remittances. Credit facilities available to the rice farmers in Swat were probably inadequate to their needs for financing rice cultivation, and it was found that only a very small proportion of loans actually went into financing farm operations. The share of non-institutional credit was more than institutional credit. The study insisted that the farmers should utilize their income on economic pursuits so as to improve their standard of living. Government should make efforts to provide basic facilities to the rice farmers.

Nirmala and Muthuraman (2009) opined that pests and disease incidence, lack of remunerative prices and labour shortage were the major constraints in rice production in Kaithal district of Haryana State. The study covered four villages of two blocks and data on constraints and cost-return aspects of rice cultivation were collected from 80 farmers through pre-structured questionnaires. The cost concepts approach to farm costing was used to work out various costs. The total costs in rice production amounted to Rs. 33778.68/ha. Average yield was 4.99 tons /ha. Benefit-cost ratio worked out to 1.27. According to them management of pests and diseases and addressing the problem of soil salinity will help in enhancing the yield levels in Kaithal district.

Alarima *et al.* (2011) identified constraints of Sawah rice production system in Nigeria. The term Sawah refers to levelled and bunded rice fields with inlet and outlet connecting irrigation and drainage. They randomly selected one hundred and twenty- four Sawah farmers and interviewed. Descriptive statistics was used to analyse the socio-economic and farming characteristics of the farmers. Correlation analysis was done to determine the inter-correlation between the constraints and other study variables. For determining the relationships between the yield and constraints regression analysis was done. The study found that the production and on-farm constraints affecting Sawah development were water management and flood. Major economic constraints faced by them were lack of viable financial agencies to support production, poor capital base and non-availability of loan. Regression analysis showed that the yield of Sawah was negatively related to land acquisition constraints and technological constraints. Study concluded that the problems faced by farmers were interwoven in which existence of one related to the other. Addressing these problems would lead to increase in the rate of adoption of Sawah rice production technology and ultimately rice productivity in Nigeria.

Shashekala *et al.* (2012) categorised the constraints faced by the small farmers into technological, economical and institutional constraints. Technological constraints included management techniques and production technology, choice of breeds - crossbred and types of animals, effective control of diseases in rural areas, and improved feed and fodder. Unfavourable marketing systems, limited incentives and ineffective credit policy were the major economic constraints. Lack of institutions for agricultural development, such as agricultural extension offices, veterinary dispensaries, fertilizer depots, seed and agro-chemical stores, rural credit agencies and banks, were the institutional constraints faced by the small farmers. Data were obtained through a pretested structured interview schedule from 150 selected farmers using random sampling method. Respondent small farmers were asked to point out constraints faced by them. The constraints mentioned by them were content analyzed

for proper analysis and interpretation of facts. The findings of the study indicated that the constraints faced by small farmers in adoption of improved production practices were non-availability of inputs, lack of credit, lack of assured irrigation, untimely availability of inputs, high cost of inputs, insufficient funds, lack of knowledge, poor quality seed, lack of technical guidance, non-availability of plant protection equipment, poor marketing facility, and poor quality of lands. Further, constraints faced in adoption of improved livestock projects are like high initial investment, lack of credit, high cost of feeds, lack of capital, high care and maintenance, no fodder, no surplus labour and no grazing land.

Ravikumar and Sudheesh (2013) studied the economies of paddy cultivation in the Palakkad district of Kerala and analysed the socio economic background of the paddy cultivators in the selected villages of the District and also the problems of the paddy cultivators. The study was based on primary data collected through structured questionnaire. Percentages and regression analysis were used for data analysis. The major causative factor identified was shortage of labour and low price for paddy. The authors emphasised group management for improving the economies of paddy cultivation through better management based on low cost technology, improvement in productivity, selective mechanization and cost reduction.

The major constraints faced by the paddy farmers as identified by different authors include labour shortage, high cost of inputs, problems of obtaining credit, low rice price, low profitability of agricultural operations, ineffective marketing systems, high rate of crop failures, lack of proper varieties, post – harvest technology constraints, high crop damage/loss caused by rice diseases and pests including weeds, lack of assured irrigation, untimely availability of inputs, and inadequate research and extension service. Among others, the suggestions are government intervention to sensitise and train increased contact with extension services, support of government and NGOs to improve farmers' access to credit institutions, encouragement of private

investments in farm mechanisation by attracting agricultural entrepreneurs, enhancement and timely disbursement of production bonus, reduction in power tariffs, establishment of cooperative and marketing societies and introduction of old age pension scheme for rice farmers.

MATERIALS AND METHODS

CHAPTER 3

MATERIALS AND METHODS

The study entitled 'Impact of institutional interventions for promotion of rice farming in Thrissur district' has been conducted with the objectives of examining the developmental programmes/ schemes of various governmental and other institutions for the promotion of rice farming in Kerala; analysing the impact of developmental schemes of various institutions on the net income of the farmers and analysing the constraints of rice farmers so as to suggest policy measures for the promotion of rice farming. This chapter presents the methodology and data sources used for the study, which are presented as follows.

3.1 Concepts used in the study

3.2 Locale of the study

3.3 Sources of data

3.4 Selection of the sample

3.5 Critical variables for the study

3.6 Statistical tools used for the study

3.1 Concepts used in the study

The major concepts used in the study are given below:

3.1.1 Tenant farmers

Farmers, who have no land of their own, but do rice cultivation on leased land are classified as tenant farmers.

3.1.2 Marginal farmers

Those farmers who hold less than one hectare of paddy land are categorised as marginal farmers.

3.1.3 Small farmers

Farmers having paddy land holding of one hectare to two hectare are categorised as small farmers.

3.1.4 Large farmers

Farmers who hold more than two hectare of paddy land are termed as large farmers.

3.1.5 Gross cropped area (GCA)

GCA is the total area sown plus area sown more than once in a particular year. In rice farming, the same area may be cultivated during two or three seasons in a year. Hence the area is counted as many times as there are sowings in a year.

3.2 Locale of the study

The developmental programmes/ schemes of various governmental and non-governmental institutions for the promotion of rice farming were examined at the study area level. For examining the impact of institutional interventions for the promotion of rice farming in Thrissur district, three blocks which had the highest rice production in Thrissur district during the year 2011-12, viz., Pazhayannur block (11116.125 tonnes), Puzhakkal block (10854.885 tonnes) and Wadakanchery block (7667.600 tonnes) were selected (Economic Review, 2011-12). From each of these blocks, one panchayat, viz., Pazhayannur, Adat and Mundathikode respectively, were selected, based on the area under rice cultivation.

3.3 Sources of data

For examining the developmental programmes/ schemes of various institutions for the promotion of rice farming in Kerala, the websites of Department of Agriculture, Government of India and Government of Kerala, Kerala State Civil Supplies Corporation (SUPPLYCO) and various commercial banks were the major sources. The details of schemes and their assistance were also available from Economic Review, State Planning Board, Thiruvananthapuram. The data on area, production and productivity of rice were collected for the period 1990-91 to 2012-13 from Indiastat (www.indiastat.com) and various issues of Economic Review.

For the purpose of the last two objectives, viz., impact of developmental schemes of various institutions on the net income of the farmers and constraints of rice farmers, primary data regarding socio-economic indicators, rice production, cost of cultivation, sources and uses of subsidies and assistance, impact of assistance, problems with respect to production, marketing, finance and institutions were collected from 90 farmers from three panchayats (30 from each panchayat), using a pre-tested structured interview schedule for the year 2012-13. The amount of subsidies availed by farmers from the Department of Agriculture were collected from the concerned Krishi Bhavans. The information required for presenting the profile of panchayats were made available from the 'Vikasana Rekha' of the concerned panchayat.

3.4 Selection of sample

Multi-stage random sampling was used to select 90 respondents from Thrissur district. Multistage sampling refers to sampling plans where the sampling is carried out in stages using smaller and smaller sampling units at each stage. In the first stage, three blocks namely Pazhayannur, Puzhakkal and Wadakanchery were selected from Thrissur district based on the norm of highest rice production. In the second stage one panchayat from each block, viz., Pazhayannur, Adat and Mundathikode were selected

on the basis of highest area under rice cultivation. From each panchayat, 30 farmers were randomly selected from the list of farmers in Krishi Bhavan to form the sample size of 90 farmer respondents.

3.5 Critical variables for the study

Critical variables for the study include demographic details of respondents, asset creation, income, land utilisation pattern, rice production details, marketable surplus of rice, market intermediaries, sources of finance, details of prices including Minimum Support Price (MSP), schemes of assistance to rice farmers through Department of Agriculture, Krishi Bhavans, panchayats, Supplyco, and financial institutions, problems of rice farming etc.

All these variables have been included in the interview schedule to collect data from the respondent farmers. Schedule was pre tested among rice farmers before actual data collection.

3.6 Statistical tools used for the study

The data collected from the respondent farmers were analysed with the help of statistical tools like, chi-square test, paired t-test, ANOVA test, Post-Hoc test, Mann-Whitney U Test, Cobb-Douglas production model and simple percentages.

3.6.1 Chi-square test

Chi-square test was applied to check the independence of relationship between area and paddy production, area and cost of cultivation, type of farmers and cost of cultivation, area and net income, type of farmer and net income and also between type of farmer and supply agency.

Generally, chi-square test has three applications, viz., chi-square test for goodness of fit, chi-square test for homogeneity and chi-square test for independence.

To examine the independence of relationship between two attributes, chi-square test for independence was used.

Chi-square test of independence is employed to test the hypothesis whether two categorical variables are independent of each other. A small chi-square statistic indicates that null hypothesis is correct and that the two variables are independent of each other. At a time the independence of relationship between two variables only can be tested.

The procedure involves comparing the observed cell frequencies with the expected cell frequencies. Observed cell frequencies are the actual number of cases falling in different cells of r X c contingency table and expected frequencies are the number of cases that should fall in each cell if there is no relationship between two categorical variables. The basis of test is the difference between the observed frequency and the expected frequency of each cell of contingency table.

Let $O_{r,c}$ is the observed frequencies and $E_{r,c}$ is the expected frequencies, then the test statistic is

$$X^2 = \frac{(O_{r,c} - E_{r,c})^2}{E_{r,c}}$$

Critical values of X^2 are tabulated for various levels of degrees of freedom ([r-1]*[c-1]) at different levels of significance level. If the observed value is greater than the table value, the null hypothesis of 'attributes are independent 'can be rejected.

3.6.2 One-way analysis of variance (ANOVA)

ANOVA test has been done for analyzing area - wise production of rice, farmer group - wise comparison of cost of cultivation and farmer group - wise comparison of net income from rice farming.

ANOVA is used to compare the means of more than two population. It uses F-statistic, which tests whether the means of groups, formed by one independent variable or a combination of independent variables, are significantly different. It is based on the comparison of two estimates of variances - one representing the variance within groups, often referred to as error variance and the other representing the variance due to differences in group means. If the two variances do not differ significantly, one can believe that all the group means come from the same sampling distribution of means and there is no reason to claim that the group means differ. The F-statistic calculates the ratio between the variance due to difference between groups and the error variance.

$$F = \frac{Variance\ due\ to\ difference\ between\ groups}{Error\ variance}$$

The larger the F-ratio, the greater is the difference between groups as compared to within group difference. An F-ratio equal to or less than one indicates that there is no significant difference between groups and the null hypothesis is correct. If the F-test proves the null hypothesis to be wrong, multiple comparison tests are used to further explore the specific relationship among different groups.

3.6.3 Post-Hoc test for multiple comparisons

Rejection of null hypothesis in ANOVA only indicates that all population means are not equal. Multiple comparisons are used to assess which group means differ from which others, once the overall F-test shows that at least one difference exists. Tukey HSD (Honestly Significant Difference) was used in the present study, which is one of the most conservative and commonly used test.

3.6.4 Paired t- test

Paired t- test was used to compare the yield before and after the introduction of Seed Subsidy Programme of Department of Agriculture, so as to analyse the impact of this scheme on the net income of farmers.

If the observations are made on the same sample at two different times, it is called dependent or paired sample t-test. Here one can compare the values of means from two related samples, for example in a 'before and after' scenario. The test statistic is calculated as

$$t = \frac{\bar{d}}{\sqrt{sd^2/n}};$$

Where, $\bar{d}$ is the mean of difference, sd^2 is the sample variance, n is the number of pairs and t is a Student t quantile with n-1 degrees of freedom.

Critical values of 't' are tabulated for various values of n upto 30 at different levels of significance. If the observed value is greater than the table value, one can reject the null hypothesis.

3.6.5 Mann-Whitney U Test

Mann-Whitney U Test has been done to compare the gross income of farmers who are supplying their produces to Supplyco and those who are supplying to private agencies. If the ordinal measurement is satisfied, Mann-Whitney U Test can be used to test whether there is any significant difference between two independent groups. This is a powerful non parametric test which can be used as an alternative to independent sample t- test.

Let $H_0 : M_x = M_y$

And, n_1, and n_2 be the sample sizes where $n_1 < n_2$. To apply this test, first combine the observations of both samples and rank them in the order of increasing size. Let R_1 be the sum of the ranks obtained by the sample having n_1 observations, R_2 be the sum of ranks obtained by sample having n_2 observations. The test statistic U is calculated as

$$U_1 = n_1 n_2 + \frac{n_1 (n_1+1)}{2} - R_1 \ldots . (1)$$

Or equivalently,

$$U_2 = n_1 n_2 + \frac{n_1 (n_1+1)}{2} - R_2 \ldots . (2)$$

Equations (1) and (2) give different values of U. The smaller value is taken as the best criterion.

Case I

When $n_1 < n_2 < 9$

$P_r (U \leq U')$ where 'U' is the observed value of U and are tabulated for various values of n_1 and n_2. If this observed probability is less than or equal to the value given in the statistical tables one can reject the hypothesis.

Case 2

When $9 \leq n_2 \leq 20$

The critical values of U are tabulated for various values of n_1 and n_2 and at different levels of significance. If the observed value is less than or equal to the value given in the statistical table one can reject the hypothesis.

Case 3

$N_2 > 20$

As n_1 and n_2 increase in size, the sampling distribution of 'U' approaches to normal distribution with

$$Mean = \frac{n_1 n_2}{2}$$

$$Variance = \frac{n_1 n_2 (n_1 + n_2 + 1)}{12}$$

$$Z = \frac{U - \frac{(n_1 n_2)}{2}}{\sqrt{[n_1 n_2 (n_1 + n_2 + 1)]}} \sim N\,(0,1)$$

3.6.6 Cobb - Douglas production model

To examine the impact of agriculture inputs such as seeds, fertilizer, labour and herbicides on gross income of rice farmers, Cobb-Douglas production model has been used. Cobb- Douglas production model was fitted using production as dependent variable and seeds, fertiliser, labour and herbicides as independent variables. In order to analyse the impact of credit on gross income, the dependent variable was gross income and total credit and GCA were the independent variables.

In addition to the above tools, simple percentages have also been computed to find the share of each variable to the total of each category.

3.7 Conclusion

With a sample size of 90 farmer respondents selected through multi stage random sampling from three panchayats of Thrissur district, impact of institutional interventions have been investigated. Study region, sources of data, sample selection and critical variables were determined according to the requirements of study objectives. Statistical tools used were in accordance with the availability and reliability of data to analyse the problem under study.

RESULTS AND DISUSSION

CHAPTER IV

RESULTS AND DISCUSSION

Institutions are systematic arrangements for the accomplishment of ambitions of society and individuals in an appropriate manner. Hence institutions are as equal as all other inputs in the process of production and prosperity of the society. A lot of institutions have emerged to satisfy the wide variety of social and individual needs. Institutionalism as a school of thought assumes that larger the number of institutions, higher will be the degree of development. Many areas and actors of the economy are lagging in performance only by the paucity of meaningful institutional interventions.

Institutional interventions in rice farming sector in Kerala are immediately intended neither to make the state self sufficient in foodgrains nor to fasten the pace of progress of any region. Interventions in rice farming are inalienable to insulate the farming community from the vicissitudes of rapidly changing economy of the country. Gross Cropped Area (GCA) under rice farming declined sharply from 8.81 lakh hectares in 1974 to 1.18 lakhs hectares in 2014. Rice area and production are on the verge of total extinction from Kerala where rice is the staple food and land has more than 5000 years of rice farming history. Various committees and study reports identifying the causes of declining rice cultivation could not arrest the process of further decline. Only by strong institutional intervention rice can be saved from its current crisis.

Various institutions are functioning at national, state and local levels with various schemes to protect and preserve rice cultivation in the State. They have different projects and schemes for promoting rice production and allied activities. How far they are useful to the farmers and effectively encouraging rice farming has to be explored and explained. The data collected and analysed with regard to the present work should throw light on impact of institutional interventions on the net income of rice farmers as a critical factor of assistance of rice farming in the

State. Based on the objectives of the study and the results of data analysis the discussions are presented in four parts in the present chapter viz,

4.1 Institutions and schemes for rice development

4.2 Impact of institutional interventions for promotion of rice farming in Thrissur district.

4.3 Constraints of rice farmers and

4.4 Suggestions for promotion of rice farming

4.1 Institutions and schemes for rice development

Globally rice is one of the most important food crops in the fight against hunger and rice is the staple food crop of India as well as Kerala. As such it is essential to keep and promote rice farming in the country. A large number of developmental institutions are functioning across the world for the development and promotion of rice cultivation and rice farmers. At international level the International Rice Research Institute (IRRI) is functioning for enhancing rice researches and ensuring food security in the world. At the national level, the Ministry of Agriculture and Cooperation and Central Rice Research Institute (CRRI) are providing production support to rice farmers by providing High Yielding Variety (HYV) seeds, fertilizers, and pesticides in the form of inputs, besides launching many developmental schemes for rice development.

4.1.1 International institutions/schemes

The main international institution for rice development is International Rice Research Institute (IRRI) which is functioning under the purview of Consultative Group on International Agricultural Research (CGAIR).

4.1.1.1 Consultative Group on International Agricultural Research (CGIAR)

CGIAR is a global partnership that unites organisations engaged in research for a food secured future. The Organisation was found by the Rockefeller Foundation in the year 1970 as a worldwide network of agricultural research

centres under a permanent secretariat. This was further supported and developed by the World Bank, Food and Agriculture Organisation (FAO) and Uniten Nations Development Programme (UNDP). CGIAR was established on May 19, 1971 to coordinate international agricultural research efforts aimed at reducing poverty and achieving food security in developing countries. This is an international organisation which funds and co-ordinates research into agricultural crop breeding with the goal of reducing rural poverty, increasing food security, improving human health and nutrition, and ensuring more sustainable management of natural resources through a network of 15 research centers known as the CGIAR Consortium of International Agricultural Research Centers. The Global Rice Science Partnership is a major rice development project of CGIAR and IRRI is the most important institution functioning under the CGIAR for rice development.

(i) The Global Rice Science Partnership (GRiSP)

The Global Rice Science Partnership (GRiSP) is a project of CGAIR, which provides a single strategic plan and unique new partnership platform for impact-oriented rice research for development. It is designed to more effectively solve development challenges. GRiSP streamlines current rice research for development activities of the CGIAR and aligns them with more than 900 rice research and development partners worldwide to:

i) Increase rice productivity and value for the poor
ii) Foster more sustainable rice-based production
iii) Help rice farmers adapt to climate change
iv) Improve the efficiency and equity of the rice sector

a) Mission of GRiSp

GRiSP's mission, in accordance with that of the CGIAR, is to reduce poverty and hunger, improve human health and nutrition, reduce the environmental footprint and enhance ecosystem resilience of rice production

systems through high-quality international rice research, partnership, and leadership. It aims to achieve this mission through fostering high-quality, impact-oriented research and development activities in a global context. The key entry points for achieving this mission lie in lifting the productivity and resource efficiency of rice production systems to unprecedented levels. This will enable farmers to enter a virtuous circle, allowing them to invest more in diversification and sustainable management practices.

b) Objectives of GRiSP

GRiSP has three objectives, aligned with the CGIAR strategic objectives.

i) To increase rice productivity and value for the poor in the context of a changing climate through accelerated demand-driven development of improved varieties and other technologies along the value chain.
ii) To foster more sustainable rice-based production systems that use natural resources more efficiently, are adapted to climate change and are ecologically resilient, and have reduced environmental externalities.
iii) To improve the efficiency and equity of the rice sector through better and more accessible information, improved agricultural development and research policies, and strengthened delivery mechanisms.

In pursuing the objectives, the focus is on poverty reduction and the livelihoods of poor farmers. Gender issues are inherent in all the three objectives, and capacity strengthening in rice science and extension are emphasised to ensure adequate skilled personnel for future rice development.

(ii) International Rice Research Institute (IRRI)

The IRRI is a non - profit independent organisation and a member of the CGIAR Consortium that, through research, aims to reduce poverty and hunger, improve the health of rice farmers and consumers, and ensure that rice production is environmentally sustainable. IRRI officially started its functioning on 14th April 1960 in Manila, Philippines.

a) Objectives of IRRI

The IRRI's goals contribute to the United Nations Millennium Development Goals to eradicate extreme poverty and hunger and ensure environmental sustainability. The other objectives are:

i) Reduce poverty through improved and diversified rice-based systems.
ii) Ensure that rice production is stable and sustainable, has minimal negative effect on the environment, and can cope with climate change.
iii) Improve the nutrition and health of poor rice consumers and farmers.
iv) Provide equitable access to information and knowledge on rice and help develop the next generation of scientists.
v) Provide scientists and producers with the genetic information and material they need to develop improved technologies and enhance rice production.

b) Funding of IRRI

The Organisation is funded worldwide by governments, philanthropy, the private sector, and CGIAR. In 2013, major donor groups included CGIAR ($39.23 million), CGIAR centers and programs ($2.74 million), national governments ($30.18 million), philantrophic foundations ($11.34 million), international organisations ($7.15 million), the private sector ($1.64 million), and universities ($0.58 million) (IRRI). The Institute also receives donations through the IRRI Fund. The IRRI Fund facilitates partnerships and encourages support for rice research in Singapore, Hong Kong, India, Asia, and around the world.

c) IRRI activities

IRRI is a global leader in rice science. Since 1960, it helps farmers to boost production through improved rice varieties. Its economic research helps governments formulate policies to develop their rice sectors. Through GRiSP, the CGIAR Research Program on Rice, the Institute is extending its reach even further, into Africa and Latin America. IRRI develops new rice varieties and crop

management techniques that help farmers to improve the yield and quality of their crop while conserving natural resources. Other activities of the Institute are:

i) Conserving, understanding, sharing, and using rice genetic diversity

ii) Breeding and delivering new varieties

iii) Developing and sharing improved crop and environmental management practices

iv) Adding to the economic, nutritional, and environmental value of rice

v) Broadening the Institute's impact by supporting strategic policy and market development

vi) Facilitating large-scale adoption of technologies

d) Recent IRRI achievements

The recent achievements of IRRI are the following:

i) Shared flood-tolerant rice now used by around five million farmers across South and Southeast Asia.

ii) Released drought-tolerant rice in India to boost production during dry periods.

iii) Doubled salt tolerance in rice by crossing wild rice with cultivated rice.

iv) Released new high-yielding rice varieties in Mozambique, Tanzania, and Burundi.

v) Advanced healthier rice research to improve the nutrition of rice consumers.

vi) Empowered women in Asia and Africa to learn and share rice production technologies.

vii) Found a key gene for phosphorus uptake that can increase rice yield by 20 per cent.

viii) Satellite mapping to determine where rice crops are grown and to aid disaster response.

ix) Reduced use of pesticides by Vietnamese rice farmers by 20 per cent.

x) Started a new scholarship program to support young rice scientists.

4.1.2 National level institutions/ schemes

Department of Agriculture under central government is the major institution for promoting rice farming at the national level. Other institutions are Central Rice Research Institute, Cuttack, Directorate of Rice Research, Hyderabad and public sector banks.

4.1.2.1 Department of Agriculture, Government of India

Agriculture is the principal source of livelihood for more than 58 per cent of the population of this country (www.agricoop.nic.in, 2014). Agriculture provides bulk of the wage goods required by non-agriculture sectors and most of the raw materials for agro based industries. Rice is the staple food crop of India and it is the potential sub-sector in enhancing food security and livelihoods for considerable number of the population. In order to enhance rice production and productivity, the Department of Agriculture of the Country has launched many developmental schemes. The Department has introduced a number of rice developmental schemes for improving rice cultivation in the country during various periods. When some projects are completed, the Department will commence new schemes or projects. Some of the major projects / schemes of the Department – both ongoing and completed - are discussed in the ensuing paragraphs.

(i) National Food Security Mission (NFSM)

The NFSM was launched in the year 2007 as a centrally sponsored scheme funded by the Central Government. The objective is to increase production and productivity of wheat, rice and pulses on a sustainable basis so as to ensure food security of the country. The approach is to bridge the yield gap in respect of these crops through dissemination of improved technologies and farm management practices. The major objectives of the Mission are the following;

i) Increasing production of rice, wheat and pulses through area expansion and productivity enhancement in a sustainable manner in the identified districts of the country

ii) Restoring soil fertility and productivity at the individual farm level

iii) Creation of employment opportunities

iv) Enhancing farm level economy i.e. farm profits, to restore confidence amongst the farmers

The major intervention schemes of the NFSM are as follows:

i) System of Rice Intensification (SRI)

ii) Hybrid Rice Technology

iii) Varietal Replacement of Rice and Wheat

iv) Seed Minikit Programme of Rice and Wheat

v) Promotion of Micronutrients in Rice and Wheat

vi) Conoweeders and o\ther Farm Implements for Rice

vii) Plant Protection Chemicals and Bio-Pesticides for Rice

(ii) Special Rice Production Programme (SRPP)

A full-fledged Centrally Sponsored "Special Rice Production Programme - SRPP" was started in the year 1985-86 with the objective of bringing substantial increase in the productivity of low productivity areas. For implementation of the Scheme, one-fifth of the total number of blocks in the States of Assam, Bihar, Eastern Madhya Pradesh, Orissa, Eastern Uttar Pradesh and West Bengal were taken up. Before taking up the Scheme, the block-wise plans were prepared and based on the needs of each block, different programmes were taken up. As the constraints vary from block to block, the programmes of work across the block also vary. The Programme was implemented in 420 selected blocks. Under the Scheme, programmes were taken up to improve the supply of inputs like quality seeds, fertilisers, pesticides, plant protection equipments, farm implements and technology, programme requiring short-term measures for taking up other works for the improvement of the irrigation, drainage and development of infrastructure facilities.

During 1986-87, the Scheme was extended to ten additional blocks of Assam State. The State of Tripura was also included during 1988-89 and nine blocks of the State were identified for the implementation of the Scheme. In all, the SRPP was implemented in 439 blocks of the seven Eastern States. The funding pattern under the Scheme was 50:50 sharing basis between the Government of India (GOI) and concerned State Government.

(iii) Special Foodgrains Production Programme (SFPP) - Rice

Consequent to the mid-term appraisal of the Seventh Five Year Plan a Centrally Sponsored "Special Foodgrains Production Programme (SFPP)" was launched with a view to achieve the minimum food production of 166 million tonnes during 1988-89 and 175 million tonnes for the terminal year 1989-90 of the Seventh Five Year Plan. For implementation of SFPP-Rice, potential districts in 13 States i.e., six SRPP States: Assam (3), Bihar (13), Madhya Pradesh (11), Orissa (5), Uttar Pradesh (21), West Bengal (7) and other 7 States - Andhra Pradesh (8), Gujarat (4), Haryana (5), Karnataka (8), Maharashtra (7), Punjab (3) and Tamil Nadu (8) were identified. The implementation unit of the SFPP- Rice Programme was district and all the areas in the identified districts were covered for the implementation of the Programme. SFPP was 100 per cent funded by the Government of India.

(iv) Integrated Programme for Rice Development (IPRD)

SRPP and SFPP-Rice were merged on the recommendations of the Planning Commission and unified scheme "Integrated Programme for Rice Development (IPRD)" was implemented from 1990-91. Four additional States namely Goa, Himachal Pradesh, Jammu & Kashmir and Kerala and one Union Territory of Pondicherry were covered under the Scheme. While the SRPP was implemented in the identified blocks and SFPP-Rice in the identified districts, the IPRD was implemented in all the districts of the States covered under the programme. The funding pattern under the Scheme was modified to 75:25 to be shared between Government of India and the concerned State Government.

The State Governments were provided the flexibility to choose the most suitable components out of the approved components under IPRD, namely distribution of certified seeds, micro-nutrients, herbicides, pesticides, plant protection equipments, seed treating chemicals, farm implements, supply of power tiller to small and marginal farmers, and allocate funds to each component keeping in view of the specific constraints to rice production in the State and overall limit to ₹ 57.44 lakhs per district. Besides, field demonstrations and training programmes for farmers and farm labourers were also included under the Scheme for effective transfer of crop production technology.

(v) Integrated Cereals Development Programme in Rice based Cropping System Areas (ICDP-Rice)

The Integrated Programme for Rice Development (IPRD), Special Foodgrains Production Programme-Wheat and Special Foodgrains Production Programme-Maize and Millets Schemes have been modified to form schemes such as Integrated Cereals Development Programme in Rice Based Cropping System Areas (ICDP-Rice), Integrated Cereals Development Programme in Coarse Cereals Based Cropping System Areas (ICDP-Coarse Cereals) and Integrated Cereals Development Programme in Wheat Based Cropping System Areas (ICDP-Wheat). In an area, only one scheme was implemented and there is no overlapping in the implementation of the schemes of ICDP-Rice, ICDP-Coarse Cereals and ICDP-Wheat. The objective of the modified scheme is to increase the overall productivity of cereals under specific crop based systems as a whole as against the individual crop approach.

The ICDP-Rice was implemented in 1200 identified blocks of 16 States namely Andhra Pradesh (120), Arunachal Pradesh (20), Assam (75), Bihar (220), Goa (4), Kerala (55), Eastern Madhya Pradesh (90), Manipur (12), Meghalaya (12), Mizoram (8), Nagaland (12), Orissa (115), Tamil Nadu (140), Tripura (8), Eastern Uttar Pradesh (180), West Bengal (125) and one Union Territory of Pondicherry (4).

(vi) High Yielding Varieties Programme

The High Yielding Varieties (HYV) Programme was initiated during 1966-67 and the Directorate of Rice Development, Government of India commenced monitoring the Scheme of HYVs in a systematic manner from 1970 onwards. The total area under rice during 1969-70 was 37.68 million hectares (ha) in which the area under HYV was about 4.34 million ha. Thus the share of HYV was 11.5 per cent of the total area under rice in the country during 1969-70. Due to the successful implementation of the Scheme, the area under HYV Programme increased significantly from 4.34 million ha during 1969-70 to 33.10 million ha during 1999-2000, thereby registering nearly eight - fold increase during these 30 years. During 1969-70, only 16 HYV were released or notified for cultivation and thereafter due to the concerted efforts of research, 639 varieties of rice have been released and notified. These varieties have been popularised at the farmer's field through Rice Mini-Kit programme which was initiated during 1971-72 and continued upto Ninth Plan period. As a result, the percentage of area under HYV has increased from 11.5 in 1969-70 to 79 during 1999-2000.

(vii) Rice Seed Mini-Kit Programme

This was introduced during the Ninth Five Year Plan period. Seed is the basic input for increasing production and productivity. Therefore, maintenance of genetic purity through seed replacement is essential for stabilising the yield levels. In addition to the supply of certified seeds of high yielding varieties of rice to the farmers, seed mini - kits of recently released location specific HYVs were being distributed to the farmers at nominal cost under Central Sector Rice Seed Mini Kit Programme since 1972 for popularisation of varieties and seed multiplication at the farmer's field level.

(viii) State - Level Training Programme on Rice Production Technology

With a view to disseminate the latest rice production technology to the extension officers of the State Governments, State Level Training Programme on Rice Production Technology was organised continuously since 1975-76. The

training programmes were conducted at Indian Council of Agricultural Research (ICAR) Research Centres and State Agricultural Universities for three days duration with 30 participants upto Ninth Five Year Plan period. Assistance of ₹ 22,900/- per programme was given to the organising centres for conducting training programmes.

(ix) Special Orientation Training Programme on Rice Production Technology

In addition to the State Level Training Programme, a Special Orientation Training Programme on Rice Production Technology was also organised at the State Agricultural Universities (SAUs) and ICAR Institutes. The duration of the training programme was five days with 20 participants. Financial assistance of ₹ 35,000/- was given to the organiser for each training course. This training programme was initiated during the year 1997-98 with a view to disseminate the latest rice production technology.

(x) Rashtriya Krishi Vikas Yojna

Rashtriya Krishi Vikas Yojna (RKVY) is a special additional Central Assistance Scheme launched by the Government of India to evolve a strategy to rejuvenate agriculture and allied sector during the Eleventh Five Year Plan. RKVY is 100 per cent centrally sponsored scheme and implemented by state governments. As per the Scheme, the Government of Kerala (GOK) has to prepare the State and District-level plans in the field of agriculture and allied sectors, based on the guidelines issued by the Planning Commission, for availing financial assistance from GOI. The Scheme was introduced in the year 2007-08 and aims at achieving four per cent annual growth in the agricultural sector during the Eleventh Plan period, by ensuring a holistic development of agriculture and allied sectors. The Scheme is still continued by GOI during the Twelfth Five Year Plan. The beneficiaries of the Scheme include individuals, families and women. The major objectives of the Scheme are:

(i) To incentivise the State so as to increase public investment in agriculture and allied sectors.

(ii) To provide flexibility and autonomy to the State in the process of planning and executing agriculture and allied schemes.

(iii) To achieve the goal of reducing the yield gaps in important crops through focused interventions.

(iv) To maximise the returns to the farmers in agriculture and allied sectors.

The allocation of funds for Kerala under RKVY Scheme for the period of six years from 2007 -08 to 2012 - 13 is given in Table 4.1, which include funds for all crops including rice, under the Scheme. The funds allocated include amount released by GOI, GOK, actual expenditure under the Scheme in Kerala and the percentage of actual expenditure to the amount released by GOI.

Table 4.1 Allocation of funds under RKVY Scheme for Kerala 2007-13 (₹ in Crore)

Sl. No (1)	Year (2)	Amount released by GOI (3)	Amount released by GOK (4)	Actual Expenditure (5)	Utilisation (% of col.5 to col.3) (6)
1	2007-08	55.40	55.44	54.44	98
2	2008-09	30.06	58.11	55.84	186
3	2009-10	110.92	129.32	105.69	95
4	2010-11	149.65	155.78	148.70	99
5	2011-12	182.89	222.09	154.38	84
6	2012-13	253.30	210.01	169.87	67

Source: Economic Review, 2013.

Table 4.1 reveals that the amount released by GOI and GOK have been increasing over the years, except during 2008-09 by GOI. But the actual expenditure has been consistently increasing over the years. But the percentage share of expenditure to the amount released has been declining in the recent years.

The share of allocation for Kerala is very low compared to the budget provision for the country. A number of very small schemes are included for assistance under RKVY in the State like adoption of naturally ventilated

greenhouse technology, adoption of precision farming technology, establishment of mushroom cultivation units, popularisation of temperate fruit crops in Idukki district, development of cool season vegetables in Kanthaloor and Vattavada, etc. More focused areas with larger projects have to be identified for support under RKVY. The preparation of district and state agriculture plans are a prerequisite for getting assistance for which concrete steps are required. The State Agricultural Plan also has to be prepared for availing assistance under RKVY.

Under the scheme, rice farmers are getting a financial assistance of ₹3000 per hectare. The subsidy component is disbursed in terms of both cash and kind. The kind component is given as seeds, fertilisers, and organic manure.

4.1.2.2 Central Rice Research Institute (CRRI)

In order to intensify research on all aspects of rice crop, the Government of India decided to establish a central institute for rice research in the year 1945. As a result, the Central Rice Research Institute (CRRI) was set up on 23 April 1946 at Bidhyadharpur, Cuttack, Odisha with an experimental farm land of 60 hectares provided by the Government of Orissa. The CRRI is one of the Institutes of the ICAR under the Division of Crop Sciences. The Institute has two research stations- Central Rain-fed Upland Rice Research Station (CRURRS), Hazaribagh, in Jharkhand, and the Regional Rain-fed Lowland Rice Research Station, Gerua, in Assam. These research stations were established to tackle the problems of rain-fed uplands, and flood prone rain-fed lowlands, respectively. The basic goal of CRRI is to improve the income and quality of life of rice farmers in India. The objectives of the Institute are:

(i) Conduct basic, applied and adaptive research on crop improvement and resource management for increasing and stabilising rice productivity in different rice ecosystems with special emphasis on rain fed ecosystems and the related abiotic stresses.

(ii) Generation of appropriate technology through applied research for increasing and sustaining productivity and income from rice and rice-based cropping/farming systems in all the ecosystems in view of decline in per capita availability of land.

(iii) Collection, evaluation, conservation and distribution of improved plant materials to different national and regional research centres.

(iv) Development of technology for integrated pest, disease and nutrient management for various farming situations.

(v) Characterisation of rice environment in the country and evaluation of physical, biological, socio-economic and institutional constraints to rice production under different agro-ecological conditions and in farmers' situations, and develop remedial measures for their amelioration.

(vi) Maintain database on rice ecology, ecosystems, farming situations and comprehensive rice statistics for the country as a whole in relation to their potential productivity and profitability.

(vii) Impart training to rice research workers, trainers and subject matter/extension specialists on improved rice production and rice-based cropping and farming systems.

(viii) Collect and maintain information on all aspects of rice and rice-based cropping and farming systems in the country.

Enhancing and Sustaining the Productivity of Rice Based Farming Systems, Mechanisation for Rice Production and Post Harvest Systems, Developing Integrated Pest Management (IPM) Technologies for different Rice Ecologies, Socio-Economic Research for Sustainable Development etc. were some of the projects implemented by the CRRI during 2011-12.

4.1.2.3 Directorate of Rice Research (DRR)

Directorate of Rice Research (DRR), formerly All India Coordinated Rice Improvement Project (AICRIP), was established by the ICAR in 1965 with its national headquarters at Hyderabad to organise and coordinate multi-location testing of genetic lines and technologies for crop production and protection generated across the country. The project was elevated to DRR in 1975 with an added mandate of research in the thrust areas of irrigated rice. The Directorate continues its multi-location All India Coordinated Rice Improvement Programme with active partnership of 47 funded cooperating centres affiliated to SAUs, State Department of Agriculture and other Research Institutes of ICAR. Besides, over 90 voluntary centres operate under AICRIP which also form a part of the mandate of DRR. In addition, DRR initiates network projects of national importance and coordinates these activities. Since 1968, more than 990 rice varieties for various agro-ecological systems prevalent across the country have been developed by the Directorate.

The basic goal of the Directorate is the welfare of the present and future generations of Indian rice farmers and consumers by ensuring food and national security.

The mission is to develop technologies to enhance rice productivity, resource and input use efficiency and profitability of rice cultivation without adversely affecting the environment. The mandate of the Directorate are as follows:

(i) To organise, co-ordinate and monitor multi location testing at national level to identify appropriate varietal and management technologies for all the rice eco-systems.

(ii) To conduct basic, strategic and anticipatory research in the major thrust areas of irrigated rice aimed at enhancement of production, productivity and profitability while preserving environmental quality.

(iii) To develop, organise, co-ordinate and monitor research networks relating to problems of national and regional importance.

(iv) To serve as major centre for exchange of research material and information.

(v) To accelerate the pace of technology transfer through development and adoption of innovative extension training models, self learning modules and through organising formal training courses, frontline demonstrations, exhibitions, farmers' day etc.

(vi) To develop linkages with national, international and private organisations for collaborative research programmes.

(vii) To provide consultancy services and undertake contractual research.

4.1.2.4 Commercial Banks

Credit is an inevitable element in agriculture production. Year after year, increasing targets are set for agriculture credit disbursements in the Union Budget implying its importance for investment in agriculture. The target for the credit flow to agriculture and allied sectors had been fixed at ₹ 5, 75,000 crore during 2012-13. Against this target, the total credit flow to agriculture by commercial banks, co-operative banks and Regional Rural Banks (RRBs) was ₹.6,07,375 crore exceeding the target by six per cent (NABARD Annual Report, 2012-13).

At present farmers are getting financial assistance in the form of interest subvention schemes. Interest subvention is a subsidy of interest given by government to small and marginal farmers. Interest subvention of two per cent per annum is made available to Public Sector Banks and Private Sector Scheduled Commercial Banks, in respect of loans given by their rural and semi-urban branches, on their own funds used for short-term crop loans up to ₹3, 00,000/- per farmer provided the lending institutions make available short term credit at the ground level at seven per cent per annum to farmers. This amount of interest subvention will be calculated on the crop loan amount from the date of its

disbursement/withdrawal upto the date of actual repayment of the crop loan by the farmer or upto the due date of the loan fixed by the banks whichever is earlier, subject to a maximum period of one year. Commercial banks are mainly providing agriculture loans in two forms, viz, Kisan Credit Card (KCC) and Agriculture gold loan scheme.

(i) Kisan Credit Card

Commercial banks are providing KCC to meet the short term credit requirements for cultivation of crops, post harvest expenses, consumption requirements of farmer households, working capital for maintenance of farm assets and activities allied to agriculture, like dairy animals, inland fisheries etc. and also for investment credit requirements for agriculture and allied activities. All farmers – individuals / joint borrowers who are owner cultivators, tenant farmers, oral lessees and share croppers, Self Help Groups or Joint Liability Groups of farmers including tenant farmers and share croppers are eligible for this assistance. The assessment of crop loan component is based on the scale of finance for the crop, extent of area cultivated, insurance premium etc. The validity of KCC is five years. For crop loans, no separate margin is insisted as the margin is in-built in the scale of finance. Interest subvention /incentive for prompt repayment are available as per the GOI and / or State Government norms.

The benefit of interest subvention has also been extended to small and marginal farmers having KCC for a further period upto six months post harvest, against negotiable warehouse receipt for keeping their produce in warehouses to avoid any distress sales.

As per Interest Subvention Scheme 2013-14, interest subvention of two per cent per annum is made available to Public Sector Banks in respect of loans given by their rural and semi-urban branches, on their own funds used for short-term crop loans up to ₹ 3, 00,000 per farmer provided the lending institutions make available short term credit at the ground level at seven per cent per annum to farmers. This amount of interest subvention will be calculated on the crop loan

amount from the date of its disbursement/drawal upto the date of actual repayment of the crop loan by the farmer or upto the due date of the loan fixed by the banks whichever is earlier, subject to a maximum period of one year. Besides, additional interest subvention at three per cent will be available to the prompt paying farmers from the date of disbursement of the crop loan upto the actual date of repayment by farmers or upto the due date fixed by bank for repayment of crop loan, whichever is earlier, subject to a maximum period of one year from the date of disbursement. Thus the prompt paying farmers would get short term crop loans at four per cent per annum during the year 2013-14. This benefit would not accrue to those farmers who repay after one year of availing such loans.

Security requirements are applicable as per Reserve Bank of India (RBI) guidelines as listed below:

(i) Hypothecation of crops upto card limit of ₹ 1 lakh as per RBI extant guidelines.

(ii) If there is tie-up for recovery, hypothecation of crops upto card limit of ₹ 3 lakh without insisting on collateral security.

(iii) Collateral security by way of mortgage of immovable property is to be obtained for loan limits above ₹1 lakh in case of non tie-up and above ₹3 lakh in case of tie-up advances.

(iv) In States where banks have the facility of online creation of charge on the land records, the same shall be ensured.

Repayment of KCC is subject to review at annual intervals. Each withdrawal under the short term sub-limit is allowed to be liquidated within 12 months without the need to bring the debit balance in the account to zero at any point of time. No withdrawal in the account should remain outstanding for more than 12 months. The term loan component will be repayable depending on the type of activity/ investment as per the existing guidelines applicable for investment credit.

(ii) Agricultural gold loan scheme

Commercial banks are providing agricultural loans on the backing of gold and this component is eligible for interest subvention scheme. The loan is provided for purchase of inputs, to meet expenditures incurred for raising crops or for creation of assets to be used in farming operation or for allied activities like Dairy, Poultry, Fisheries etc. Eligibility of loan is upto ₹ 1 lakh to small and marginal farmers, landless labourers, oral lessees and share croppers on declaration basis, provided the sanctioning authority is satisfied that the funds are for raising crops. For loans above ₹1 lakh proof of farming activity is required. Demand Loans / Overdraft / Cashcredit / Term Loans are given against the pledge/ security of gold ornaments/ jewellery / coins made of 18 to 24 carat to enable the farmers in meeting their short term and medium term agriculture related credit needs, not higher than the advance value of gold ornaments/coins subject to maximum of ₹15 lakhs. Margin is 25 per cent of market value. Margin should be regularly maintained and service of interest and installments should not be missed. Interest should be paid half yearly. In case of gold loan for crop production purpose, rate of interest would be seven per cent upto ₹3.00 lakhs. For other agricultural allied activities and indirect agricultural loans, rate of interest will be (i) upto ₹ 3 lakhs – 1.5 per cent above Base Rate and (ii) above ₹ 3 lakhs – 2.50 per cent above Base Rate. Benefit of interest subvention as per the announcement by GOI / State Governments, shall be available if gold loan is taken for crop production purpose and not for anything other than crop production.

The interest subvention is two per cent of the interest rate. An additional subvention of one per cent (i.e. total three per cent) is also available to the farmers who make prompt repayment of the loan. Outstanding in the loan account should never exceed the market value of ornaments/coins, at any point of time. For Demand Loan / Term Loan, repayment should coincide with the harvesting and marketing with a two to three months grace period after harvesting; but total

period will generally not exceed one year from disbursement for short term production credit loans and 36 months in other cases.

4.1.3 State level institutions

At the State level, institutions working for rice farming are Department of Agriculture, Kerala State Civil Supplies Corporation (SUPPLYCO), cooperative banks, Kerala Agricultural University and Krishi Vigyan Kendras.

4.1.3.1 Department of Agriculture

The Department of Agriculture in Kerala came into existence in 1956. It is one of the major development departments in the State and undertakes formulation and implementation of various programmes in the areas of crop production, infrastructure development, planting material production and distribution, quality control of agricultural inputs, farm mechanisation, transfer of technology, agricultural marketing, crop damage relief and women development. The Department has made linkages with Panchayati Raj Institutions (PRIs), other state and central agencies, co-operative institutions, farmers' organisations, input agencies, non-governmental organisations and self help groups (SHG) in the field of agriculture for proper implementation of the programmes.

The major functions of the Department are:

(i) To promote better land and water management.

(ii) To improve production of HYV /hybrid seeds

(iii) To increase the area under cultivation with HYV, replanting/rehabilitation of old and uneconomic perennial crops with suitable HYV

(iv) To promote adoption of Integrated Nutrient Management (INM) and Integrated Pest Management (IPM) practices

(v) To develop the necessary infrastructure facilities and to encourage adoption of new marketing techniques to reduce post-harvest losses

(vi) To improve the quality of the produces

The major schemes of the Department for rice development are Sustainable Development of Rice (SDR), Production Bonus and Assistance for Upland Cultivation of Rice, which are briefly discussed in this section.

(i) Sustainable Development of Rice

The scheme on Sustainable Development of Rice (SDR) is implemented in the States with natural endowments for augmenting rice productivity. The ultimate objective is to promote scientific rice farming to enhance production and productivity and to sustain rice cultivation by increasing the average productivity to around three tonnes per ha by the end of the Twelfth Five Year Plan period. To achieve this objective, a rice-based farming system approach is envisaged based on group farming concepts and group contact system enabling farmers to adopt improved production technology and scientific package of cultivation suited to each agro-climatic condition. In Kerala, this rice development programme is concentrated in the major rice growing tracts of the State with natural endowments, for augmenting rice productivity. Group farming Agencies (GFAs)/ Padasekhara samithies constitute the nucleus of the Programme. Under the Scheme, input assistance is given to paddy cultivators which should be used for the following activities:

(i) Mechanisation support for cultivation of rice

(ii) Use of uniform seed of an identified high yielding variety for each padasekharam

(iii) Pre-planned sowing and community nursery raising

(iv) Soil nutrient management

(v) Community weed control using weedicides

(vi) Organising joint plant protection operations following IPM

(vii) Application of soil ameliorants to correct soil pH

(viii) Following uniform crop rotation practices including raising of pulses / green manures / vegetables in the rice fallows

(ix) Mechanised harvesting and carrying out post harvest operation on a group basis

(x) Organising seminars, campaigns, harvesting melas making the farmers participate and highlighting their achievements.

The amount of assistance under this Scheme is limited to ₹ 1500/- per ha. The Comprehensive State Food Security Project, 90 per cent Centrally Sponsored Rice Development Programme, RKVY programme for Paddy Development, Local Self Government's Paddy Schemes etc. are integrated with this Scheme wherever possible for enhancing productivity, reducing cost of cultivation and for increasing overall income from the paddy land. The assistance is sanctioned for the components such as community nursery, fertiliser application including integrated nutrient management, biological control of pests like use of tricho-cards, water management like developing small feeder/drainage channels and mechanisation like purchase of pump sets and mechanical weeders. Anyone/all of the above components can be sanctioned for assistance provided the remaining components are implemented by the Group Farming Samithy using their own resources.

The four components of SDR are (a) Revitalisation of Group Farming Activities, (b) Assistance for Bringing Fallow Land Cultivation, (c) Assistance for Paddy Development Agencies and (d) Promoting supplementary income source to paddy farmers.

a) Revitalisation of Group Farming Activities

The GFAs will be revitalised through SHG mode and the activities will be concentrated mainly in the predominant rice growing areas of the State. Support is given in the form of inputs like seeds, soil ameliorants, purchase of modern agricultural machinery and construction of godowns based on the approved plans. The objective of the group farming programme is to implement a package of measures capable of making rice production more attractive by reducing the cost of inputs, providing infrastructure and adopting modern farming technology through group approach, so as to instill confidence among paddy farmers. Under

the group-farming programme, problems faced by individual farmers can be eased out and solved by group activity.

An Annual Action Plan for each season for every padasekharam for taking up identical variety and obtaining higher productivity by the adoption of modern technical know-how should be prepared by the Agricultural Officer of the Krishi Bhavan and get approved by the Assistant Director of the concerned block. Common activities such as raising of community nursery, ploughing and other tillage operations, application of organic and inorganic manures, adoption of IPM techniques for the control of pests and diseases, weed control, irrigation and drainage facilities, value addition and marketing facilities will be organised through these registered and revitalised GFAs. As an encouragement to samithies for adopting group farming activities on padasekharam basis, an assistance of ₹1500/- per hectare will be provided.

b) Assistance for Bringing Fallow Land Cultivation

In Kerala land is a limiting factor. Bringing paddy cultivation back in cultivable fallow land is one of the means to increase area under paddy cultivation. The main objective of the Scheme is to bring paddy lands left as fallow under cultivation thereby increasing production of paddy and creation of employment in the rural sector. Since considerable initial investment is required to make the fallow land cultivable, an assistance of ₹5000/- per ha is provided. The assistance is provided to individual farmers, padasekharams, SHGs, Non Governmental Organisations (NGOs), government and quasi government institutions. In areas where extra investment is required for bringing fallow land under cultivation due to high labour intensive activities, assistance can be sort from funds under State Food Security Programme, RKVY and National Rural Employment Guarantee Scheme (NREGS). An amount of ₹ 27 crores was set apart for this component during the Annual Plan 2012-13 and the area to be brought under cultivation was 3000 ha.

c) Assistance for Paddy Development Agencies

State Government has constituted Paddy Development Agencies for tackling the problem of rice cultivation in special problem areas. Financial assistance is provided for development of the problem area based on approved location specific projects and actual needs. An amount of ₹150 lakhs is earmarked for implementation of this component. The funds will be provided to Paddy Development Agencies based on the action plan approved by the Executive Committee of the concerned agency. Financial assistance will be provided to formulate location specific projects based on the approved plan for infrastructural development works including strengthening of peripheral bunds of padasekharams to prevent flood.

d) Promoting Supplementary Income Source to Paddy Farmers

In order to improve the total income from farm to the family of paddy farmers, assistance is provided for the cultivation of supplementary crops like pulses, sesamum, vegetables, ground nuts, tuber crops (coleus), green manure crops, fish farming etc in paddy fields after harvesting the regular crops either in the second or third crop season. An assistance of ₹ 2500/ha is given as 50 per cent assistance for these activities. The following are the crop combinations considered for the implementation of this component under SDR Scheme.

(i) Paddy – paddy – pulses / tuber crops (coleus)
(ii) Paddy – paddy- vegetables
(iii) Paddy- paddy- sesamum/ ground nut
(iv) Paddy – paddy- green manure crops
(v) Paddy – fish
(vi) Establishing small diary units in homestead

(ii) Production Bonus

Production bonus is a scheme which is intended to encourage rice cultivators for doing rice farming. The assistance is given in cash and the amount of assistance is ₹1000/ha. All farmers who are cultivating paddy are eligible for getting production bonus.

c) Assistance for Upland Cultivation of Rice

The assistance under the Scheme on Upland Cultivation of Rice commenced in the year 2011-12. All those farmers who are not cultivating in kole lands are eligible for the assistance at the rate of ₹7500 per hectare.

4.1.3.2 The Kerala State Civil Supplies Corporation

The Kerala State Civil Supplies Corporation better known as 'SUPPLYCO' is the gateway for the 30 million people of the State of Kerala, assuring the much needed food security in a substantive style by supplying life's essentials and reaching out to the rural poor and the urban rich alike. It was incorporated in 1974 as a fully owned government company with an authorised capital of ₹15 crores, to meet the limited objectives of regulating the market price of essential commodities at reasonable prices. The growth of SUPPLYCO for nearly four decades was tremendous and unbelievable compared to any of the similar organizations in the country. With headquarters at Cochin, SUPPLYCO is operating through five regional offices, 56 depots and more than 1200 retail outlets and a work force of nearly 3500 to fulfill its task.

SUPPLYCO is procuring paddy on behalf of State Government under decentralised Paddy Procurement Scheme of GOK. As the nodal agency to implement the decentralised procurement of paddy from Kerala State, the Corporation undertakes the procurement and milling of paddy for distributing Custom Milled Rice (CMR) through its Maveli Stores and Authorised Retail Dealers (ARD) in the State. The paddy procurement programme of SUPPLYCO started in the year 2004-05. In the State of Kerala, on the basis of the period of harvesting, procurement is done in two spells, one from the middle of September

to December and the second from January to June. It benefits nearly 70,000 farmers in the State and the payment to farmers is completely web based, where every grain of paddy procured from farmers and payments to farmers are duly accounted for. Compared to other states of India, Kerala is paying the highest support price to paddy farmers, ie., ₹19/- per kg 2014 onwards. At present the paddy procurement is being done in all the districts in the State. On an average one lakh farmers are registering with SUPPLYCO for paddy procurement during one crop season. At present 60 contracted rice mills in the State are participating in the paddy procurement programme of SUPPLYCO. In 2011-12 paddy season, SUPPLYCO made a record procurement of 5.61 lakh tonnes of paddy and prompt payment to the farmers. In 2012-13 SUPPLYCO procured 1.36 lakh tonnes paddy in the first season and 1.51 lakh tonnes paddy during the second season (Food & Civil Supplies (C) Department, G.) (Rt) No.155/13/F&CSD, dated 15.05.2013).

4.1.3.3 Cooperative banks

Cooperative banks are playing an important role in providing financial support to the farmers. Through KCC, they provide financial assistance to the rice farmers. Cooperative banks provide short term, medium term and long term agricultural credit. The cooperative credit structure for short term and medium term credit is a three tier and federal one with a State Cooperative Bank at the apex level in each state, the Central Cooperative Bank at the district level, and Primary Agricultural Credit Societies (PACS)/ Primary Agricultural Cooperative Banks/ Large- sized Agricultural Multi- Purpose Societies (LAMPS)/ Farmers Service Societies (FSS) at the base level. A separate institutional structure for providing long term credit in the cooperative sector owes its origin to the Report of Maclagan Committee (1915). The cooperative institution engaged in providing long term credit was known as Land Mortgage Bank (LMB) established at Jhang district in Punjab in the year 1920. Later the nomenclature of the banks changed from LMBs to Land Development Banks (LDBs), and then to Agriculture and Rural Development Bank (ARDBs). The credit structure comprises of two-tier viz., the State Cooperative Agriculture and Rural Development Bank (SCARDBs)

at the state level and Primary Cooperative Agricultural and Rural Development Bank (PCARDBs) at the primary level. At national level, State Cooperative Banks have their apex institution National Federation of State Cooperative Banks from the year 1967 at Mumbai. This federation does not undertake any banking and financial activities but only coordination and financial activities.

The co-operative movement in Kerala has a solid foundation and impressive record in terms of strength and financial stability and is one of the most vibrant cooperative movements in the country. There are 14205 co-operative societies functioning under the Registrar of Co-operative Societies as on 31st March 2013. The co-operative credit structure in Kerala comprises of 1636 PACS and 63 affiliated PCARDBs supported by the Central and Apex Co-operative Banks. As on 31.3.2013, out of 1636 PACS, 617 were running at loss and 69 societies were threatening under liquidation. The PACS are functioning with a total paid up share capital of ₹1231.21crores and reserves of ₹2193.41crores. The total loan disbursed during 2012-13 was ₹82410.64 crores against that of ₹ 46689.63 crores in 2011-12. Compared to the previous year, there is an increase in the disbursement of short term, medium term and long term loans (Economic Review, 2013). Table 4.2 gives the details of the type – wise cooperatives in Kerala under the administrative control of the Registrar of Co-operative Societies during the year 2012-13.

Table 4.2 Co-operatives under the administrative control of Registrar of Cooperative Societies, 2012-13

Sl. No	Type of Societies	Total number	Number of working societies
1	Apex, Federal, Central Societies	28	28
2	Credit Co-operatives	3434	3119
3	Marketing Co-operatives	555	228
4	Consumer Co-operatives	4696	4067
5	Processing Co-operatives	36	21
6	Housing Co-operatives	382	281
7	SC/ST Co-operatives	823	400
8	Health Co-operatives	194	103
9	Women Co-operatives	1079	808
10	Other Co-operatives (Miscellaneous)	2978	1775
11	Total	14205	10830

Source: Economic Review, 2013

Table 4.2 reveals that, with the exception of the Apex, Federal and Central Societies, the number of working societies are less than the number of societies registered. This implies that there are a lot of co-operative societies of different types, which are under the liquidation process.

The National Cooperative Development Corporation (NCDC) gives loans and grants to State Governments for financing primary and secondary level cooperative societies and direct to the national level and other societies. NCDC is a statutory corporation under the Ministry of Agriculture which undertakes planning, promoting and financing programmes for production, processing, marketing, storage, export and import of agricultural produce, food stuffs, certain other notified commodities like fertilisers, insecticides, agricultural machinery etc. Now, the Corporation can also go in for direct funding of projects under its various schemes of assistance. As on 31st March 2013, the cumulative financial

assistance of NCDC was ₹ 4774.78 crores in Kerala. During the fiscal 2012-13, Kerala stood fourth in all India standing for sanction, and third for disbursement of NCDC's financial assistance to States. Table 4.3 shows the physical achievements of funds disbursed by NCDC during the year 2012-13.

Table 4.3 Disbursement of funds by NCDC to Kerala 2012-13 (₹ in Crores)

Sl. No.	Item	Amount
1	Short Term (Agriculture)	11943.65
2	Medium Term (Agriculture)	2424.47
3	Long Term(Agriculture)	282.12
4	Retail sale of fertilizers	1017.12
5	Retail sale of Consumer goods	1845.73
6	Agricultural produce marketed	493.75
7	Storage in Co-operatives (NMT)	67313.50
8	Total	85320.34

Source: Economic Review, 2013

Around 300 cooperatives in Kerala have been benefitted by NCDC funding through State Government /Direct funding scheme during 2012-13 either through sanctions/ disbursement of funds (Economic Review, 2013). Almost all sectors of agriculture and allied activities including short term agricultural credit, marketing of agriculture produce, distribution of fertilisers and inputs, consumer cooperatives, processing activities, storage/ godowns, infrastructure creation, service sector, industrial cooperatives, labour cooperatives and weaker section programmes like fisheries, Scheduled Caste/Scheduled Tribe (SC/ST) etc. were covered by NCDC finance in the State during 2012-13. Table 4.4 depicts the types of assistance given by NCDC to the state of Kerala, during 2012-13 (cumulative as on 31.03.2013).

Table 4.4 Types of NCDC assistance to Kerala (₹ in crores)

Sl. No.	Type of assistance	Through State Government	Direct funding	Total
1	Long term loan	1211.10	00	1211.10
2	Subsidy	37.18	00	37.18
3	Working capital	00	3526.50	3526.50
4	Total	1248.28	3526.50	4774.78

Source: Economic Review, 2013

The programmes of the Local Self-Government Department (LSGD) are also implemented through cooperative societies. The fertiliser subsidy of local institutions is provided through service cooperative banks. Some cooperative societies are providing marketing support to the farmers by procuring rice at Minimum Support Price (MSP).

4.1.3.4 Kerala Agricultural University

Kerala Agricultural University (KAU) is the primary and the principal instrumentality of the Kerala State in providing human resources, skills and technology, required for the sustainable development of its agriculture, defined broadly, encompassing all production activities based on land and water, including crop production (agriculture), animal husbandry, forestry and fishery through conducting, interfacing and integrating education, research and extension in these spheres of economic endeavour. The University came into existence on February 24th 1971 by the Act 33 of 1971. Its headquarters is situated at Vellanikkara, Thrissur. The goal of the University is to provide human resources, skills and technology required for sustainable development of agriculture, including Crop Production, Animal Husbandry, Veterinary Sciences, Dairy Sciences & Technology, Co-operation, Fisheries, Forestry, Agricultural Engineering, Home Science and other allied disciplines by integrating education, research and extension.

The University has identified 15 regions for the purpose of recommending varying cultural practices such as Modan, Palliyal, Poonthal, Kuttanadu, Kole, Pokkali, Onattukara, high range, eastern laterite region, coastal sandy areas, deep ill-drained region of southern districts, double crop wet lands, triple crop areas, kootumundakan and waterlogged/ flooded area. The University is having Rice Research Stations at Pattambi in Palakkad District, Moncompu in Alappuzha District, and Vyttila in Ernakulam District. The Research Stations of the University in Mannuthy and Kayamkulam are also engaged in rice development activities.

The Pattambi Rice Research Station was established with the mandate of generation and transfer of technology related to rice and rice based cropping system, pulses, vegetables, organic farming and seed technology. Major Programmes of the Station are:

(i) All India Coordinated Rice Improvement Project

(ii) All India Coordinated Research Project on Arid Legumes

(iii) AICRP on Long Term Fertiliser Experiments

(iv) University Research Projects

(v) ICAR Ad-hoc Scheme on Development of Superior Hybrid Rice Varieties

(vi) ICAR Funded Project on Technology Assessment and Refinement through Institution Village Linkage Programme

(vii) National Seed Production – Breeder Seed Production Programme

(viii) Research Components of National Watershed Development Programme for Rainfed

(ix) Intensive Vegetable Production Programme

The Station has developed 54 high yielding rice varieties from Aryan (Ptb l) to Karuna (Ptb54). It has developed Annapoorna rice variety which is the first high yielding, early, dwarf rice variety in the whole country and also the Jyothy

rice which is the ever popular rice variety among the farmers. Kairali, Kanchana, Aathira, Aiswarya, Mangala, Mashuri and Karuna are some of the other rice varieties introduced by the Research Station. Apart from these, it has developed comprehensive cultivation package for rice for different seasons, scientific fertiliser schedules for rice under different situations, integrated weed management strategy with emphasis on herbicides, and effective pest and disease management practices in rice.

The Moncompu Rice Research Station was started in the year 1940 to deal exclusively with research on rice in Kuttanad ecosystem. A unit of AICRIP is functioning in this Station. The Centre was instrumental in solving several problems in deep water areas such as Kuttanad. The Centre has released 19 rice cultivars namely, Mo1, Mo2, Mo3, Bhadra, Asha, Pavizham, Karthika, Aruna, Makom, Remya, Kanakam, Ranjini, Pavithra, Panchami, Remanika, Uma, Revathy, Karishma and Krishnanjana. The Station has come up with viable management strategy against varinellu (wild rice) in rice by coating rice seeds with calcium peroxide. Recommendations on nitrogen management, herbicidal control of weeds, use of rock phosphates in acid soils, etc. are other contributions of the Station. The Station has designed an indigenous cheap and efficient rat trap "the Moncompu trap" for trapping rats in rice fields.

The Rice Research Station, Vyttila is situated in a representative site in the centre of the Pokkali tract. The Station started functioning during the year 1958 and was taken over by the KAU in 1974. The Station is exclusively for rice in Pokkali (Saline) areas and rice-fish farming systems. The Station has developed eight saline tolerant, high yielding rice cultivars suited to the Pokkali ecosystem and they are Vyttila - 1, Vyttila - 2, Vyttila - 3, Vyttila - 4, Vyttila -5, Vyttila -6, Vyttila -7, and Vyttila -8. It has standardised a technology for raising prawns as a follow up crop after rice.

The Agricultural Research Station (ARS) in Mannuthy was started during the year 1957 as Rice Research Station under Department of Agriculture, Kerala. With the formation of KAU during 1972, the Rice Research Station and the

Agricultural Research Station both at Mannuthy were taken over from the State Department of Agriculture and brought under the control of Agricultural University. In the year 1976, Rice Research Station and Agricultural Research Station were merged and renamed as Agricultural Research Station, Mannuthy. The lead functions of the Station are on rice for kole land management system and also on coconut. The Centre has developed an extra short duration red kernelled rice cultivar, Hraswa maturing in 75 to 80 days. It has also released another cultivar named as Ahalya for cultivation.

The Station has come out with the concept of "Food Security Army for Food Security" to establish a "service provider" for the farmer. This is a training program, which provides training to the farmers in a well designed and disciplined manner, designates them as Food Security Army and later organise them as registered societies like Agro Machinery Operation Service Centre (AMOSC). Several models, for example, Wadakkanchery Green Army model, were created and evolved for large scale adoption, by the intervention of ARS, Mannuthy. A Farm Machinery Facilitation Centre (FMFC) is functional at the Station, catering to the needs of rice farmers who are in need of farm machinery by providing apt machinery on time, on custom-hire-basis with trained operators. The Station is now undertaking the State Plan, assisting projects of establishment and holding of 14 model Agro Service Centres, one each in each district, with a financial outlay of ₹ 250 lakhs. Different facilities were created under Plan schemes at ARS towards farm machinery procurement, testing and training. The resources so created are being developed and extended as a service facility for farmers and public for improving rice production and productivity. The machineries available are being rented out, or its operations are being hired out. Food Security Army is trained in the use of all farm machines.

The Regional Agricultural Research Station in Kayamkulam was established in the year 1937 under the erstwhile University of Travancore. It was subsequently transferred to the Department of Agriculture in 1958 and continued to function under the Department till it became a part of KAU on 7th February

1972. In April, 2000, this Station was upgraded to the status of Regional Agricultural Research Station (Onattukara Region). The lead functions of the Station are on rice in Onattukara. The Station has released eight rice varieties for cultivation, especially for Onattukara tract of Kerala and they are U 19, UR 110, Kottarakkara-1, Lakshmi, Bhagya, Onam, Dhanya and Sagara. It has also released two cultivars namely Makaram and Kumbham. It has made recommendations on several crop management and crop protection methods for rice with respect to Onattukara tract.

KAU has played a significant role in the development of rice. The University has developed a new rice variety 'Ezhome' with the participation of farmers of Ezhome Panchayat of Kaipad in Kannur district. These varieties are high-yielding and non-lodging red rice varieties with awn less, non-shattering grains and favourable cooking qualities better than local cultivars. The average yield of Ezhome-1, Ezhome-2 and Ezhome-3 is 3.5 tonnes per ha, 3.2 tonnes per ha and 4.3 tonnes per ha respectively under close planting and zero management conditions of Kaipad.

4.1.3.5 Krishi Vigyan Kendra

Krishi Vigyan Kendra (KVK) places a special emphasis on training and education of farmers, entrepreneurs, farm women, rural youth, financial institutions, extension functionaries as well as voluntary organisations. It plays a first line extension role - a linkage between research and the field in augmenting the socio-economic conditions of farmers, farm women and livestock owners. The KVKs provide intensive hands on training in various aspects of agriculture, horticulture, animal husbandry and related fields to encourage unemployed farm youth and farm women to start their own agro-based enterprises in their locality. These KVKs would also conduct on-farm testing of various agricultural and allied technologies for refinement and conduct frontline demonstrations on oilseeds, cereals and pulses. The functions of KVK are the following:

(i) Planning and conducting survey of the operational area in order to prepare the resource inventory with special reference to identifying the training needs of the farming community.

(ii) Planning and conducting production- oriented, need-based short and long duration training courses both on campus as well as in the villages for various target groups with priority on the weaker and the poor.

(iii) Organising farm science clubs, both in rural schools and in villages in order to induce in younger generation a liking for, and an interest for agricultural and allied sciences and scientific farming through supervised projects.

(iv) Developing and maintaining the campus farms and demonstration units on scientific lines as the facilities for providing work experience to the trainees as also disseminating the latest technical know-how.

4.1.4 Local level institutions

The Local Self Government Institutions are promoting rice cultivation through their Planned Schemes and Local Self Government Development (LSGD) Schemes. The decentralisation initiated by the 73rd and 74th Amendment Acts of the Indian Constitution has given greater responsibility and powers to the local bodies for local planning, effective implementation and monitoring of various social and economic development programmes. In Kerala, the process of decentralisation launched at the beginning of Ninth Five Year Plan as the People's Plan Campaign was restructured and named as Kerala Development Plan during the Tenth Plan and a number of innovative steps were taken to strengthen and institutionalise the decentralisation process in the State. During Eleventh Plan, the Government revamped the entire process, emphasising the concept of People's Planning, focusing on institutionalisation of decentralisation. Kerala is a role model for other states in the area of financial and functional devolution. Grama panchayat, block panchayat, district panchayat, municipality and corporation are the major local self government institutions in the State.

Financial devolution is the most important element of Kerala's decentralisation process, which has enabled the Local Governments (LGs) to receive the required resources from various sources for their Plan. LGs raise the resources for the local development activities from the State's Plan allocation as well from its own revenue. LGs are provided Plan allocation for implementing LGs own schemes as well as State and Central Schemes transferred to LGs.

The LGs allocate their Plan funds mainly in three sectors viz, productive, service and infrastructure. Productive sector includes agriculture and allied sectors, soil and water conservation, irrigation and industries. Service sector consists of education and allied sectors, health and allied services, women and child development, labour and labour welfare. Infrastructure sector includes energy, transportation and buildings. Out of the total Plan fund made available to productive sector by LGs, 35 per cent of the fund was earmarked for the implementation of various schemes under agriculture and allied sectors in 2012-13 (Economic Review, 2013). Table 4.5 shows the allocation of Plan funds for various LGs for agriculture and allied sector during 2012-13.

Table 4.5 Allocation of Plan fund for LGs for agriculture sector, 2012-13 (₹ in lakhs)

Sl.No (1)	Category of LG (2)	Fund allocated (3)	Actual expense (4)	Utilisation (% of col. 4 to col. 3) (5)
1	Grama panchayat	22334.75	18313.86	82.00
2	Block panchayat	4438.47	3572.95	80.50
3	District panchayat	5390.30	3693.65	68.52
4	Muncipalities	1950.09	1396.68	71.62
5	Corporation	1226.69	653.97	53.31
6	Total	35340.29	27631.11	78.19

Source: Economic Review, 2013

It is evident from Table 4.5 that grama panchayats have the highest allocation and utilisation of Plan funds. None of the LGs have utilised the full amount allocated to them. Corporations have the lowest utilisation of their allocated funds. It is noteworthy that nearly 50 per cent of their funds are remaining unutilised. This calls for identifying the reasons for unutilisation of the allocated amount by the LGs and methods for effective utilisation of the funds allotted within the financial year so that the funds do not get lapsed.

4.1.4.1 Grama Panchayat

A grama panchayat is a local self-government institution at the village or small town level in India. There are 978 grama panchayats in Kerala and 88 panchayats in Thrissur district. The schemes of Panchayat for rice development are different for all panchayats and it will be based on their Plan fund. However there are some common schemes which are implemented through grama panchayats which are discussed in this section.

(i) Development Plan Scheme

Panchayats through its Development Plan Scheme, popularly known as *Janakeeyasoothranam*, provide assistance to rice farmers. These schemes on agriculture projects are implemented through Krishi Bhavans. Comprehensive rice development, distribution of daincha seeds, organic manure, fertilisers etc. are some of the components of the rice development schemes of panchayats. Through this scheme, panchayats are giving permits to farmers for purchasing manures, fertilisers, pesticides and herbicides at a subsidised rate. The permit is given through Group Farming Samithies.

4.1.4.2 Krishi Bhavan

Krishi Bhavan in every panchayat is the grass-root level office for agriculture development headed by the Agricultural Officer. There are 1046 Krishi Bhavans in the State. Krishi Bhavans have a lead role in planning, formulation, and implementation of agriculture projects of local self-government. The activities of the Department of Agriculture are spearheaded and coordinated

by the Agricultural Officer in his jurisdiction. Krishi Bhavans are entrusted with transfer of technology from lab to land and provide scientific management information to the farming community.

4.1.5 Non Governmental Organisations

Non Governmental Organisations (NGOs) are also working for the development of agriculture. Agriculture Technology Management Agency (ATMA) is a major NGO engaged in the process of agriculture development.

4.1.5.1 Agricultural Technology Management Agency (ATMA)

ATMA is an autonomous institution formed and registered at district level under Travancore Cochin Literary Scientific Charitable Societies Act, 1955. It is a public extension agency responsible for technology management and dissemination activities at the district level. The major functions of ATMA are the following:

(i) Strategic Planning Function: Preparation of Strategic Research and Extension Plans (SREPs)

(ii) Networking and Co-ordination Function: Networking and co-ordination of all stakeholders in agriculture establishing effective linkages.

(iii) Integrated Extension Delivery Function: Integration of multi-agency extension strategies

(iv) Information Management Function: Involving collection, compilation and dissemination of relevant information on agricultural technology

(v) Farmer Facilitation and Empowerment Function: For facilitating empowerment of the farming community.

(vi) Training and Capacity Building Function: Knowledge and skill upgradation of farmers and extension functionaries

(vii) Fund Management Function: As a society it can receive and expend funds, enter into contracts and agreements and maintain accounts

(viii) Participatory Technology Development Function: To generate appropriate technologies with the involvement of all stakeholders

(ix) Monitoring and Evaluation Function: To undertake monitoring and evaluation studies for suitable modification and refinement of future programmes

4.1.6 Group farming agencies (Padasekhara Samithies)

Group Farming launched by the Department of Agriculture as an extension scheme to augment rice production, created new hopes and confidence among rice farmers. GFAs are the collective group of farmers, scientists and administrative personnel with active government support. Krishi Bhavans implement most of the schemes through GFAs like supply of seeds, permits for subsidised fertilisers etc. At present, most of the farmers are doing rice cultivation as group farming so that they can undertake agricultural operations in time, at a reasonable cost with economy of large scale operations.

Summing up the first objective of the study, viz., examination of the developmental programmes/ schemes of various governmental and other institutions for the promotion of rice farming in Kerala, it is seen that at international level, IRRI is the major institution engaged in rice development. By enhancing rice research it ensures stable and sustainable rice production. At the national level, Department of Agriculture is the nodal agency which provides production support to the rice farmers. Even though it has launched many schemes for rice development, only a few schemes are currently in vogue. The NFSM in 2007 was a milestone of the Department which enhanced the food security in the country in a considerable manner. At the State level, the Department of Agriculture makes its landmark through its flagship scheme of SDR. The SUPPLYCO is playing an important role in providing marketing support to rice farmers by procuring the rice at MSP. Commercial banks and cooperative banks are providing financial support to the farmers in the form of KCC and agricultural gold loan schemes providing the benefit of interest subvention to the borrower farmers. KAU is the principal instrumentality in the

Kerala State which provides human resources, skills and technology for its sustainable agriculture development. It has played a significant role in the growth of rice production through research and development of HYVs suitable for different regions and types of land.

In overall, these organisations and agencies are supporting rice development in the country through their schemes and programmes. How far these organisations / agencies and their schemes / programmes have been instrumental in the promotion of rice farming through their interventions in Thrisssur District is discussed in the next section.

4.2 Impact of institutional interventions for promotion of rice farming in Thrissur district

Impact of institutional intervention on net income of rice farmers is the second objective of the study. Interventions can be in the form of positive incentives normally. Institutions can provide incentives at various stages of farming activity from production to marketing, in kind, cash and services like subsidised inputs, income transfer, cash benefits, facilities, and skill / information/ technology transfer etc. The influence of some of these incentives on farming may not be quantified objectively. For instance, assured price gives the courage to produce because it protects the farmer from distress sales. Assured price influences the market price of the other agents and intermediaries who are marketing the product. Price of the product in the absence of assured price cannot be assumed and compared. Treatment of subsidised input as cost or income is a methodological problem. All cash incentives and subsidy are treated as income transfer leading to increase in net income so that actual cost of cultivation can be recorded in the study as well as benefit to the farmer is also reflected. This part of the study is organised into four parts viz,

4.2.1 Socio economic profile of the respondents

4.2.2 Features of rice cultivation of respondents

4.2.3 Production details of rice

4.2.4 Impact of institutional interventions for promotion of rice farming

4.2.1 Socio-economic profile of the respondents

Socio - economic status is the measure of economic and social prospects of the individuals. It indicates the social position of an individual with respect education, income and occupation. In order to examine the socio-economic characteristics of the respondents, eight indicators, viz., sex, age, education,

occupation, family income, annual family income, income from agriculture and income from rice farming are considered and they are given in Table 4.6.

Table 4.6 Socio-economic profile of the respondents: Panchayat - wise

Sl. No	Characteristics	Unit	Pazhayannur	Adat	Mundathikode	Total
1	**Sex**	Number				
1.1	Male		24	29	28	81 (90)
1.2	Female		06	01	02	09 (10)
2	**Age level**	Years				
2.1	35-45		00	03	01	04 (04)
2.2	45-55		08	08	07	23 (26)
2.3	55-65		09	11	16	36 (40)
2.4	65-75		10	07	03	20 (22)
2.5	75 and above 75		03	01	03	07 (08)
3	**Education level**	Number				
3.1	Below SSLC		16	02	07	25 (28)
3.2	SSLC		12	15	18	45 (50)
3.3	Higher secondary		01	06	02	09 (10)
3.4	Graduation		01	06	03	10 (11)
3.5	Post-graduation		00	01	00	01(01)
4	**Family size**	Type				
4.1	Nuclear family		21	28	28	77 (86)
4.2	Joint family		09	02	02	13 (14)
5	**Occupation**					
5.1	Agriculture		25	20	18	63 (70)
5.2	Government sector		00	02	01	03 (03)
5.3	Business		01	01	02	04 (05)
5.4	Others		04	07	09	20 (22)
6	**Income from Agriculture**	In ₹				
6.1	Less than 1 Lakh		08	04	16	28 (31)

6.2	1 Lakh – 2 Lakhs		06	07	06	19 (21)
6.3	2 Lakhs – 3 Lakhs		10	11	06	27 (30)
6.4	3 Lakhs – 4 Lakhs		04	06	00	10 (12)
6.5	Above 4 Lakhs		02	02	02	06 (06)
7	**Income from paddy**	In ₹				
7.1	Less than 1 Lakh		20	07	28	55 (60)
7.2	1 Lakh – 2 Lakhs		07	09	01	17 (19)
7.3	2 Lakhs – 3 lakhs		03	12	00	15 (17)
7.4	3 Lakhs – 4 Lakhs		00	02	01	03 (02)
7.5	Above 4 Lakhs		00	00	01	01 (02)
8	**Annual family income**	In ₹				
8.1	Less than 1 Lakh		06	03	11	20 (22)
8.2	1 Lakh – 2 Lakhs		07	04	06	17 (20)
8.3	2 Lakhs – 3 lakhs		11	12	07	30 (33)
8.4	3 Lakhs – 4 Lakhs		02	04	03	09 (10)
8.5	Above 4 Lakhs		04	07	03	14 (15)

Source: Compiled from primary data
Note: Figures in parenthesis represents percentage share of each to total

Table 4.6 reveals that both male and female respondents are engaged in rice farming and majority (90 per cent) are male. Pazhayannur Panchayat has the highest women rice farmers who are highly interested in doing rice cultivation.

Seventy per cent of the respondent farmers are having more than 55 years of age. Only four percent fall in the category of upto 45 years which implies that the new generation is keeping away from rice farming.

The level of education has an important role in the awareness level of rights. Education helps the farmers to update their information regarding new schemes, new institutions, modern high yielding varieties, other inputs of cultivation and also to adapt new production technologies. Eighty eight per cent of

the farmers are having education below graduation. Hence it can be inferred that educated persons are comparatively not interested in rice farming and agriculture.

As seen in the present era, majority of the respondents (86 per cent) belong to nuclear family and only 14 per cent of the respondents are having joint family.

With regard to the occupation of sample respondents, the main occupation of 70 per cent of the respondents are agriculture and the rest 30 per cent are doing agriculture as subsidiary occupation. It indicates majority of the respondents are spending their entire time in farming activities and highly dedicated to agriculture.

Income from agriculture of the respondents varies according to the land holding size. The agriculture income of majority of the respondents (82 %) falls within ₹ 3 lakhs per annum. 28 per cent of respondents have annual agriculture income less than ₹ 1 lakh and only six per cent respondents are having agriculture income above ₹ 4 lakhs.

As regard to the income from rice farming, more than 50 per cent of respondents are having income less than ₹ 1 lakh since majority of the respondent farmers are marginal farmers considering their landholding under rice cultivation. Only three per cent are having income more than ₹ 3 lakhs.

Since the main occupation of respondents is agriculture, income from agriculture contributes major share to the annual family income. As in the case of income from agriculture, annual family income of majority of respondents falls within ₹ 3 lakhs. Only 15 per cent of the respondents have income more than ₹ 4 lakhs.

4.2.2 Features of rice cultivation of respondents

The characteristic features of rice cultivation discussed in this section encompasses proportion of paddy land holding to total land holding (Table 4.7), share of income from rice farming to total agriculture income (Table 4.8), classification of farmers based on land under rice cultivation (Table 4.9), cropping pattern of farmers (Table 4.10), rice varieties used by farmers (Table 4.11),

productivity of rice (Table 4.12), and mechanisation of paddy farms (Table 4.14) of the sample panchayats.

One of the factors that determine the quantity of rice production and income generated is the size of land holding for rice cultivation. Hence the share of paddy land holding to the total land holding size of the respondents, is worked out and presented in Table 4.7.

Table 4.7 Proportion of paddy land holding to total land holding: Panchayat - wise

Sl.No	Paddy land holding to total land holding (%)	Pazhayannur	Adat	Mundathikode	Total
1	0 – 25	00	00	06	06 (07)
2	25 – 50	06	01	13	20 (22)
3	50 – 75	12	8	08	28 (31)
4	75 – 100	12	21	03	36 (40)

Source: Compiled from primary data
Note: Figures in parenthesis represents percentage of each to total

Table 4.7 reveals that majority of the respondents (71 per cent) use more than half of their land for rice cultivation. Only seven per cent of the respondents use less than one – fourth of their total landholding for rice cultivation. In Pazhayannur and Adat Panchayats majority of the respondents (80 per cent and 97 per cent) hold major share of their land as paddy land. However, in Mundathikode Panchayat, the picture is different with proportion of rice land less compared to other two Panchayats. This is because they concentrate on other crops also along with paddy.

To examine the share of income from rice farming in the total agriculture income of the respondents, the income from rice farming is expressed as percentage of total agriculture income and is depicted in Table 4.8

Table 4.8 Share of income from rice farming to total agriculture income: Panchayat - wise

Sl.No	Rice income to total agriculture income (%)	Pazhayannur	Adat	Mundathikode	Total
1	Less than 25	1	0	4	05 (06)
2	25-50	1	2	9	12 (13)
3	50-75	7	9	5	21 (23)
4	75-100	21	19	12	52 (58)
5	Average	54.51	83.32	62	66.61

Source: Compiled from sample survey
Note: Figure in parenthesis represents percentage of each to total

Since rice contributes major land holding share in the total land holding of rice farmers, the major share in the total agriculture income is contributed by rice cultivation. More than half of the respondents (58 per cent) are getting 75 to 100 per cent of their agriculture income from rice farming. In all panchayats, income from rice farming contributes highest share in the total agriculture income of the respondents.

Based on the land holding size, the farmers are categorised as tenant, marginal, small and large farmers. The classification is made on the basis of land holding size of rice cultivation alone. The farmers, who have no land their own, but do rice cultivation on leased land are classified as tenant farmers. The farmers who hold land less than one hectare of paddy land is categorised as marginal farmers. Those farmers who have land holding size of one hectare to two hectare is categorised as small farmer. The farmers who hold land more than two hectare are considered as large farmers. The classification of farmers based on paddy land holding in each panchayat is depicted in Table 4.9.

Table 4.9 Distribution of farmers based on land under rice cultivation: Panchayat - wise

Sl.No	Type of farmer	Pazhayannur	Adat	Mundathikode	Total
1	Tenant farmers	00	00	01 (03)	01(01)
2	Marginal farmers	23 (77)	11(37)	28 (94)	62 (69)
3	Small farmers	07 (23)	12 (40)	01 (03)	20 (22)
4	Large farmers	00	07 (23)	00	07 (08)
	Total	30 (100)	30 (100)	30 (100)	90 (100)

Source: Compiled from primary survey
Note: Figures in parenthesis represent percentage share of each to total

Table 4.9 reveals that marginal farmers constitute the highest share of farmer respondents in all the three panchayats taken together. Marginal farmers have the largest presence in Mundathikode Panchayat followed by Pazhayannur panchayat. However, in Adat Panchayat, small farmers constitute the highest number among the sample farmers. There are no respondents from Pazhayannur and Mundathikode who belong to the category of large farmers.

Cropping pattern is an important component of any farming system. It is the proportion of area under various crops at a point of time. Apart from rice, the farmers in the study area are mainly cultivating vegetables, banana, coconut, rubber, arecanut and other crops consisting of pepper, turmeric, tapioca and coleus. The cropping pattern adopted by the respondent farmers in the three panchayats are depicted in Table 4.10.

Table 4.10 Cropping pattern of farmers: Panchayat wise

Sl. No	Panchayat	Rice	Coconut	Banana	Vegetables	Rubber	Arecanut	Others
1	Pazhayannur	30 (100)	08 (27)	22 (73)	20 (67)	02 (7)	05 (17)	12 (40)
2	Adat	30 (100)	19 (63)	10 (33)	10 (33)	18 (60)	15 (50)	10 (33)
3	Mundathikode	30 (100)	13 (43)	04 (13)	00	12 (40)	10 (33)	08 (27)
4	Total	90 (100)	40 (44)	36 (40)	30 (33)	32 (36)	30 (33)	30 (33)

Source: Compiled from sample survey
Note: Figures in brackets represents percentage to each total

Table 4.10 reveals that other than rice, the major crops of the study area are coconut, banana, rubber, vegetables, and arecanut. After rice, banana and vegetables are the major crops in Pazhayannur Panchayat and 67 to 73 per cent of the farmer respondents in the Panchayat are cultivating these crops also along with rice. Even though Pazhayannur Panchayat is a rubber growing area, rubber growers are less among the sample respondents of the Panchayat, since the study has concentrated on farmers cultivating rice. Compared to other two Panchayats, farmers in Adat Panchayat are having more rubber cultivation. It is noteworthy that none of the respondent farmers in Mundathikode Panchayat are engaged in vegetab114le cultivation on a commercial scale.

Rice is the major crop of Thrissur district as well as in the entire study area. Seed is the major input essential for undertaking rice cultivation. Quality of seeds is a major determinant of rice production. In the early days, farmers were using local varieties and the production was low. After the implementation of NFSM in 2007, the Department of Agriculture, GOI started to supply HYVs of seeds to farmers through Krishi Bhavans as subsidies. In Kerala, especially in Thrissur district, group farming is very popular. The subsidy seeds are supplied through the GFAs. Since rice cultivation is done on group basis, the farmers are using almost same variety for cultivation. Uma, Jyothi, Kanchana, Mattatriveni, and Jaya are the major notified HYV seeds popular in Thrissur district. Table 4.11 depicts the rice varieties cultivated by the sample respondent farmers.

Table 4.11 Distribution of farmers based on rice varieties cultivated: Panchayat wise

Sl.No.	Varieties	Pazhayannur	Adat	Mundathikode	Total
1	Mattatriveni	02	00	00	02 (02)
2	Jyothi	00	18	18	36 (41)
3	Kanchana	12	00	00	12 (13)
4	Kunjukunju	04	00	00	04 (04)
5	Uma	12	12	12	35 (40)

Source: Compiled from sample survey
Note: Figures in parenthesis represents percentage of each to total

The major rice varieties in the study area are Jyothi, Uma, Kanchana, Kunjukunju and Mattatriveni. In Pazhayannur Panchayat majority of the farmers are using HYVs, Uma and Kanchana. Some of the elder farmers are using their local varieties like Kunjukunju, AST, Gund etc. In Adat and Mundathikode Panchayats all the farmers are using the notified HYV seeds, viz., Uma and Jyothi varieties.

Rice is the major crop of all the three areas of the study. It contributes major share in the total cropping pattern of all the farmers (Table 4.10). In Pazhayannur Panchayat, the farmers are doing rice cultivation in two seasons: Virippu and Mundakan, while in other two Panchayats, cultivation is only during one season, viz., Mundakan. This is mainly because of lack of irrigation facilities in Mundathikode Panchayat, while in Adat Panchayat paddy fields are Kole land and cultivation is possible only once in an year. The productivity of rice per hectare in the three Panchayats is worked out and depicted in Table 4.12.

Table 4.12 Productivity of rice of respondent farmers: Panchayat - wise

Sl. No.	Production (kg /ha)	Pazhayannur	Adat	Mundathikode	Total
1	Less than 1000	02	00	02	04 (04)
2	1000 – 2000	09	00	08	17 (19)
3	2000 – 3000	10	02	08	20 (22)
4	3000 – 4000	06	00	05	11 (12)
5	4000 – 5000	03	04	04	11 (12)
6	5000 – 6000	0	09	03	12 (13)
	6000 – 7000	00	11	00	11 (12)
	More than 7000	00	04	00	04 (04)
7	Average production	2444	5868	2947	3753
8	Chi Square	62.106**			

Source: Compiled from sample survey
Note: Figures in parenthesis represents percentage of each to total

It is seen from Table 4.12 that productivity of rice is different in the three areas of the study. Rice production is the highest in Adat Panchayat followed by Mundathikode Panchayat. Wide difference is noticed in the productivity of rice between Adat Panchayat and the other two panchayats. Adat Panchayat is a well developed agricultural area. The local administration authorities like panchayat and Krishi Bhavan are maintaining good relationship and co-operation with the farmers. Besides, the Adat Farmers Service Cooperative Bank also maintains good link with farmers, Krishi Bhavan, panchayat and SUPPLYCO. Since farmers are getting better institutional support/ interventions, they are able to produce larger quantity of rice compared to the other two areas. In Pazhayannur Panchayat even though they are getting reasonable institutional assistance, there is high existence of weed plants in the area. It adversely affects rice production of the Panchayat. As a result the farmers in Pazhayannur Panchayat are not able to get as high a production as in the case of Adat Panchayat, inspite of the institutional interventions made available to them.

The Chi-square statistic is found to be significant at one per cent level which implies that productivity of rice is highly related to the locality and area under cultivation. In order to examine whether there is any significant difference between the productivity of the three sample areas, Analysis of Variance (ANOVA) test has been done, the results of which are given in Table 4.13

Table 4.13 Analysis of Variance of productivity of rice: Area - wise

Sl No.	Panchayat	Mean production per ha	F	Significance at 5 %
1	Pazhayannur	2444	140.28**	0.000
2	Adat	5868		
3	Mundathikode	2947		

Source: Compiled from primary data

The results of ANOVA as depicted in Table 4.13 reveals that there is significant difference between the average productivity between the three areas of

the study. It is already seen that in Adat Panchayat which is having the highest productivity, the institutional interventions are also the highest (Table 4.12).

Mechanisation technologies keep changing with industrial growth and socio-economic advancement of the farmers. Declining interest of farmers in agriculture due to non availability of agricultural labourers and high cost of cultivation necessitated the need for mechanisation in rice farming operations. Mechanisation has helped the farmers to remove the hindrance of labour problems, reduce the cost of cultivation and also to improve the productivity. Mechanisation in rice farming is mainly adopted for land preparation, transplanting and harvesting. KAU has initiated the formation of a labour bank of skilled agricultural labourers in the name of "Green Army" for mechanisation purposes by providing initial training to a group of youth who later became master trainers. These master trainers provide training to further people and the services of the labour bank are available in the entire Thrissur district and even spreading to nearby districts. Manual transplanting requires 10 labours at the rate of ₹ 450 per labour whereas on an average, machine transplanting costs ₹ 3200 per acre, which may vary from area to area. Table 4.14 depicts details of the respondent farmers in the selected panchayats who are availing the benefits of farm mechanisation for rice cultivation.

Table 4.14 Distribution of farmers based on adoption of farm mechanisation

Sl No	Cultivation stages	Pazhayannur	Adat	Mundathikode
1	Land preparation	30	30	30
2	Transplanting	5	0	30
3	Harvesting	30	30	30

Source: Compiled from sample survey

It could be seen from Table 4.14 that in all the three panchayats, land preparation and harvesting are mechanised. In Mundathikode Panchayat, transplanting is done using transplanter whereas it is labour intensive in Pazhayannur Panchayat. In Adat Panchayat, the farmers are broadcasting the seeds instead of planting. The services of Green Army are availed by farmers in

Mundathikode Panchayat but in Pazhayannur only a few farmers are availing their services. Even though transplanters and tractors are available in Pazhayannur Block Panchayat, the farmers are not getting it on time due to poor working conditions of machines. As a result mechanisation in transplanting is low in Pazhayannur Panchayat.

4.2.3 Production details of rice

Once the specific features of the rice cultivation of the study area and the respondents are discussed, the next attempt is to present the various production details of rice of the farmer respondents with respect to cost of cultivation of rice, net income from rice cultivation and marketable surplus of rice farmers.

4.2.3.1 Cost of cultivation of rice

The cost of cultivation of rice is the sum total of the cost of inputs, cost of plant protection, cost of cultural operations, labour charges and other costs like transportation and storage charges. In order to analyse the cost of cultivation of rice, the cost per ha is calculated for each respondent and percentage of farmers in each class interval have been found out and depicted in Table 4.15.

Table 4.15 Distribution of respondents based on cost of production of rice

Sl No.	Cost of production/ ha (in ₹)	Pazhayan+nur	Adat	Mundathikode	Total
1	25000-30000	00	25	00	25 (28)
2	30000-35000	01	01	00	02 (02)
3	35000-40000	16	01	26	43 (48)
4	40000-45000	12	01	04	17 (19)
5	45000-50000	00	01	00	01 (01)
6	50000-55000	00	01	00	01 (01)
7	55000-60000	01	00	00	01 (01)
8	Total	30	30	30	90(100)
9	Average cost (in ₹)	40345	28489	38927	35920
	Chi-square	90.505**			

Source: Compiled from sample survey
Note: Figures in parenthesis represents percentage of each to total

The cost of production of nearly half (48 %) of the sample respondents falls within the category of ₹ 35000 to ₹ 40000 per ha. The cost of cultivation is the lowest in Adat Panchayat, where 25 out of the 30 respondents, ie, 83 per cent are having cost of cultivation between ₹ 25000 to ₹ 30000 per ha and the average cost of all the respondents of the Panchayat is only ₹ 28489. Pazhayannur Panchayat has the highest cost of cultivation, with average cost of cultivation of ₹ 40345 per ha. In Pazhayannur Panchayat, transplanting is mainly done manually (Table 4.14) and hence farmers are spending significant amount as labour charges for transplanting operation. Moreover, during the year 2012-13, i.e., the period of study, weed problems and pest attack were very high. As a result cost of production has increased considerably. In Mundathikode Panchayat which comes second in cost of production, all agriculture operations are mechanised including transplanting. Cost of mechanised transplanting is less than that of human labour. Mechanisation has improved the yield as well as reduced the cost of cultivation in Mundathikode Panchayat compared to Pazhayannur Panchayat. In Adat Panchayat operations other than transplanting are mechanised, where, instead of transplanting they are broadcasting the seeds. Broadcasting involves only very low cost while transplanting costs more than ₹ 15000 per hectare. The weed problems and pest attack were also lower in Adat Panchayat. As a result the cost of cultivation is lower in Adat Panchayath compared to Mundathikode Panchayat even though in Mundathikode Panachayat operations are fully mechanised.

Chi-square test was employed to identify whether there is any relationship between location and cost of production and it was found significant at five per cent level. It implies that cost of production is highly related to the location where paddy cultivation is done.

An attempt is also made for finding out the cost of production of different categories of farmers viz., tenant, marginal, small and large farmers, for identifying the cost of production of each farmer category, which are depicted in Table 4.16. Chi-square test is also employed to confirm whether the cost of production depends on the land holding size of the farmers.

Table 4.16 Distribution of respondents in relation to cost of production of rice: farmer – wise

Sl. No.	Cost of production/ ha (₹)	Tenant farmer	Marginal farmer	Small farmer	Large farmer	Total
1	25000-30000	00	07	11	07	25 (28)
2	30000-35000	00	00	02	00	02 (02)
3	35000-40000	01	36	06	00	43 (48)
4	40000-45000	00	16	01	00	17 (19)
5	45000-50000	00	01	00	00	01 (01)
6	50000-55000	00	01	00	00	01 (01)
7	55000-60000	00	01	00	00	01 (01)
8	Total	01	62	20	07	90(100)
9	Average cost	37286	38648	30914	25860	35920
9	Chi-square	44.916**				

Source: Compiled from sample survey
Note: Figures in parenthesis represents percentage of each to total

It has been found that the marginal farmers is having the highest cost of cultivation (₹38648 per hectare) followed by the tenant farmer. A tenant farmer is one, who does not have land on his own, but take land on lease for cultivation. The tenant farmer in the study has leased 6.88 ha of land which enables him to enjoy the benefits of large scale cultivation of a large farmer. Hence his cost of cultivation is lesser than the small farmers even after paying the lease rentals. The large farmers are having the least cost of cultivation since they are enjoying the benefits of economies of scale in their operations. ANOVA test with Post hoc test are performed for comparing the costs of cultivation of different types of farmers. The group of tenant farmer is excluded from ANOVA since it has only one sample respondent.

Table 4.17 ANOVA of cost of cultivation: Farmer - wise

Sl. No	Type of farmers	Mean cost per ha	F	Significance at 5%
1	Marginal farmer	38648	18.89**	0.00
2	Small farmer	30914		
3	Large farmer	25860		

The result is significant at 0.05 level which implies that there is significant difference between the costs of cultivation of different types of farmers.

As there is significant difference between the costs of cultivation of farmer group, an attempt is made to analyse the significant difference between each group using Post hoc test. Table 4.18 shows the significance between each farmer group.

Table 4.18 Result of Post hoc test of cost of cultivation: Farmer wise

Sl. No.	Type of farmer	Marginal farmer	Small farmer	Large farmer
1	Marginal farmer	-	0.000	0.000
2	Small farmer	0.000	-	0.265
3	Large farmer	0.000	0.265	-

Significant difference is found between the cost of marginal farmers and small farmers and between marginal farmers and large farmers. There is no significant difference found between the cost of cultivation of small farmers and large farmers.

4.2.3.2 Net income from rice farming

Net income is the income from rice farming after meeting the entire cost of cultivation including the interest amount. Table 4.19 exhibits the net income or net loss per hectare of the sample respondents. Chi-square test was employed to

identify the relationship between the area or location, and net income of rice farmers.

Table 4.19 Net income of respondents from rice farming: Panchayat - wise

Sl. No	Net income/ ha (₹)	Pazhayannur	Adat	Mundathikode	Total
1	Net loss	14	00	00	14 (16)
2	Less than 25000	08	00	00	08 (09)
3	25000-50000	06	00	01	07 (08)
4	50000-75000	02	01	12	15 (17)
5	75000-100000	00	03	17	20 (22)
6	100000-125000	00	04	00	04 (04)
7	125000-150000	00	22	00	22 (24)
8	Average net income	2092	125430	77432	68318
9	Chi-square	98.357**			

Source: Compiled from sample survey
Note: Figures in parenthesis represents percentage of each to total

The chi-square statistic is significant at five per cent level, which implies that net income and area or location of cultivation are related. Table 4.19 reveals that net income per ha is the highest in Adat Panchayat and lowest in Pazhayannur Panchayat. Pazhayannur has the lowest productivity and highest cost of cultivation. (Tables 4.12 & 4.15). Hence their net income will also be the lowest. It is to be noted here that in Pazhayannur, out of 30 respondents, 14 farmers representing 47 per cent are facing loss from rice cultivation. Even though the Pazhayannur farmers are having high cost of cultivation, they are not ready to quit rice farming since they have been doing it for years and are highly dedicated to it. It is noteworthy here that in Pazhayannur, 43 per cent of the farmers belong to the age group of 65 years and above while it is only 27 per cent and 20 per cent in Adat and Mundathikode respectively (Table 4.6). Although almost all farmers are doing rice cultivation in two seasons in Pazhayannur, their production is lower than the other two panchayats. It is already revealed that cost of production is the highest in Pazhayannur, due to high labour charges for manual transplanting and expenses for overcoming high weed and pest attack (Table 4.15).

The net income of the farmers based on their land holdings or farmer category - wise is examined and chi-square test was used to analyse the relationship between net income and land holding size of the farmers.

Table 4.20 Net income from rice farming: Farmer category - wise

Sl. No	Net income/ ha (₹)	Tenant farmer	Marginal farmer	Small farmer	Large farmer	Total
1	Net loss	00	13	01	00	14 (16)
2	<25000	00	06	02	00	08 (09)
3	25000-50000	00	04	03	00	07 (08)
4	50000-75000	00	13	02	00	15 (17)
5	75000-100000	01	19	00	00	20 (22)
6	100000-125000	00	03	01	00	04 (04)
7	125000-150000	00	04	11	07	22 (24)
8	Total	01	62	20	07	90 (100)
9	Average (₹)	75092	53019	92038	135087	68318
10	Chi-square		52.820**			

Source: Compiled from sample survey
Note: Figures in parenthesis represents percentage of each to total

Table 4.20 reveals that marginal farmer category is having the lowest net income per ha. This reinstates the earlier finding that they are having the highest cost of cultivation (Table 4.16). Out of the marginal farmers, 21 per cent are facing net loss from the rice cultivation. Out of the 14 farmers having loss from rice cultivation in Pazhayannur, (Table 4.19), 13 belong to the category of marginal farmers. Hence it can be inferred that it is the marginal farmer category which is reducing the average net income of the farmers of Pazhayannur Panchayat. All the large farmers are in the highest income bracket of ₹ 125000 to ₹ 150000. Even the tenant farmer has leased 6.88 ha for cultivation and has net income of ₹ 75,092/- per ha. This implies that higher the land holding, higher will be the net income per ha.

Chi-square statistic is found significant at five per cent level which implies that landing holding size and net income of farmers are related. ANOVA test has

been performed to identify whether there is any significant difference between net income of each farmer category.

Table 4.21 ANOVA of net income of farmers: farmer category – wise

Sl. No	Type of farmers	Mean	F	Significance at 5 %
2	Marginal farmer	53019	7.714**	0.000
3	Small farmer	92038		
4	Large farmer	135087		

A significant difference in the net income of three types of farmers has been observed. Large farmers have the highest net income followed by small farmers and marginal farmers. As there is significant difference between the net incomes of farmer group, an attempt is made to identify the groups between which there is significant difference.

Table 4.22 Result of Post-hoc test for net income of farmers: Farmer wise

Sl. No	Type of farmer	Marginal farmer	Small farmer	Large farmer
1	Marginal farmer	-	0.008	0.000
2	Small farmer	0.008	-	0.208
3	Large farmer	0.000	0.208	-

Significant difference has been found between the net income of marginal farmers and small farmers and also between marginal farmers and large farmers. It implies that, as the size of land holding increases, the amount of net income will also be increased.

4.2.3.3 Marketable surplus of rice farmers

From the rice produced by farmers, to what extent they are supplying to the market for sale is being discussed in this section. Marketable surplus is the surplus available for sale after meeting self-requirement, seed requirements and spoilage. Unlike other crops, farmers do not sell their entire yield. Since rice is

the staple food of the people of Kerala, farmers used to keep certain quantity of their production for their own use and seed requirements. But in recent days, most of the farmers are not ready to retain their produce, because it involves lengthy processing procedures like boiling, drying, milling etc. Moreover, for seed requirements, they depend on notified / HYV seeds which are available from Krishi Bhavan. Table 4.23 depicts the share of marketable surplus to the total production per annum of the sample respondents.

Table 4.23 Share of marketable surplus to total production of rice: Panchayat - wise

Sl.No.	Marketable surplus to total production (%)	Pazhayannur	Adat	Mundathikode	Total
1	40-50	1	1	0	02 (02)
2	50-60	4	1	0	05 (06)
3	60-70	1	1	2	04 (04)
4	70-80	5	0	3	08 (09)
5	80-90	7	4	11	22 (24)
6	90-100	4	3	1	08 (09)
7	100	8	20	13	41 (46)
8	Average (%)	85	96	92	88

Source: Compiled from sample survey
Note: Figures in parenthesis represents percentage of each to total

Table 4.23 reveals that nearly half of the respondents (46%) of all the three panchayats together are having cent per cent of their total production as marketable surplus. In Adat Panchayat alone 67 per cent of the respondents have 100 per cent of their production as marketable surplus. It is to be noted here that large farmers are available only in the Adat Panchayat (Table 4.9). The higher the presence of large farmers, higher will be the marketable surplus of the farmers of the area. Compared to Adat Panchayat, farmers of Pazhayannur and Mundathikode Panchayats are retaining more of their produce for meeting own requirements, as is revealed from the lower share of marketable surplus. Since farmers are getting higher price than the open market price, from SUPPLYCO, the farmers of Adat Panchayt who have larger production are more interested to

supply their produce to SUPPLYCO rather than retaining for personal use, which has resulted in the highest marketable surplus for them. They will purchase rice from open market for their personal use, so that they can reduce the effort and time of processing the paddy.

4.2.4 Impact of institutional interventions for promotion of rice farming

The second objective of the study is to analyse the impact of developmental schemes of various institutions on the net income of the farmers. Although there are innumerable schemes and developmental programmes of governmental and non governmental agencies for promotion of rice farming in Kerala, as already discussed (Para 4.1), the schemes and programmes actually enjoyed by the farmers are limited in number. In this section an attempt is made to examine the developmental schemes and programmes implemented among the rice farmers of the three panchayats selected for the study and the impact of these interventions on rice production and income of farmers. Based on the available and ongoing institutional interventions in the study area, this section is further subdivided as follows:

4.2.4.1 Impact of interventions of Department of Agriculture on rice production
4.2.4.2 Impact of interventions of credit institutions on rice production
4.2.4.3 Impact of institutional interventions on marketing of paddy

4.2.4.1 Impact of interventions of Department of Agriculture on rice production

Department of Agriculture is the nodal agency for implementing rice development programmes of the Government in the State. The Department is assisting the farmers through various schemes and mainly in the form of seeds, fertiliser subsidies and cash subsidies. The major ongoing schemes of Agriculture Department in Kerala are RKVY, SDR, Production bonus, and assistance for

bringing fallow land cultivation. Rice development schemes are not implemented separately but they are executed in a combined manner. For example HYV seeds will be distributed to the farmers and its amount will be adjusted in both RKVY and SDR funds. Table 4.24 exhibits the details of respondents who have availed the assistance of Agriculture Department for rice farming.

Table 4.24 Assistance for rice farming from Department of Agriculture: Panchayat wise

Sl. No.	Panchayat	RKVY	SDR	Production bonus	Fallow land cultivation
1	Pazhayannur	30	30	30	00
2	Adat	30	30	30	00
3	Mundathikode	30	30	30	01
4	Total	90	90	90	01

Source: Compiled from sample survey

Table 4.24 reveals that all the respondent farmers including the tenant farmer are availing the assistance from Agriculture Department under all the ongoing schemes, viz., RKVY, SDR and production bonus. For availing the subsidy, the tenant farmer should produce a lease agreement and an authorisation certificate from the owner of the land. The subsidy amount will be credited to the bank account of the farmer. The assistance for fallow land cultivation is availed only by one farmer who is a tenant farmer.

The pattern of assistance of Agriculture Department through RKVY, SDR and production bonus is mainly in the form of cash, kind and other forms. Kind and other components include seeds, fertilisers, organic manures, information on scientific management practices and Transfer of Technology (ToT) through training programmes. Krishi Bhavan is the nodal implementing agency for the distribution of assistance to farmers. The seed component of the assistance is 32kg per acre of HYV. The amount spent on seed component will be deducted from the cash components of RKVY and SDR funds by the Krishi Bhavan and the balance

amount only will be credited to the bank accounts of the farmers. The details of assistance availed by the respondent farmers are depicted in Table 4.25.

Table 4.25 Pattern of assistance from Department of Agriculture: Panchayat - wise

Sl. No.	Panchayat	Seeds	Fertiliser	Information	Training
1	Pazhayannur	30	30	12	27
2	Adat	30	30	11	19
3	Mundathikode	30	30	30	30
4	Total	90 (100)	90 (100)	53 (58)	76 (84)

Source: Compiled from sample survey
Note: Figures in parenthesis represent percentage of each to total

All the respondent farmers are availing assistance in the form of seeds and fertilisers. Fifty eight per cent of the respondents are getting information on improved management practices from the Agriculture Department and 84 per cent of the respondents are getting training on scientific management practices, control of pests and diseases etc. from Krishi Bhavan. Some farmers are not availing the benefits of ToT, due to their inconvenience in attending the training programme, and lack of time and interest. In Mundathikode Panchayat all the farmer respondents are availing improved scientific management information and training from Krishi Bhavan through ToT. This indicates the efficient extension activities of the Mundathikode Krishi Bhavan. In Pazhayannur Panchayat also Krishi Bhavan is playing an important role in ToT to the field. The extent and efficiency of the ToT programmes depend on the interest and efficiency of the concerned Agricultural Officer and the participation of the farmers. In the Adat Panchayat, farmers are more self-sufficient and as such they are not very much interested in the ToT programmes.

Even though farmers are receiving these subsidies from the Department, it is complained that they are not receiving the subsidy amount in time. But supply of HYV seeds is very helpful to the farmers for increasing production. The

notified HYV seeds supplied in the study area include Uma, Jyothi, Kanchana and Mattatriveni.

In order to examine the impact of the seed component of interventions of Department of Agriculture on the promotion of rice farming, the production of rice before and after the implementation of the intervention is examined. Table 4.26 exhibits the varieties used before and after the introduction of the seed component of supplying subsidised HYV seeds.

Table 4.26 Varieties of seeds used before and after the Seed Subsidy: Panchayat - wise

Sl. No.	Varieties before the Scheme	Varieties after the Scheme	Panchayat/ No. of farmers							
			Pazhayannur		Adat		Mundathikode		Total	
			Before	After	Before	After	Before	After	Before	After
1	Chenkazhama	Mattatriveni	07	02	00	00	00	00	07	02
2	IR 8	Jyothi	23	00	00	18	00	18	23	36
3	Ponmani	Kanchana	00	12	00	00	19	01	19	13
4	Cheera	Kunjukunju (Varna)	00	04	00	00	05	00	05	04
5	Aiswarya	Uma	00	12	00	12	04	11	04	35
6	Thavalakanan		00	-	00	-	02	-	02	-
7	Culture 28		00	-	10	-	00	-	10	-
8	Poojyam 10		00	-	09	-	00	-	09	-
9	Triveni		00	-	11	-	00	-	11	-
10	Total		30	30	30	30	30	30	90	90

Source: Compiled from sample survey

Table 4.26 reveals that the farmers were using number of local varieties of seeds before the supply of subsidised HYV seeds to the rice farmers. The seed varieties differed from area to area. There was no uniformity in the varieties used by the farmers. But after the introduction of seed subsidy, almost all farmers are using notified varieties like Jyothi, Uma and Kanchana in a particular area, as a result of which they are able to do cultivation on group farming basis.

In order to examine the impact of the seed component, the production per acre before and after the intervention has been found out using Paired t- test (Dependent Sample t-test), the result of which is given in Table 4.27.

Table 4.27 Change in mean productivity of rice before and after the introduction of seed subsidy using Paired t- test.

Sl. No.	Variable	Mean	t statistic
1	Before seed supply	1901.44	-9.572**
2	After seed supply	2425.53	

The't' statistic is significant at five per cent level which implies that there is significant difference between production before and after the seed subsidy. It is evident that, productivity has increased after the seed supply. Hence the intervention of the Department of Agriculture by way of supply of notified HYV seeds with subsidy has significant impact on the total production and productivity of rice farmers and thereby on their income in the study area.

The objectives of interventions of various institutions are to enhance the production through various kinds of assistance. Production is a function of 'n' number of inputs such as land, labour, seed, fertiliser, pesticides etc. So if the assistance given by the institutions influences these inputs, one can say that the particular assistance has impact on the production of rice farmers. Cobb-Douglas production function has been employed to analyse the input-output relationship of rice production. The dependent variable of the model is production (₹) and the independent variables are seeds (₹), fertiliser (₹), labour (₹) and plant protection

materials (₹). Since there is a problem of multi co-linearity existing between land area and seeds, the land area is excluded in the model. The general form of Cobb-Douglas production function is as follows:

$$Y = A X_1^{b1} + X_2^{b2} + X_3^{b3} + X_4^{b4} \quad \ldots\ldots (1)$$

Where A = constant, X_1 = Seeds (in ₹) , X_2 = Labour (in ₹), X_3 = Fertiliser (in ₹), X_4 = Plant protection materials (in ₹) and Y = Production (in₹)

The Function can be estimated in logarithmic form as follows:

$$\text{Log } Y = \log A + b_1 X_1 + b_2 \log X_2 + b_3 \log X_3 + b_4 \log X_4 \ldots\ldots (2)$$

Table 4.28 Result of Cobb-Douglas production function for input-output relationship of rice production

Sl. No.	Variables	Coefficient (B)	t- statistic
1	A (constant)	1.834**	2.261
2	X_1 (Seeds)	0.772**	2.929
3	X_2 (Labour)	1.768**	5.479
4	X_3 (Fertiliser)	0.366 N.A	1.489
5	X_4 (Plant protection)	-1.968**	-7.446

$R^2 = 0.963$, Adjusted $R^2 = 0.927$

Cob-Douglas production function will be:

$$Y = \log 1.834 + 0.772 \log X_1 + 1.768 \log X_2 + 0.366 \log X_3 - 1.968 \log X_4$$

The adjusted R^2 of 0.927 indicates that 92 per cent of the production is explained by the inputs such as seeds, labour, fertiliser and plant protection materials. Seeds and labour significantly affect the production at one per cent and five per cent level of significance. It can be inferred that one rupee increase in labour leads to ₹ 1.77 increase in the production and one rupee increase in seeds will lead to 77 paisa increase in the production. One rupee change in plant

protection materials will lead ₹ 1.97 decrease in the production of rice. This is because, there is high heterogeneity in the application pattern of plant protection materials like, insecticides, herbicides, weedicides etc. by each farmer. In Pazhayannur Panchayat, weed problem is higher than other two panchayats. So there will be high rate of application of herbicides and pesticides while it is lower in the other two panchayats. Even though fertiliser is positively related to the output, it is not significant. This is because of the uniformity in fertiliser application, i.e., all farmers are using the fertiliser as recommended by the Agriculture Department.

It is inferred from the analysis that subsidies given for seeds and labour will have positive impact on the production of rice farmers. Hence the intervention of the Department of Agriculture by way of supply of subsidised seeds have an impact on the production and thereby income of the rice farmers.

4.2.4.2 Impact of interventions of credit institutions on rice production

Timely credit is an inevitable element in the production process and it helps the farmer to conduct agricultural operations in time in the absence of owned funds. There are both institutional and non institutional agencies engaged in the provision of agricultural credit. The major institutional credit agencies are public sector banks, private sector banks, RRBs and cooperative banks. In the study area, public sector banks and cooperative banks are the major agencies which provide financial support to the rice farmers. There are also farmers who are taking credit from non institutional agencies like money lenders.

Public sector banks and cooperative banks are providing agricultural credit either in the form of KCC or agricultural gold loan. Public sector banks are providing agricultural gold loan at subsidised interest rate. Both these loans of public sector banks are eligible for interest subvention scheme of the Central Government. Presently State Bank of Travancore, Bank of India and Canara Bank are the major banks which provide agricultural gold loans in the study area. Table 4.29 shows the various sources of credit availed by the sample respondents.

Since the same farmers are availing credit from different sources, the total of the respondents availing credit and not availing credit will be more than the actual number of respondents.

Table 4.29 Sources of credit to respondents for rice farming: Panchayat - wise

Sl. No.	Panchayat	Not availed	Public sector banks	Cooperative banks	Private agencies
1	Pazhayannur	14	08	06	07
2	Adat	00	07	30	00
3	Muundathikode	10	12	04	05
4	Total	24	27	40	12

Source: Compiled from sample survey

Table 4.29 reveals that 24 out of 90 respondents constituting 27 per cent are not having any loans or credit. Out of 66 respondents availing loans, 12, constituting 18 per cent are borrowing from private agencies like money lenders. It proves that non institutional sources are still prevalent among farmers. In Adat panchayat, all the farmers are accessing credit from the cooperative bank of the area, viz, Adat Farmers Service Cooperative Bank. It is also to be noted that none of the respondent farmers in Adat Panchayat have availed loans from non – institutional sources, and all of them have availed from institutional sources, which shows the efficient intervention of the Bank with respect to credit. It is the only panchayat among the selected panchayats which has cent percent respondents coming under the purview of institutional sources of credit for paddy farming. Adat Bank will sanction a KCC for all rice farmers for one year while starting the cultivation at the rate of ₹ 10000 per acre subject to a maximum limit of ₹ 25000 per farmer. The loan amount will not be given directly to the farmer, but can be used by the farmer like a revolving fund without any interest. The farmer can purchase fertilisers, herbicides, insecticides and other inputs from the Depot of the Bank. After harvesting, the Bank will take the marketable surplus of the farmers and it will be given to SUPPLYCO. From the cash realised from sales proceeds, the loan amount and commission of one percent of sale proceeds will be

deducted by the Bank and the balance amount disbursed to the farmer. The farmers are able to get easy finance without interest and can undertake timely cultural operations due to the efficient intervention of Adat Service Co-operative Bank.

But in Pazhayannur and Mundathikode panchayats the picture is entirely different with farmers depending on non – institutional sources along with institutional sources. In Pazhayannur and Mundathikode panchayats, 47 and 33 per cent of the respondents respectively, have not availed any credit – institutional or non institutional. Moreover, out of those who availed loans, 44 per cent in Pazhayannur and 25 per cent in Mundathikode are depending on money lenders also. In both these areas, cooperative banks are not providing KCC advance to the respondent farmers and they are giving agricultural loans at 12 per cent interest rate, for which there is no interest subsidy. Availing credit is considered as a burden by some of the farmers. Reluctance to approach institutional agencies is yet another factor dissuading the farmer from availing credit. While interest subsidy is the prominent motivating factor for farmers for availing loans from institutional sources, it is timely and easy accessibility of credit for preferring non institutional agencies.

This section on impact of interventions of credit institutions on rice production encompasses extent of institutional credit to agriculture, details of Interest Subvention Scheme, criteria for selection of source of credit by farmer respondents and impact of institutional credit on rice production using Cobb-Douglas Production Function.

(i) Extent of institutional credit to agriculture

As already seen, the major institutional sources of agricultural credit in the study area are commercial banks and cooperative banks. The extent of credit availed by farmers from the two institutional agencies in the three panchayats is discussed in this section. The quantum and share of credit to farmers by various agencies in the three panchayats are shown in Table 4.30. The average amount of

credit given per farmer in each panchayat is also given in the Table. Since the farmers are availing credit from different sources, average credit has been calculated by considering total number of farmers who availed credit, i.e., if the farmer has taken loans from both commercial and cooperative banks, he/she is counted twice while taking the total number of farmers who availed institutional credit.

Table 4.30 Institutional credit to rice farmers: Source - wise

Sl. No.	Panchayat	Cooperative banks		Public sector banks		Total	
		Amount (in ₹)	No. of farmers	Amount (in ₹)	No. of farmers	Amount (in ₹)	No. of farmers
1	Pazhayannur	500000 (35.46) [83333]	06	910000 (64.54) [113750]	08	1410000 (100) [100714]	14
2	Adat	595000 (51.74) [19833]	30	550000 (48.26) [78571]	07	1145000 (100) [30945]	37
3	Mundathikode	80000 (21.28) [20000]	04	296000 (78.72) [24667]	12	376000 (100) [23500]	16
4	Total average credit	29375	40	65037	27	43746	67

Source: Compiled from primary data
Note: (i) Figures in simple brackets represent percentage share of each to total
(ii) Figures in square brackets represent average credit per farmer given to each farmer in the panchayat

As far as the total quantum of credit is concerned, the highest amount is disbursed by co-operative banks in Adat Panchayat, and by public sector banks in Pazhayannur Panchayat. But the average credit per borrower is the highest in Pazhayannur Panchayat in the case of both co-operative banks and public sector banks. The disbursement of credit by co-operative banks is the highest in the Adat Panchayat since all the respondents have availed loans from Adat Service Co-operative Bank. But the average credit per farmer is the lowest

since the Bank gives agriculture loans under the KCC in which the maximum amount is only ₹ 25,000. The dependence on public sector banks for credit is the lowest in the case of Adat Panchayat, where, only seven out of 30 respondents have availed loans from commercial banks. It is the farmers who have higher landholdings who have availed loans from public sector banks in addition to what is obtained from Adat Co-operative Bank. The average credit per farmer is higher for public sector banks in all the three Panchayats resulting in the highest total average credit of all panchayats together at ₹ 65037/-. The maximum loan amount under this Scheme is ₹ 3 lakhs. So naturally the average credit per borrower will be higher than cooperative banks. The benefit of interest subvention scheme available in public sector banks, is attracting more farmers to this institutional source in recent days.

(ii) Interest subvention scheme

As per the interest subvention or interest subsidy scheme of the Central Government, farmers are eligible to get two per cent interest subvention and one per cent additional interest subvention for prompt repayment in the case of agricultural loans. The rate of interest of the loans under this Scheme is at present seven per cent, of which three per cent interest will be given by the Government and the farmer needs to pay only four per cent interest if the loan is repaid in time. This benefit will be available only if the farmer makes prompt repayment of the loan. If prompt repayment is not made, the rate of interest subsidy will be only two per cent. Table 4.31 presents the details of subsidy amount received by the respondent farmers.

Table 4.31 Receipt of interest subsidies by farmers from institutions: Panchayat -wise

Sl. No.	Subsidy class (Amount in ₹)	Pazhayannur		Adat		Mundathikode		Total	
		Public sector banks	Co-op banks	Public sector banks	Co-op banks	Public sector banks	Co-op banks	Public sector banks	Co-op banks
1	Not availed	00	06	00	00	00	04	00	10
2	< 1000	00	00	00	09	11	00	11	09
3	1000-2000	02	00	02	21	01	00	05	21
4	2000-3000	00	00	02	00	00	00	02	00
5	3000-4000	04	00	03	00	00	00	07	00
6	6000-7000	02	00	00	00	00	00	02	00
7	Total	08	06	07	30	12	04	27	40
8	Average subsidy (in ₹)	927	00	555	1750	296	00	593	1750

Source: Compiled from sample survey

All the respondents who have availed loans from public sector banks are getting the benefit of Interest Subvention Scheme. But with regard to the cooperative bank, only farmers in Adat Panchayat are getting the benefit of subvention scheme. The co-operative banks of Mundathikode and Pazhayannur panchayats are not providing KCC and the farmers are taking loans at 12 per cent interest rate, without any interest subsidy. It is noteworthy that even though the average credit is the highest for public sector banks (Table 4.30), the average subsidy amount is the highest for co-operative banks, the credit of which goes to Adat Service Co-operative Bank alone since the co-operative banks in the other two panchayats have not given any subsidised loans. This also implies that the farmers of Adat Panchayat who are borrowing from Adat Service Co-operative Bank are utilising the benefit of interest subsidy to the maximum extent. The case of default is completely eliminated since the Bank links credit with the marketing of the rice produced. Thus the efficient intervention of Adat Service Co-operative Bank with respect to extending the benefit of subsidy to its farmers is underlined here.

(iii) Criteria for selection of source of credit

The factors which motivate a farmer for selecting his or her source of credit will help the lending institution to make any changes if needed, within the framework set to them so as improve the efficiency of their interventions. The reasons for selecting their source of finance, whether institutional or non – institutional, have been identified from the respondents and presented in Table 4.32. Since the same farmer respondent has various reasons for selecting the source of credit, the response of the farmers for each category has been divided by the total number of farmers who availed credit from the concerned institution.

Table 4.32 Criteria for selection of source of credit: Institution - wise

Sl. No.	Criteria	Commercial banks	Cooperative banks	Private agencies
1	Timely credit	15 (56)	32 (80)	10 (83)
2	Easy accessibility	00	10 (25)	06 (50)
3	Low rate of interest	27 (100)	33 (83)	00
4	Availability of subsidies	27 (100)	30 (75)	00

Source: Compiled from sample survey
Note: Figures in parenthesis represent percentage share of each criterion to total number of farmers who availed credit from the concerned institutions

The farmers have identified four main reasons for selecting their source of credit, viz, timely credit, easy accessibility of credit, low rate of interest and availability of subsidies. Of these, low rate of interest followed by availability of subsidies are the primary reasons for selecting the commercial banks by the farmers. Both these criteria are related, since due to the availability of subsidies only, the rate of interest is becoming low. All the respondents who have availed loans from commercial banks are supporting the criteria of low rate of interest and availability of subsidies. It is to be noted that easy accessibility is not at all a criteria for selecting commercial banks, which is to be considered by commercial banks for making their interventions more effective. As far as co-operatives are considered, low rate of interest and timely credit are the favourable factors. Out of the 33 respondents who consider low rate of interest as their first preference for opting for co-operative banks, 30 belong to Adat Service Co-operative Bank. Only 30 respondents have opted for availability of subsidies, all of whom belong to Adat Service Co-operative Bank. The position of co-operative banks is better compared to commercial banks, with respect to timely credit. The farmers approach private agencies for their financial needs, only because of timely credit and easy accessibility.

(iv) Impact of institutional credit on rice production

Credit, as already seen, is an inevitable element in production. If the farmer does not have own fund for doing cultivation, timely availability of credit is essential for him/her for carrying on agricultural operations. Generally the credit availed by farmers are used for purchasing inputs, payment of wages and other agricultural operations. In this section, the impact of institutional credit are analysed from two angles – firstly, on the basis of the benefits derived by the rice farmers from the credit availed, using indicator approach, and secondly, the impact of institutional credit on rice production using Cobb – Douglas Production Model.

For analysing the benefits from the credit availed, the probable indicators have been identified first. The variables identified are increase in rice production, repayment of existing debt, and purchase/ construction of assets, after which the extent of benefit has been found using the opinion of the respondents on these indicators. The same farmer might have got more than one benefit and hence the number of responses will be higher than the number of respondents. Moreover, public sector banks have provided less number of loans, with higher amounts, while co-operative banks have given higher number of loans with lesser limits. Hence the percentage share of each benefit has been found out based on the number of responses for a particular benefit to the total number of respondents who have availed benefit from both the institutions together. The results are depicted in Table 4.33.

Table 4.33 Benefits of farmers from institutional credit availed: Source - wise

Sl. No.	Benefits	Public sector banks	Co-operative banks	Total no. of responses
1	Increase in production	12	16	28 (42)
2	Repayment of existing debt	15	24	39 (59)
3	Purchase of assets	03	00	03 (05)

Source: Compiled from primary data
Note: Figures in parenthesis represent percentage share of total responses to total number of institutional credit respondents

Table 4.33 reveals that out of total number of respondents who availed institutional credit, 42 per cent farmers have increased rice production. It has helped 59 per cent of respondents in repaying their existing credit and five per cent in purchasing/ constructing assets for rice farming like, sprayers, tube wells etc. with the help of institutional credit. In the opinion of farmers, if they had not availed credit, they would not have been able to do rice cultivation. All the respondents who have availed credit has benefited in at least one of the above methods.

In order to analyse the impact of credit on rice production, Cobb-Douglas production function has been used. Total production (₹) is the independent variable and GCA (ha) and total credit availed (₹) are taken as the independent variables.

The function is estimated in logarithmic form as follows:

$\text{Log } Y = \log A + b_1 X_1 + b_2 \log X_2$

Where, Y = total production (in ₹), X_1 = Gross Cropped Area, and X_2 = Total credit availed (₹). The results are depicted in Table 4.34.

Table 4.34 Results of Cobb – Douglas production function for production and credit

Sl. No.	Variables	Coefficient (B)	T statistic
1	A (constant)	7.279**	9.774
2	X_1 (GCA)	0.809**	4.627
3	X_2 (Credit availed)	0.337**	12.997

$R^2 = 0.907$ and Adjusted $R^2 = 0.904$

The Cobb - Douglas production function will be:

$Y = \log 7.28 + 0.81 \log X_1 + 0.34 \log X_2$

The adjusted R^2 is 0.90 which indicates that 90 per cent of variation in production can be explained by GCA and total credit availed. It has been found that both the variables are significant at one per cent significant level and are

positively related to output. From the production function, it can be inferred that an investment of ₹ 100 in GCA, will lead to an increase in production by ₹ 81. In case of credit availed, a credit of ₹ 100 can increase the production by ₹ 34. So, it can be concluded that institutional credits have significant impact on the production and income of rice farmers.

4.2.4.3 Impact of institutional interventions on marketing of paddy

Marketing is a very significant process in rice farming like production. If the farmer does not get reasonable price for his produce, he may not be able to cover the cost of production and earn a reasonable income. Prior to the introduction of the present procurement policy of SUPPLYCO, rice farmers were forced to make distress sales in the absence of a reasonable market price. But the situation has changed to some extent as a result of government intervention. State government policies on prices and procurement have helped rice farmers to receive steady prices. The procurement policy of SUPPLYCO is a major intervention done by the Kerala Government to stabilise the price of paddy. The SUPPLYCO will procure paddy from the farmers at the MSP declared by the Government. SUPPLYCO will authorise private millers to procure paddy from the fields of the farmers, process it and supply to the SUPPLYCO. There is a maximum limit fixed by SUPPLYCO for the quantity of paddy that can be procured by a single miller. The quantity of rice to be supplied based on the quantity of paddy procured by the suppliers is fixed by the SUPPLYCO beforehand, for which commission is given by SUPPLYCO to the private millers. The farmers will be issued a receipt by the private millers specifying the name of miller, rice variety, quantity procured, and other details of the farmer. Based on the receipt of paddy issued by the millers, SUPPLYCO transfers money to the farmer's bank account. For the respondents of the study, Bank of India has been identified as the banker in all the three panchayats. The transfer of cash by SUPPLYCO to the farmers' account will take an average period of one month. Some of the farmers are selling their produce to private agencies directly.

Table 4.35 displays the agencies to which the sample respondents are selling their produce. Chi square test was also done to see if there is any relationship between procurement agency and the area from where paddy is produced.

Table 4.35 Procurement agency for rice: Panchayat - wise

Sl. No	Agency	Pazhayannur	Adat	Mundathikode	Total
1	Private agencies	09	00	05	14 (16)
2	SUPPLYCO	21	30	25	76 (84)
3	Total	30	30	30	90
	Chi-square	200.639**			

Source: Compiled from sample survey

Note: Figures in parenthesis represents percentage of each to total respondents

Table 4.35 shows that 84 per cent of the sample respondents are selling their produce to SUPPLYCO while 16 per cent are selling to private agencies. Adat Service Co-operative Bank is having efficient intervention in marketing also by procuring the paddy from the farmer's field and providing to SUPPLYCO directly without any intermediary. Hence the farmer need not worry about the transportation, procurement time and procedures. As a result, the entire rice farmers in the Adat panchayat are selling their marketable surplus to SUPPLYCO through Adat Service Co-operative Bank. It is already seen that farmers of Adat Panchayat has the highest marketable surplus and 67 per cent of the farmers have 100 per cent of their production as marketable surplus. (Table 4.23). Hence the factors motivating the farmers to supply their entire produce or their marketable surplus to SUPPLYCO is substantiated here. As evident from the Table above, some of the farmers of Pazhayannur and Mundathikode are depending on private agencies for selling their produce. When SUPPLYCO procures paddy at MSP, other private agencies procure at open market rate, which is usually less than the

MSP. The procurement policy of SUPPLYCO helps the farmer not only to get reasonable price but also to maintain a stable market price in the open market.

The result of chi-square test is significant at one per cent significance level. The result indicates that supply agency of the farmers is dependent on the area where rice cultivation is done. Since Adat Service Co-operative Bank has linkage with SUPPLYCO, all the farmers in Adat are supplying to SUPPLYCO, while in Pazhayannur and Mundathikode, farmers are also supplying their produces to private agencies.

After the identification of the procurement agency, the reasons for selecting the agency, relation between type of farmers and procurement agency, procurement price of different agencies, and finally the impact of interventions of the procurement policy of the Kerala State Government through SUPPLYCO are discussed in this section.

(i) Determinants of selection of procurement agency

One of the major concerns of a farmer while selecting the marketing agency is naturally, better price. On the basis of the discussion with farmers, it was possible to identify the main factors behind the decision of the procurement agency. As already seen, in the study area, SUPPLYCO and private parties are the major procurement agencies of rice. Table 4.36 explains the reasons why the farmer selected a particular agency for selling his produce.

Table 4.36 Determinants of selection of the procurement agency

Sl. No.	Determinants	SUPPLYCO	Private agencies
1	Better price	76	00
2	Speedy procurement	00	07
3	No procedural formalities	00	04
4	Easy realisation of cash	00	13

Source: Compiled from sample survey

As depicted in Table 4.36, farmers are selecting the procurement agency based on number of reasons such as reasonable price, speedy procurement, easy procedural formalities and easy realisation of cash. Out of 90 respondent farmers, 76 sell their paddy to SUPPLYCO. Better price is the only determinant for selecting SUPPLYCO as their procurement agency. SUPPLYCO is procuring the paddy at the present MSP of ₹ 19/kg. But procedural formalities are high in SUPPLYCO. Application for procurement should be given before starting the cultivation and realisation of cash will be delayed for some days, sometimes two weeks, or one month or even more sometimes. But the period taken for crediting the amount to the farmers' account through the DBT system has drastically reduced in the recent days.

Speedy procurement, lack of procedural formalities and easy realisation of cash are the determinants of selecting private agencies which are all related. SUPPLYCO will permit only 17 per cent moisture content in the paddy inorder to make it eligible for procurement. Having moisture content above this level fixed by SUPPLYCO will cause delay in procurement by SUPPLYCO but not in the case of private traders. SUPPLYCO will ask the farmer to dry and bring the moisture content to 17 per cent to make procurement. This will naturally cause delay in procurement of paddy which leads to the farmers approaching private agencies.

In Pazhayannur Panchayat, the moisture content is high in the yield of Virippu season. As a result SUPPLYCO will procure paddy only if the farmers dry and bring the moisture content to 17 per cent as prescribed by them which will cause delay in procurement and realisation of cash by the farmers. It is already seen that, of those availing credit for rice farming, 18 percent borrow from private agencies like money lenders. This is 44 per cent and 25 per cent in Pazhayannur and Mundathikode respectively (Table 4.29). These farmers have to pay higher interest rate compared to those who have availed institutional credit. So if the realization of cash is delayed, they will not be in a position to repay their loans in time. As a result they will sell the produce to private parties immediately after the harvest for whom moisture content is not a problem, but provide lower prices.

Those farmers who have speedy procurement, no procedural delays and easy realisation of cash as their determinants for selecting their procurement agency are all belonging to this category of farmers who have taken loans from money lenders. These farmers are selling their produce to private parties. They are even making distress sales. It is one of the important reasons for the farmers in Pazhayannur Panchayat running into net loss from rice farming (Table 4.19)

(ii) Type of farmers and procurement agency

This section is earmarked for finding out the choice of procurement agency by farmers based on farmer – category. Table 4.37 shows the distribution of respondents based on farmer category along with their option for procurement agency. Chi square test is also employed to examine whether there is any relationship between the category of farmer and supply agency.

Table 4.37 Option for procurement agency: Farmer wise

Sl. No.	Procurement agency	Tenant farmer	Marginal farmer	Small farmer	Large farmer	Total
1	SUPPLYCO	01	48	20	07	76
2	Private agencies	00	14	00	00	14
3	Total	01	61	08	20	90
4	**Chi-Square**	**7.487****				

Source: Compiled from sample survey

It can be observed from Table 4.37 that only marginal farmers (15 per cent) are selling their produce to private agencies. All others are selling their paddy to SUPPLYCO. The chi-square statistic is significant at one per cent level, and the result implies that the farmer class and supply agency are related. The farmers who have high production are interested to sell their produce to SUPPLYCO, because a small difference in the price will create large variation in the amount of sales. The marginal farmers who have a lower level of production are not much bothered about the marginal differences in the price. Hence they

prefer to sell their produce at a lower open market price rather than undertaking the troubles and procedural formalities of supplying to SUPPLYCO. It is to be noted here that all the marginal farmers of Adat Panchayat are selling their produce to SUPPLYCO. The intervention of the Adat Panchayat is once again reinstated here.

Many of the marginal farmers are mainly depending on non institutional money lenders for their finance. So they have to repay the credit immediately after the sales. The realisation of cash proceeds from SUPPLYCO is not immediate. The farmers who have taken loan from money lenders will not be in a position to repay the credit within the prescribed period. Hence these farmers are forced to sell their produce to private agencies at a lower price for quick realisation of cash, even if they are making distress sales. It has already been seen that marginal farmers of Pazhayannur are facing net loss from rice farming (Table 4.20), and this distress sale is the major reason for the loss incurred by the marginal farmers. If there had been proper institutional intervention of credit agencies in Pazhayannur Panchayat, as in the case of Adt Panchayat, the problems of marginal farmers would have been solved to a large extent.

(iii) Procurement price of paddy

As already seen, SUPPLYCO and open market are the two procurement agencies of paddy in the study area. The private millers who procure from the farmers, for and on behalf of SUPPLYCO, will also procure at the open market price from the farmers. The SUPPLYCO is procuring rice at the MSP and the open market price will be less than the MSP. Table 4.38 indicates the price provided by these agencies for paddy during the three years, 2010-11 to 2013-14.

Table 4.38 Procurement price of different agencies

Sl. No	Panchayat	Procurement price of SUPPLYCO (in ₹/k.g.)			Procurement price of Private agencies (In ₹ /k.g.)		
		2010-11	2012-13	2013-14	2010-11	2011-12	2013-14
1	Pazhayannur	17	18-19	19	12-13.5	14-15	15-16.5
2	Adat	17	18-19	19	12-14	14-15.5	16-17
3	Mundathikode	17	18-19	19	12-14	14-15	15-17

Source: Compiled from Primary Survey

The procurement price of SUPPLYCO is the MSP and private agencies are procuring at open market price. The open market price is always lower than the price offered by SUPPLYCO. But it is seen that the open market price is increasing or moving along with the MSP. Hence it can be inferred that the MSP is a pillar which helps to maintain the market price stable. The existence of procurement policy of SUPPLYCO will help to ensure a reasonable market price in the open market.

(iv) Impact of intervention of SUPPLYCO on income of rice farmers

The intervention of the Kerala State Government through the Paddy Procurement Scheme of SUPPLYCO is a major step for the promotion of rice farming. Although it is proved that the Scheme is helping the farmers to fetch a better price and income from rice farming, it is attempted here to substantiate it statistically by employing Mann Whitney U test. For this, farmers are classified into two groups, farmers who are marketing to SUPPLYCO and those who are not marketing to SUPPLYCO but to private agencies, and then the means of gross income of these two groups are compared. The result of Mann-Whitney U test is presented in Table 4.39.

Table 4.39 Mann-Whitney U test for SUPPLYCO and private agencies

Sl. No.	Variables	N	Gross income	
			Mean rank	Sum of ranks
1	SUPPLYCO	77	50.12	3859.50
2	Private agencies	13	18.12	235.50
3	Mann-Whitney U	144.50**		
4	Wilcoxen W	235.50**		
5	Asymp. Sig. (2-tailed)	0.00		

The results of Mann-Whitney U test indicate that there is significant difference between gross income of farmers who are supplying their produces to SUPPLYCO and that of supplying to private agencies. Farmers who are supplying to SUPPLYCO have higher income than farmers who are supplying to private agencies. Thomas (2011) in his study on "Paddy Cultivation in Kerala" has also found that farmers in Palakkad district have benefited greatly from the procurement of paddy by SUPPLYCO. Hence it is proved beyond doubt that the intervention of the Kerala State Government through the Procurement Policy of SUPPLYCO has significant impact on the income of rice farmers.

It can be concluded that the major institutions intervening in the promotion of rice farming in Thrissur District are the Department of Agriculture, commercial banks, co- operative banks and SUPPLYCO. It has been found that the schemes of the Department of Agriculture, viz. RKVY and SDR have significant impact on the production of farmers in the three study areas. Commercial banks and cooperative banks are successful in providing financial support to the farmers and their credit has impact on the production and income of the rice farmers. The procurement policy of SUPPLYCO has an important role which helps the farmer to get a reasonable price for their produce and also in stabilizing the market price of rice in the open market.

4.3 Constraints of rice farmers

The third and last objective of the study is to analyse the constraints faced by the rice farmers so as to enable measures for promotion of rice farming. The constraints and problems pointed out by the farmers have been grouped and presented under four main heads, viz, production constraints, financial constraints, marketing constraints and institutional constraints. Percentage analysis has been adopted to examine the gravity of these constraints to the farmers. The classification of the constraints together with the specific problems of the farmers of the three panchayats under each of these categories is depicted in Table 4.40.

Table 4.40 Constraints of rice farmers in Thrissur district: Panchayat - wise

Sl. No.	Constraints	Pazhayannur	Adat	Mundathikode	Total
1	**Production constraints**				
a)	Labour problems	30	30	30	90 (100)
b)	Pests and diseases	30	30	30	90 (100)
c)	Weed problems	30	19	25	74 (82)
d)	Attack of wild animals	25	12	28	65(72)
e)	High cost of inputs	25	10	20	55 (61)
2.	**Financial constraints**				
a)	High procedural formalities	17	05	06	31 (34)
b)	Lack of availability of timely credit	07	00	05	12 (13)
c)	Lack of easy accessibility to credit	04	02	02	08 (09)

3.	**Marketing constraints**				
a)	Lack of remunerative price for output	30	30	30	90 (100)
b)	High procedural formalities in government agencies	30	00	25	55 (61)
c)	Distress sales	14	00	00	14 (16)
4.	**Institutional constraints**				
a)	Problems associated with DBT scheme	26	22	25	73 (81)
b)	Lack of availability of adequate amount of subsidies from Department of Agriculture	28	25	28	81 (90)
c)	Inadequate support from governmental agencies	25	24	30	79 (88)
d)	Lack of awareness about the schemes and programmes for rice development	20	12	18	50 (56)

Source: Compiled from primary data
Note: Figures in parenthesis represent percentage of each to total number of respondents

4.3.1 Production problems

As far as the production constraints are concerned, labour problems, and pests and diseases, are the most severe. Cent per cent of the farmers are facing these problems. Other production problems include existence of weeds, attack of wild animals, and high cost of inputs.

4.3.1.1 Labour problems

All the rice farmers are having labour problems such as lack of availability of skilled labourers and high wage levels. It is often difficult to find workers at the time of transplanting and harvesting operations for which timely availability of labour is crucial. In Pazhayannur Panchayat, only five farmer respondents are doing mechanised transplanting (Table 4.14), and the rest are depending on manual transplantation. In the absence of sufficient number of skilled labourers, the available labourers are demanding high labour charges. In some areas cultural operations are not undertaken in the proper manner in the absence of skilled labourers and high labour charges, which will reduce the production and productivity. Besides, since the introduction of National Rural Employment Guarantee Programme (NREGP), labourers are not interested in rice farming work, because they are getting regular wages when they go for NREGP works. It is suggested that the Government may take necessary steps for including rice farming operations also under the NREGP programme to promote rice farming in the State. The farmers may be made to pay the amount over and above the wages paid to the labourers by the Government as per the prevailing wages of the area under cultivation. As a result of this, farmers will be ensured ready availability of labour at reduced labour charges. On the other hand rice farming can be promoted by the Government. The labourers may also be interested since they will get higher wages than that of other NREGP works.

4.3.1.2 Pests and diseases

Kerala is a hot spot for pests and diseases. The high humidity and temperature of the rice growing environments during the cropping periods increase the incidence of pests and diseases. All farmers in the three study areas are facing the problem of pests attack and diseases. Kudappuzhu, rice bug, leaf roller etc. are some of the pests which create severe damage to the rice plants. Leaf blight, yellowing etc. are the major pests which creates severe damage to the rice crop in the study areas. In order to control these pests and diseases, KAU and other research organisations should give due considerations for developing

suitable Integrated Pest Management (IPM) strategies. IPM is essential to overcome the biotic constraints mainly, pests and diseases for realising yield potential of rice.

4.3.1.3 Weed problems

Weeds reduce rice yield by competing for space, nutrients, light and water, and also by serving as hosts for pests and diseases. If weed control is not done properly or timely, it results in severe yield reduction. Majority of the farmers (82 per cent) are having the weed problems. It has already been pointed out that in Pazhayannur Panchayat, there is high existence of weed plants. And hence even with institutional interventions, rice production of the farmers of the Panchayat is adversely affected (Table 4.12). Due to high weed problems some farmers are not undertaking production in some seasons. Although various weed control methods including complementary practices, hand weeding, mechanical weeding, chemical weeding, biological control, and integrated approaches are available, these methods need to be fine-tuned for specific regions, ecosystems, cropping systems, and economic groups. A weed called 'Vari Vithu' is a major threat in Mundathikode area. At present no herbicides are found effective against this weed. This highlights the significance of tackling this problem for increasing rice production. Research institutions including KAU should take care of it by developing area specific mechanisms to control the weed problems so as to increase productivity of rice.

4.3.1.4 Attack of wild animals and birds

. 72 per cent of the respondents are facing the problem of attack of wild animals in the rice fields, especially in Pazhayannur and Mundathikode panchayat. Pig, deer, peacock, birds etc. are the main wild animals and birds that are attacking the rice fields. The attack of these animals and birds usually come towards the end of the crop season, when major part of the costs of cultivation has been incurred by the farmers. Since these animals and birds are coming under the definition of wild animals, they cannot be destroyed or controlled by the farmers.

Hence Governments and the Forests Department should positively consider this constraint and come to the rescue of the farmers. Otherwise more number of farmers will leave the profession of not only cultivating rice, but other crops as well.

4.3.1.5 High cost of inputs

High yield in rice farming requires substantial amount of investment in inputs such as fertiliser, HYV seeds, weed management, pesticides and irrigation together with a good level of management and adoption of modern technologies. Low income farmers cannot afford these expenses and sometimes consider low production better to rising cost of cultivation. Even though farmers are getting subsidies from the Agriculture Department, it is not sufficient enough to meet the various costs of inputs. The available subsidies are not received in time which is yet another problem to be tackled immediately. Although after the introduction of DBT, considerable changes have come in the disbursement of subsidies, there is yet more to be done to make it timely and comprehensive. The Agricultural Development Policy, 2013 has made a suggestion that all the subsidies of rice farming to be converged and subsidy norms may be revised taking into account the regional specialties and total subsidy for paddy cultivation should be a minimum of 50 per cent of cost of cultivation (Draft Agricultural Development Policy, 2013, GOK).

4.3.2 Financial constraints

Credit plays an important role in increasing rice production. Availability and accessibility to adequate, timely and low cost credit from institutional sources is of prime importance especially to small and marginal farmers. Along with other inputs, credit is essential for establishing sustainable and profitable farming systems. High cost of cultivation leads to shortage of funds for the farmers, as a result of which they are forced to borrow. Here arises the question of adequate and timely credit. Due to the procedural formalities, especially in commercial banks, farmers are hesitant to approach for credit, leading to the constraint of lack

of accessibility of credit. The procedural formalities also lead to the non availability of timely credit. Hence, difficulties for conducting production activities in time include financial constraints like, lack of availability of timely credit, high procedural formalities and easy accessibility of credit.

It seen that, out of 66 respondents availing loans, 12, constituting 18 per cent are borrowing from private agencies like money lenders (Table 4.29), and all these farmers belong to Pazhayannur and Mundathikode Panchayats. According to these farmers, lack of availability of timely credit, high procedural formalities and lack of easy accessibility are the major factors which have forced them to borrow money from non-institutional credit agencies at exhorbitant rate of interest. It is to be noted that in Adat Panchayat, none of the respondent farmers are taking credit from private agencies (Table 4.29), because Adat Service Co-operative Bank is providing interest free KCC loans to rice farmers. The farmers can use it like a revolving fund and it is sanctioned while starting the cultivation. Since the credit is directly linked with marketing of paddy, the risk of delay/ default in repayment is completely eliminated. This pattern of providing credit by Adat Service Co-operative Bank may be replicated by the other two Panchayats, and even other areas wherever not implemented, so that farmers can get easy and timely credit and their dependence on private agencies will also be reduced. It will also help the farmers to avoid distress sales of paddy to meet the obligations of the money lenders immediately after harvest. As per the Agricultural Development Policy, 2013 of Kerala State, appropriate mechanism should be evolved from the part of the Government in keeping the PACs in providing valuable credit facilities to farmers, in the light of restrictions imposed on PACS in dealing with agricultural credit by RBI. The Committee in its Policy 106 recommended for the continuance of the unique model of Kerala in providing interest free loans to paddy farmers, for the coming years also, fully convinced with the utility of the same by the farmers of the State, the interest of which would be paid to the Co-operative Banks by the State Government (Draft Agricultural Development Policy, 2013, GOK). In this study, the researcher is also fully convinced with the effective and efficient credit intervention of the Adat Service Co-operative Bank with respect to

provision of interest free KCC loans and linking of credit with marketing of paddy. If credit for production is linked with marketing, misutilisation of subsidised credit by non farmers can also be prevented. Hence it is suggested that the recommendations of the Draft Agricultural Development Policy, 2013, with respect to the above specified credit areas may be implemented in the interests of the paddy farmers and for the promotion of rice farming in the State.

4.3.3 Marketing constraints

As evident from Table 4.40, lack of remunerative price is the most important marketing constraint identified by the rice farmers. According to them, even the MSP is not sufficient or remunerative to the farmers. The rising cost of inputs and other cultivation costs cannot be met with this price, as a result of which the net income of farmers is decreasing. The farmers suggested that the MSP should be enhanced to at least ₹ 25 per kg from the present ₹ 19 per kg to make rice farming profitable and attractive to the younsters.

It has already been observed that 16 per cent of the respondent farmers are selling their produce to private traders (Table 4.35). Open market price is always lower than the MSP (Table 4.38). No farmer in Adat Panchayat is selling to private traders because of the intervention of Adat Service Co-operative Bank. Since, the Bank has the system of 'linking of credit with marketing', all the farmers in the Adat area are giving their rice to SUPPLYCO through Adat Bank.

Speedy procurement, lack of procedural formalities and easy realisation of cash are the determinants of selecting private agencies by farmers. (Table 4.36). Procedural formalities are high in SUPPLYCO, which makes the realisation of cash delay. SUPPLYCO will permit only 17 per cent moisture content in the paddy inorder to make it eligible for procurement. Having moisture content above the level fixed by SUPPLYCO will cause delay in procurement by SUPPLYCO. In Pazhayannur Panchayat, moisture content will be high during Virippu season. As a result SUPPLYCO will procure paddy only if the farmers

dry and bring down the moisture content to 17 per cent as prescribed by them, which will cause delay in procurement and realisation of cash by the farmers.

Besides this, those farmers who are taking credit from private agencies have to repay the loan immediately after the harvest. These farmers have to pay higher interest rate compared to those who have availed institutional credit. So if the realisation of cash is delayed, they will not be in a position to repay their loans in time. As a result they will sell the produce to private parties immediately after the harvest for whom moisture content is not a problem, but provide lower prices. This will leads to distress sales.

The Government should take specific steps to eliminate procedural delay in realisation of cash from the sale proceeds of paddy. A tie up arrangement may be made between the banks and the SUPPLYCO for advancing money to the farmers against the receipt issued by the rice millers for the paddy procured by SUPPLYCO. The banks may be directed to advance of atleast 60 to 70 per cent of the amount due to the rice farmers. As and when SUPPLYCO makes payment, it may credited to the account of the farmer after deducting the advance. This will enable the farmer to avoid distress sales for meeting the payment to money lenders. As a result of this a relationship develops between the banker and the farmers, which in future, will help to avoid money lenders.

4.3.4 Institutional constraints

Institutional constraints are associated with subsidy available to the farmers, their adequacy and delay in their distribution. The farmers have lot of complaints against the existing system of distribution of subsidies. There is not much regional differences in this category of constraints. Problems associated with Direct Benefit Transfer Scheme, lack of availability of subsidies in time, inadequate support from government agencies and lack of awareness about

schemes and programmes on rice development are the major institutional constraints faced by the farmers in the study area.

4.3.4.1 Problems associated with Direct Benefit Transfer (DBT) Scheme

After the introduction of DBT Scheme, the farmers are getting their subsidies through their bank account. As a result they have to pay full amount for purchasing inputs even though they have subsidy and the subsidy amount will be credited in their account after some time period. Sometimes the farmers are not informed about the credit of subsidies in their account by the authorities concerned. As a result they cannot use the subsidies for timely agricultural operations. Even the farmers are not aware which all subsidies they have availed or not and under which heads the subsidy amounts are credited. Hence it is suggested that, all the subsidies given for paddy cultivation should be converged under one head and it may be made available to the farmer for conducting agricultural operations in time.

4.3.4.2 Lack of availability of adequate amount of subsidies from agriculture department

With regard to the availability of subsidies, majority of the respondents (90 per cent) opine that subsidies are not sufficient enough to meet the cost of cultivation. It is suggested that the subsidy for rice cultivation has to be enhanced and it may be made atleast 50 per cent of the cost of cultivation as recommended by the Draft Agricultural Development Policy of Kerala State, 2013. This assumes importance at present when farmers are moving out of paddy cultivation and Kerala has to depend on other states for her rice requirement.

4.3.4.3 Inadequate support from government agencies

Eighty eight per cent of the respondent farmers opine that the present level of institutional assistance is not adequate for sustaining rice farming. More agencies and institutions have to come forward for facilitating increased rice production. Among others, the Agricultural Development Policy of Kerala, 2013

has suggested strengthening of Paddy Development Agencies, Kerala State Seed Development Authority and other agencies involved in rice cultivation in Kerala for increasing productivity of rice in the State, which is reinstated here.

4.3.4.4 Lack of awareness about the schemes and programmes about rice development

Even though farmers are availing subsidies of various institutions, many farmers (56 per cent) have not enough knowledge about these schemes in the absence of which, they will be unaware about their rights and benefits. The Governments may take necessary steps to popularise the schemes and assistance available for rice cultivation through local level institutions such as Krishi Bhavans, Panchayats and Group Farming Agencies / Padasekhara Samithis.

From the analysis it is clear that rice farmers are facing a number of constraints, viz., production constraints, financial constraints, marketing constraints and institutional constraints. Lack of availability of skilled labours, high wage levels and attack of pests and diseases are the most important production problems. Inclusion of rice farming operations under the NREGP programme can reduce the problem of availability of labour and high wage levels. Adoption and practice of IPM techniques can reduce the problems of pests, diseases and weed problems. High input cost is another production problem which increases the cost of cultivation and thereby reduces the net income of rice farmers. Lack of availability of timely and adequate credit is the major financial constraint faced by the farmers. Provision of timely interest free loans and interest subsidies, in adequate amounts will attract more farmers to rice farming. In marketing, delay in realisation of cash from sale proceeds to SUPPLYCO is the important problem, which leads to delayed repayment of credit from private agencies at exhorbitant rate of interest. If the system of 'linking of credit with marketing' followed by Adat Service Co-operative Bank is replicated to the other areas, this problem can be solved to a large extent. Timely and proper intervention of governmental and other agencies can solve the problems of rice farmers to a great extent.

4.4 Suggestions for promotion of rice farming

From the analysis of the impact of developmental schemes of governmental and other agencies on the production and income of rice farmers, and the constraints faced by them, it follows that rice farming can be promoted in Thrissur and Kerala at large, if certain measures are being adopted by these agencies. It is to be kept in mind here that rice being the staple food of Kerala, the conversion of paddy lands for other purposes may be prevented and farmers may be motivated to do rice farming. Certain suggestions for promotion of rice farming which have been deduced from the study are discussed in the subsequent paragraphs.

Inorder to overcome the scarcity of skilled labourers and increased cost of production resulting from high cost of labour, especially where mechanization is not possible, due to the peculiar nature of soil, it is suggested that the State Government may take necessary steps for including rice farming operations also under the NREGP programme. The farmers may be made to pay the amount over and above the wages paid to the labourers by the Government under the Scheme, as per the prevailing wages of the area under cultivation. The farmers will be ensured ready availability of labour at reduced wages on the one hand, and rice farming can be promoted by the Government on the other. The labourers may also be interested since they will get higher wages than that of other works of the NREGP programme. In case of necessity, training can be arranged to those interested, but not skilled, by tie – up arrangement with Green Army.

The high costs of inputs are taken care of by the Government now through supply of subsidised seeds, fertilisers and loans through different agencies, which are too low in the opinion of farmers. After the introduction of DBT, the subsidy amount is being credited in their accounts directly. Sometimes the farmers are not aware of the subsidies availed or not and under which heads the subsidy amounts are credited. Hence following the recommendation of Draft Agricultural Development Policy, 2013, it is suggested that all subsidies given by the governmental agencies for rice cultivation have to be converged and the amount

of subsidy may be enhanced to a minimum of 50 per cent of cost of cultivation. This will also take care of the insufficiency or inadequacy of the subsidy amount in meeting the increasing cost of cultivation of rice and encourage the farmers to remain in rice farming.

The pattern of providing credit by Adat Service Co-operative Bank by way of revolving fund at the commencement of rice cultivation may be replicated by the other two Panchayats, and even other areas wherever not implemented, so that farmers can get easy and timely credit and their dependence on private agencies will also be reduced. It will also help the farmers to avoid distress sales of paddy to meet the obligations of the money lenders immediately after harvest. In the study, the researcher is also fully convinced with the effective and efficient credit intervention of the Adat Service Co-operative Bank with respect to provision of interest free KCC loans and linking of credit with marketing of paddy. If credit for production is linked with marketing, misutilisation of subsidised credit by non farmers can also be prevented. The Agricultural Development Policy, 2013 of Kerala State in its Policy 106 recommended for the continuance of the unique model of Kerala in providing interest free loans to paddy farmers, for the coming years also, fully convinced with the utility of the same by the farmers of the State, the interest of which would be paid to the Co-operative Banks by the State Government. Hence it is suggested that the provision of interest free KCC loans by co-operatives and even commercial banks may be implemented in the interests of the paddy farmers and for the promotion of rice farming in the State, together with transfer of funds through DBT and linking of credit with marketing.

Even with lower open market price compared to MSP, some farmers are selling their produce to private traders to repay their dues to money lenders from whom they have taken money for rice cultivation. The example of Adat Service Co-operative Bank of 'linking of credit with marketing' may be replicated in all panchayats of the State, to prevent distress sale by rice farmers and to obtain reasonable price for their produce.

Lack of remunerative price is one of the most important constraints identified by the rice farmers. Ensuring sustainable rice production is essential for food security in the State. It is possible only by stabilising and improving the income of rice farmers. Hence a reasonable floor price, by way of MSP taking into consideration the increasing cost of inputs may be fixed by the Government. It is true that Kerala is having the highest MSP compared to other states of India. But the cost of production is also the highest in Kerala. Hence it is suggested that an increase may be made in the present MSP of paddy of ₹ 19 per kg, taking into account the increased costs of inputs during the period after which it has been fixed.

It has been noticed during the study that in certain panchayats, especially in Mundathikode, farmers are not in a position to effectively utilise the farm machinery and equipments available with them. At many times, they may not be in a working condition. As part of mechanisation of farm operations, Green Army and similar organisations are undertaking and providing training for repair of farm machinery and equipments. The services of Green Army are already available in many panchayats in Thrissur District including Mundathikode. It is suggested to keep the farm machinery and equipments available with the Panchayats and other LGs in working condition by availing the services of Green Army and similar organisations so that timely agricultural operations is possible at reduced cost.

The Government may take specific steps to eliminate the procedural delay in realisation of cash from the sale proceeds of paddy and avoid the resultant interest burden on SUPPLYCO. A tie up arrangement may be made between the banks and the SUPPLYCO for advancing money to the farmers against the receipt issued by the rice millers for the paddy procured by SUPPLYCO. The banks may be directed to advance of atleast 60 to 70 per cent of the amount due to the rice farmers. As and when SUPPLYCO makes payment, it may be credited to the

account of the farmer after deducting the advance. This will enable the farmer to avoid distress sales for meeting the payment to money lenders. As a result of this a relationship develops between the banker and the farmers, which in future, will help to avoid money lenders. In order to avoid payment of huge amount of interest by SUPPLYCO, it may ensure the availability of funds for paddy procurement from the Government in time so that amount can be transferred to the banks as and when procurement takes place.

Lastly, but not the least, it is suggested to strengthen the existing institutions and programmes for rice development. Even though farmers are availing subsidies of various institutions, many farmers are not fully aware about the benefits of these schemes, in the absence of which, they will be unaware about their rights and benefits. The State Government may take necessary steps to popularise the schemes and assistance available for rice cultivation through local level institutions such as Krishi Bhavans, Panchayats and Group Farming Agencies / Padasekhara Samithis.

SUMMARY OF FINDINGS & CONCLUSION

CHAPTER 5

SUMMARY OF FINDINGS AND CONCLUSION

Institutional interventions in rice farming sector in Kerala is immediately intended neither to make the State self sufficient in foodgrains nor to hasten the pace of progress of any region. Interventions in rice farming are inalienable to insulate the farming community from the vicissitudes of rapidly changing economy of the country. Gross Cropped Area under rice farming declined sharply from 8.81 lakh ha in 1974 to 1.18 lakh ha in 2014. Rice area and production are on the verge of total extinction from Kerala where rice is the staple food and land has 5000 years of rice farming history. Various Committees and Study Reports identifying the causes of declining rice cultivation could not arrest the process of further decline. Only by strong institutional intervention rice farming can be saved from its current crisis.

The study entitled 'Impact of institutional interventions for promotion of rice farming in Thrissur district' was conducted with the objectives of (i) examining the developmental programmes/ schemes of various governmental and other institutions for the promotion of rice farming in Kerala, (ii) analysing the impact of developmental schemes of various institutions on the net income of the farmers and (iii) analysing the constraints of rice farmers so as to suggest policy measures for the promotion of rice farming.

The sample size of the study was 90 respondents, consisting of 30 each from three panchayats of Thrissur district viz., Pazhayannur, Adat and Mundathikode which were selected by Multi-stage Random Sampling Method. Data were collected through pre-tested structured interview schedule.

Major sources of data were Economic Review, websites of various institutions, namely CGIAR, IRRI, Central Department of Agriculture, DRR, CRRI, RBI, State Department of Agriculture, SUPPLYCO, ATMA and www.indiastat.com.

Chi-square test, paired t-test, ANOVA test, Post-hoc test for multiple comparisons, Cobb-Douglas production function and Mann-Whitney U test were employed to analyse the data.

5.1 Major findings

The major findings of the study are summarised and presented in the sequence given below.

5.1.1 Institutions and schemes for rice development

5.1.2 Impact of institutional interventions for promotion of rice farming in Thrissur district

5.1.3 Constraints of rice farmers

5.1.1 Institutions and schemes for rice development

The institutions for rice development are mainly classified into international institutions, national level institutions, state level institutions, local level institutions and Non-Governmental Organisations (NGOs). Consultative Group on International Agricultural Research (CGIAR) is the major international institution engaged in the promotion of food security and its major rice development project is known as Global Rice Science Partnership (GRiSP). International Rice Research Institute (IRRI) is an important international institution coming under the purview of CGIAR and through research it aims to reduce poverty and hunger, improve the health of rice farmers and consumers, and ensure that rice production is environmentally sustainable.

At the national level, the Department of Agriculture, Central Rice Research Institute (CRRI), Directorate of Rice Research (DRR) and commercial banks are the major institutions functioning for rice development. The Department of Agriculture through its various schemes like National Food Security Mission (NFSM), Rashtriya Krishi Vikas Yojana (RKVY), High Yielding Varieties (HYV) Programme, Rice Seed Mini Kit Programme, Integrated Cereals Development Programme in Rice based Cropping System Areas (ICDP-RICE), Integrated Programme for Rice Development (IPRD), Special Food-grains Production Programme (SFPP) - Rice and Special Rice Production Programme (SRPP) promote and protect rice farming in the country.

The CRRI, Cuttack plays a significant role in the rice development through its various programmes such as Enhancing and Sustaining the Productivity of Rice Based Farming Systems, Mechanisation for Rice Production and Post Harvest Systems, Developing IPM Technologies for Different Rice Ecologies and Socio-Economic Research for Sustainable Development.

The DRR, Hyderabad is an important rice development institution in the country, established with the ultimate objective of organising and coordinating multi-location testing of genetic lines and technologies for crop production and protection, generated across the country. The Directorate carry out its multi-location All India Coordinated Rice Improvement Programme (AICRIP) with active partnership of 47 funded cooperating centers affiliated to State Agricultural Universities (SAUs), State Department of Agriculture and other research institutes of Indian Council of Agricultural Research (ICAR).

Commercial banks provide financial support to the farmers at subsidised rate of interest/ Interest Subvention Scheme through Kisan Credit Cards (KCC) and Agricultural Gold Loan Scheme and other types of agricultural loans.

At the State level, institutions working for rice farming are State Department of Agriculture, the Kerala State Civil Supplies Corporation (SUPPLYCO), co-operative banks, Kerala Agricultural University (KAU) and Krishi Vigyan Kendras (KVK). The State Department of Agriculture is the nodal agency for implementation of rice development programmes. The Department through its major schemes, namely, Sustainable Development of Rice (SDR), Production Bonus and Assistance for Upland Cultivation of Rice provide production support to rice farmers. The Department has made linkages with Panchayat Raj Institutions, other state and central agencies, co-operative institutions, farmers' organisations, input agencies, NGOs and SHGs in the field of agriculture for proper implementation of the programmes.

SUPPLYCO provides marketing support to the rice farmers through its procurement policy. SUPPLYCO is procuring paddy on behalf of State Government under decentralised Paddy Procurement Scheme of Government of India. By ensuring a floor price for rice, it ensures a stable price for rice farmers in the open market. At present paddy procurement is being done in all the districts in the State. On an average one lakh farmers are registering with SUPPLYCO for paddy procurement during one crop season.

Co-operative banks are playing an important role in providing financial support to the farmers. Co-operative banks through KCC provide financial assistance to the rice farmers. Co-operative banks provide short term, medium term and long term agricultural credit. The fertiliser subsidy of local institutions are provided through service co-operative banks. Some co-operative societies are providing marketing support to the farmers by procuring rice at Minimum Support Price (MSP).

KAU is the primary and the principal instrumentality of the Kerala State in providing human resources, skills and technology, required for the sustainable development of agriculture through conducting, interfacing and integrating education, research and extension. The University through its various research stations, namely,

Pattambi Rice Research Station, Moncompu Rice Research Station, Vyttila Rice Research Station, Agricultural Research Station, Mannuthy and Regional Agricultural Research Station, Kayamkulam enhance rice production through research and development of new varieties and technologies.

KVKs place a special emphasis on training and education of farmers, entrepreneurs, farm women, rural youth, financial institutions, extension functionaries as well as voluntary organisations. It plays a First Line Extension Role - a linkage between research and the field in augmenting the socio-economic conditions of farmers, farm women and livestock owners.

The Local Self Government Institutions are promoting rice cultivation through their planned schemes and Local Self Government Development (LSGD) programmes. Grama panchayats, block panchayats, district panchayats, municipalities and corporations are the local governments which are supporting agricultural development. Panchayats through its Development Plan Scheme (Janakeeyasoothranam) provide assistance to rice farmers. Through this scheme, Panchayats are giving permits to farmers for purchasing manures, fertilisers, pesticides and herbicides at a subsidised rate.

NGOs are also working for agricultural development. Agriculture Technology Management Agency (ATMA) is a major NGO engaged in the process of agricultural development. Group Farming Agencies (GFA) are the collective group of rice farmers, scientists and administrative personnel with active government support. Krishi Bhavan implements most of the schemes through GFAs such as supply of seeds and permits for subsidised fertilisers.

Overall, these organisations and agencies are supporting rice development in the State through their schemes and programmes in a significant manner.

5.1.2 Impact of institutional interventions for promotion of rice farming in Thrissur district

Impact of institutional interventions for promotion of rice faming in Thrissur district is the second objective of the study. Interventions can be in the form of positive incentives normally. Institutions can provide incentives at various stages of farming activities, from production to marketing, in kind, cash and services like subsidised inputs, income transfer, cash benefits, facilities, and skill / information/ technology transfer etc.

In Thrissur district both males and females are engaged in rice farming and majority (90 percent) are males. Seventy per cent of the respondent farmers are having more than 55 years of age. Only four percent fall in the category of upto 45 years which implies that the new generation is keeping away from rice farming. With regard to the occupation of sample respondents, the main occupation of 70 per cent of the respondents is agriculture and the rest 30 per cent are doing agriculture as subsidiary occupation. Income from agriculture of the respondents varies according to the land holding size. The agricultural income of majority of the respondents (82%) falls within ₹ 3 lakhs per annum. As regards income from rice farming, more than 50 per cent of respondents are having annual income of less than ₹ 1 lakh since majority of the respondent farmers are marginal farmers considering their landholding under rice cultivation.

That majority of the respondents (71 per cent) use more than half of their land for rice cultivation. Only seven per cent of the respondents use less than one – fourth of their total landholding for rice cultivation. Since rice contributes major land holding share in the total land holding of rice farmers, the major share in the total income from agriculture is contributed by rice cultivation. More than half of the respondents (58 per cent) are getting 75 to 100 per cent of their agricultural income from rice farming.

Based on the land holding size of paddy, the farmers are categorised as tenant, marginal, small and large farmers. There is only one tenant farmer among the sample respondents. Sixty nine per cent of the respondents belong to the category of marginal farmers and 22 per cent are small farmers. Only eight per cent are large farmers.

Cropping pattern is an important component of any farming system. It is the proportion of area under various crops at a point of time. The major crops of the study area are rice, coconut, vegetables, banana, rubber and arecanut. The other crops include pepper, turmeric, tapioca and coleus.

Rice is the major crop of Thrissur district as well as in the entire study area. Almost all farmers are using high yielding rice varieties. The major rice varieties used in the study area are Jyothi, Uma, Kanchana, Kunjukunju and Mattathriveni.

The productivity of rice is different in the three areas of the study. Rice production is the highest in Adat Panchayat and lowest in Pazhayannur Panchayat. Wide difference is noticed in the productivity of rice between Adat Panchayat and the other two panchayats. Since farmers in Adat Panchayat are getting better institutional support/ interventions, they are able to produce larger quantity of rice compared to the other two areas. In Pazhayannur Panchayat even though they are getting some institutional assistance, there is high existence of weed plants in the area. It adversely affects rice production of the Panchayat. As a result the farmers in Pazhayannur Panchayat are not able to get high production as in the case of Adat Panchayat, inspite of the institutional interventions made available to them.

In all the three panchayats, land preparation and harvesting are mechanised. In Mundathikode Panchayat, transplanting is done using transplanter whereas it is labour intensive in Pazhayannur Panchayat due to the peculiar nature of soil. In Adat Panchayat, the farmers are broadcasting the seeds instead of planting. The services of Green Army are availed by all farmers in Mundathikode Panchayat but in Pazhayannur only a few farmers are availing their services.

Pazhayannur Panchayat has the highest cost of cultivation, with average cost of cultivation of ₹ 40345 per ha. In Pazhayannur, transplanting is mainly done manually and hence farmers are spending significant amount as labour charges for transplanting operation. Moreover, during the year 2012-13, i.e., the period of study, weed problems and pest attack were very high. As a result, cost of production has increased considerably. In Mundathikode which comes second in cost of production, all agricultural operations are mechanised including transplanting. Cost of mechanised transplanting is less than that of human labour. In Adat panchayat operations other than transplanting are mechanised, where, instead of transplanting they are broadcasting the seeds. Broadcasting involves only very low cost compared to transplanting. The weed problems and pest attack were also lower in Adat panchayat. As a result the cost of cultivation is lower in Adat Panchayat compared to other two panchayats.

While calculating cost of cultivation farmer - wise, it has been found that the marginal farmers are having the highest cost of cultivation (₹ 38648 per ha) followed by the tenant farmer. The large farmers are having low cost of cultivation compared to small and marginal farmers since they are enjoying the benefits of economies of scale in their operations.

Net income is the income from rice farming after meeting the entire cost of cultivation including the interest amount. Annual net income per hectare is the highest in Adat Panchayat and lowest in Pazhayannur Panchayat. Pazhayannur has the lowest productivity and highest cost of cultivation. Hence their net income will also be the lowest. Out of 30 respondents, 14 farmers representing 47 per cent are facing loss from rice cultivation. Net income calculated on the basis of farmer category, shows that marginal farmer category is having the lowest annual net income per hectare. All the large farmers are in the highest income bracket of ₹ 125000 to ₹ 150000. Even the tenant farmer has leased 6.88 ha for cultivation and has net income

of ₹ 75,092/- per hectare. This implies that higher the land holding, higher will be the net income per hectare.

Marketable surplus is the surplus available for sale after meeting self-requirements, seed requirements and spoilage. Nearly half of the respondents are having cent percent of their production as marketable surplus. The higher the presence of large farmers, higher will be the marketable surplus of the farmers of the area. Compared to Adat Panchayat, farmers of Pazhayannur and Mundathikode Panchayats are retaining more of their produce for meeting own requirements. Since farmers are getting higher price than the open market price, from SUPPLYCO, the farmers of Adat Panchayt who have larger production are more interested to sell their produce to SUPPLYCO rather than retaining for personal use, which has resulted in the highest marketable surplus for them.

Agriculture department is the important agency which provides production support to the farmers in the form of cash, HYV seeds, fertilisers, manures, pesticides and other kinds of inputs. Krishi Bhavan is the nodal agency through which the Department implements its various schemes. The Development Plan Scheme of Panchayats is also implemented through the Krishi Bhavan. All farmers under the study are availing assistance from the Department through various schemes such as SDR, RKVY and production bonus. Fifty eight percent of respondents are getting information on improved management practices from the Agriculture Department and 84 percent of the respondents are getting training from Krishi Bhavan. Some farmers are not availing the benefits of Transfer of Technology, due to their inconvenience in attending the training programme and lack of time and interest. Even though the farmers are receiving subsidies from the Department, they are not getting the subsidy amount in time. But supply of HYV seeds is very helpful to the farmers for increasing production. The notified HYV seeds supplied in the study area include Uma, Jyothi, Kanchana and Mattatriveni.

In order to examine the impact of the seed component of interventions of Department of Agriculture on the promotion of rice farming, the production of rice before and after the implementation of the intervention is examined using Paired t-test. The result of the Test was found significant at one per cent significance level. Hence the intervention of the Department of Agriculture by way of supply of notified HYV seeds with subsidy has significant impact on the total production and productivity of rice farmers and thereby on their income.

Cobb-Douglas production function has been employed to analyse the input-output relationship of rice production. The dependent variable of the model is production (₹) and the independent variables are seeds (₹), fertiliser (₹), labour (₹) and plant protection materials (₹). Since there is a problem of multi co-linearity existing between land area and seeds, the land area is excluded in the model. The adjusted R^2 of 0.927 indicates that 92 per cent of the production is explained by the inputs such as seeds, labour, fertiliser and plant protection materials. Seeds and labour are significantly affecting the production at one per cent level of significance. It could be inferred that one rupee increase in labour leads to ₹ 1.77 increase in the production and one rupee increase in seeds will lead to 77 paisa increase in the production. One rupee change in plant protection materials will lead to ₹ 1.97 decrease in the production of rice. Hence it could be inferred that subsidies given for seeds and labour will have positive impact on the production of rice farmers. Hence the intervention of the Department of Agriculture by way of supply of subsidised seeds have an impact on the production and thereby income of the rice farmers.

Timely credit is an inevitable element in the production process and it helps the farmers to conduct agricultural operations in time in the absence of owned funds. There are both institutional and non institutional agencies engaged in providing agricultural credit. In the study area, public sector banks and cooperative banks are the major agencies which provide financial support to the rice farmers. There are also

farmers who are taking credit from non institutional agencies like money lenders. Public sector banks and co - operative banks are providing agricultural credit either in the form of KCC or agricultural gold loan in the study area. Public sector banks are providing agricultural gold loan at subsidised interest rate. Both these loans of public sector banks are eligible for Interest Subvention Scheme of the Central Government.

Twenty seven percent of the respondents are not having any loans or credit and 18 percent of the respondents are taking credit from private agencies. In Adat Panchayat, all the farmers are accessing credit from the cooperative bank of the area, viz, Adat Farmers Service Cooperative Bank. It is also to be noted that none of the respondent farmers in Adat Panchayat have availed loans from non – institutional sources, and all of them have availed from institutional sources, which shows the efficient intervention of the Bank with respect to credit. It is the only panchayat among the selected panchayats which has cent per cent respondents coming under the purview of institutional sources of credit for paddy farming. But in Pazhayannur and Mundathicode Panchayats the picture is entirely different with farmers depending on non – institutional sources along with institutional sources. In Pazhayannur and Mundathicode panchayats, 47 and 33 per cent of the respondents respectively, have not availed any credit – institutional or non institutional. Moreover, out of those who availed loans, 44 per cent in Pazhayannur and 25 per cent in Mundathicode are depending on money lenders also. In both these areas, respondent farmers are not availing KCC advance from co-operative banks and they are giving agricultural loans at 12 per cent interest rate, for which there is no interest subsidy.

As far as the total quantum of credit is concerned, the highest amount is disbursed by co-operative banks in Adat Panchayat, and by public sector banks in Pazhayannur Panchayat. But the average credit per borrower is the highest in Pazhayannur Panchayat in the case of both co-operative banks and public sector banks. The disbursement of credit by co-operative banks is the highest in the Adat Panchayat since all the respondents have availed loans from Adat Service Co-

operative Bank. But the average credit per farmer is the lowest since the Bank gives agriculture loans under the KCC in which the maximum amount is only ₹ 25,000. The dependence on public sector banks for credit is the lowest in the case of Adat Panchayat. The average credit per farmer is higher for public sector banks in all the three Panchayats resulting in the highest total average credit of all panchayats together at ₹ 65037. The benefit of interest subvention scheme available in public sector banks, is attracting more farmers to this institutional source in recent days.

All the respondents who have availed loans from public sector banks are getting the benefit of Interest Subvention Scheme. But with regard to the co-operative banks, only farmers in Adat Panchayat are getting the benefit of the Scheme. The farmers of Adat Panchayat who are borrowing from Adat Service Co-operative Bank are utilising the benefit of interest subsidy to the maximum extent. The case of default is completely eliminated since the Bank links credit with the marketing of the rice produced. Thus the efficient intervention of Adat Service Co-operative Bank with respect to extending the benefit of subsidy to its farmers is underlined here.

The farmers have identified four main reasons for selecting their source of credit, viz, timely credit, and easy accessibility of credit, low rate of interest and availability of subsidies. Of these, low rate of interest followed by availability of subsidies are the primary reasons for selecting the commercial banks by the farmers. It is to be noted that easy accessibility is not at all a criteria for selecting commercial banks, which is to be considered by commercial banks for making their interventions more effective. As far as co-operatives are considered, low rate of interest and timely credit are the favourable factors. The farmers approach private agencies for their financial needs, only because of timely credit and easy accessibility.

Out of total number of respondents who availed institutional credit, 42 per cent farmers have increased rice production. It has helped 59 per cent of respondents in repaying their existing credit and five per cent in purchasing/ constructing assets

for rice farming like, sprayers, tube wells etc. with the help of institutional credit. All the respondents who have availed credit has benefited in atleast one of these methods.

In order to analyse the impact of credit on rice production, Cobb-Douglas production function has been used. Total production (in ₹) is the independent variable and GCA (in ha) and total credit availed ((in ₹)are taken as the independent variables. The adjusted R^2 is 0.90 which indicates that 90 per cent of variation in production can be explained by GCA and total credit availed. It has been found that both the variables are significant at one per cent significant level and are positively related to output. Hence, it is inferred that institutional credit have significant impact on the production and income of rice farmers.

Marketing is a very significant process like production. The procurement policy of SUPPLYCO is a major intervention done by the State Government to stabilise the price of paddy. The SUPPLYCO will procure paddy from the farmers at MSP. Eighty four percent of the sample respondents are selling their produce to SUPPLYCO and only 16 percent are selling to private agencies. Adat Service Co-operative Bank is having efficient intervention in marketing also by procuring the paddy from the farmer's field and providing to SUPPLYCO directly without any intermediary. The entire rice farmers in the Adat panchayat are selling their marketable surplus to SUPPLYCO through Adat Service Co-operative Bank. Some of the farmers of Pazhayannur and Mundathikode are depending on private agencies for selling their produce.

Farmers are selecting the procurement agency based on number of reasons such as reasonable price, speedy procurement, easy procedural formalities and easy realisation of cash. Better price is the only determinant for selecting SUPPLYCO as their procurement agency. SUPPLYCO is procuring the paddy at the present MSP of ₹ 19/kg. Speedy procurement, lack of procedural formalities and easy realisation of cash are the determinants of selecting private agencies. SUPPLYCO will permit only

17 per cent moisture content in the paddy inorder to make it eligible for procurement. Having moisture content above this level fixed by SUPPLYCO will cause delay in procurement by SUPPLYCO but not in the case of private traders. The farmers who consider speedy procurement, no procedural delays and easy realisation of cash as their determinants for selecting their procurement agency are all belonging to the category of farmers who have taken loans from money lenders. These farmers are selling their produce to private parties. They are even making distress sales. It is one of the important reasons for the farmers in Pazhayannur Panchayat running into net loss from rice farming.

While finding out the choice of procurement agency by farmers based on farmer – category, only marginal farmers (15 per cent) are selling their produce to private agencies. All others are selling their paddy to SUPPLYCO. The chi-square statistic is significant at one per cent level, and the result implies that the farmer class and supply agency are related. The farmers who have high production are interested to sell their produce to SUPPLYCO, because a small difference in the price will create large variation in the amount of sales. The marginal farmers who have a lower level of production are not much bothered about the marginal differences in the price. Hence they prefer to sell their produce at a lower open market price. The realization of cash proceeds from SUPPLYCO is not immediate. The farmers who have taken loan from money lenders will not be in a position to repay the credit within the prescribed period. Hence these farmers are forced to sell their produce to private agencies at a lower price for quick realisation of cash, even if they are making distress sales. It is to be noted here that all the marginal farmers of Adat Panchayat are selling their produce to SUPPLYCO. The intervention of the Adat Panchayat is once again reinstated here.

The procurement price of SUPPLYCO is the MSP and private agencies are procuring at open market price. The open market price is always lower than the price offered by SUPPLYCO. But the open market price is increasing or moving along

with the MSP. Hence it can be inferred that the MSP is a pillar which helps to maintain the market price stable. The existence of procurement policy of SUPPLYCO will help to ensure a reasonable market price in the open market.

The results of Mann-Whitney U test indicate that the farmers who are supplying to SUPPLYCO have higher income than farmers who are supplying to private agencies.

It can be concluded that the major institutions intervening in the promotion of rice farming in Thrissur District are the Department of Agriculture, commercial banks, co- operative banks and SUPPLYCO. It has been found that the schemes of the Department of Agriculture, viz. RKVY and SDR have significant impact on the production of farmers in the three study areas. Commercial banks and cooperative banks are successful in providing financial support to the farmers and their credit has impact on the production and income of the rice farmers. The procurement policy of SUPPLYCO has an important role which helps the farmer to get a reasonable price for their produce and also in stabilizing the market price of rice in the open market. The Adat Service Co-operative Bank is having efficient intervention in the provision of credit and marketing facilities, which helps the farmers of Adat to have higher rice production and income compared to the other farmers.

5.1.3 Constraints of rice farmers

The third and last objective of the study is to analyse the constraints faced by the rice farmers so as to enable measures for promotion of rice farming. The constraints and problems pointed out by the farmers have been grouped and presented under four main heads, viz, production constraints, financial constraints, marketing constraints and institutional constraints. Percentage analysis has been adopted to examine the gravity of these constraints to the farmers.

Labour problems, attack of pests and diseases, weed problems, attack of wild animals and high cost of inputs are the most important production problems. To reduce the labour shortage, the Government may take necessary steps for including rice farming operations also under the National Rural Employment Guarantee Programme (NREGP) to promote rice farming in the State. The farmers may be made to pay the amount over and above the wages paid to the labourers by the Government as per the prevailing wages of the area under cultivation. As a result of this, farmers will be ensured ready availability of labour at reduced labour charges. Adoption and practice of IPM techniques can reduce the problems pest, diseases and weed problems. High input costs are another production problem which increases the cost of cultivation and thereby reducing the net income of rice farmers. The Draft Agricultural Development Policy, 2013, recommended that, all the subsidies of rice farming to be converged and subsidy norms may be revised taking into account the regional specialties and total subsidy for paddy cultivation should be a minimum of 50 per cent of cost of cultivation. Implementation of this policy will help the rice farmers to continue rice production at lower costs.

Lack of availability of timely credit, high procedural formalities and lack of easy accessibility are the major financial constraints which force the farmers to borrow money from private money lenders. It is suggested that the pattern of providing credit by Adat Service Co-operative Bank may be replicated by the other two Panchayats, and even other areas wherever not implemented, so that farmers can get easy and timely credit and their dependence on private agencies will also be reduced. If credit for production is linked with marketing, misutilisation of subsidised credit by non farmers can also be prevented.

In marketing, delay in realisation of cash from sale proceeds to SUPPLYCO is the important problem, which leads to delayed repayment of credit from private agencies at exhorbitant rate of interest. If the system of 'linking of credit

with marketing' followed by Adat Service Co-operative Bank is replicated to the other areas, this problem can be solved to a large extent.

Institutional constraints are arises mainly with respect to problems in Direct Benefit transfer Scheme (DBT), lack of availability of adequate amount of subsidies from Department of Agriculture, inadequate support from government agencies and lack of awareness about the schemes and programmes about rice development. It can be tackled through convergence of all subsidies and its timely disbursement at the start of cultivation. The Governments may take necessary steps to popularise the schemes and assistance available for rice cultivation through local level institutions such as Krishi Bhavans, Panchayats and Group Farming Agencies / Padasekhara Samithis.

5.2 Conclusion

Institutions are instruments of growth. Central Agriculture Department, State Agriculture Department, Krishi Bhavan, SUPPLYCO, commercial banks, cooperative banks, and LGs are the major institutions engaged in the rice farming in Kerala. The schemes of Central Agriculture Department and State Agriculture Department have significant impact on rice production and thereby on net income of the rice farmers. The financial assistance of banks with a subsidised interest rate helps the farmers to raise fund for conducting timely agriculture operations. The procurement policy of SUPPLYCO provide assured market to the produce of rice farmers as well as it stabilizes the market price in the open market by offering a floor price to the farmers. Still there are problems regarding timely availability of assistance from Agriculture Department, lagging of payment by SUPPLYCO, long procedural formalities of SUPPLYCO and also with regard to the Direct Benefit Transfer Scheme. So if the Government takes necessary steps to provide the assistance in time, rice production in the State can be enhanced and thereby net income of farmers can be increased.

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ABSTRACT

IMPACT OF INSTITUTIONAL INTERVENTIONS FOR PROMOTION OF RICE FARMING IN THRISSUR DISTRICT

By

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ABSTRACT OF THE THESIS

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ABSTRACT

Institution is an effective instrument for economic development. Rice being the staple food of Kerala and rice farming as the livelihood of sizeable number of people, deteriorating rice cultivation demands immediate state intervention. Institutional support system for input supply, production process and marketing can positively promote and protect rice farming.

The study entitled 'Impact of institutional interventions for promotion of rice farming in Thrissur District' was conducted with the objectives of (a) examining the developmental programmes/ schemes of various governmental and other institutions for the promotion of rice farming in Kerala, (b) analysing the impact of developmental schemes of various institutions on the net income of the farmers and (c) analysing the constraints of rice farmers so as to suggest policy measures for the promotion of rice farming.

Ninety respondents consisting of 30 each from three panchayats of Thrissur district viz., Pazhayannur, Adat and Mundathikode were selected as the sample size through multi stage random sampling method. Data were collected through pre-tested structured interview schedule. The critical variables of the study were the institutions and their schemes, various assistance to rice farmers, demographic details of respondents, volume and cost of cultivation, net income, sources and uses of credit, marketing agencies for rice procurement and constraints of rice farming.

The major statistical tools used for the study were Chi-square test, Paired t-test, ANOVA test, Post-hoc test for multiple comparison, Cobb-Douglas production function and Mann-Whitney U test.

Consultative Group on International Agricultural Research (CGIAR), New York coordinate and cooperate with various countries to promote rice farming at the international level. International Rice Research Institute (IRRI) is the most important

rice development institution under CGIAR. Department of Agriculture under Government of India is the pivotal, around which the whole national programmes for rice farming revolves especially Rashtriya Krishi Vikas Yojana (RKVY) with components of High Yielding Variety (HYV) seeds, fertilisers and other assistance to paddy development. Central Rice Research Institute, Cuttack, has contributed remarkably to HYV seeds in rice in the country. Commercial banks have immensely supported the voluminous credit needs of rice farming in the country, especially through Kisan Credit Cards and Interest Subvention Schemes.

At the state level, institutions working for rice farming are State Department of Agriculture, Kerala State Civil Supplies Corporation (SUPPLYCO), Co-operative banks and Kerala Agricultural University (KAU). The Minimum Support Price (MSP) for paddy is operated through SUPPLYCO. Cooperatives, in addition to the programmes of State/ local governments, have their own schemes for rice farmers. KAU is a premier institution for rice farmers in the State. Krishi Vigyan Kendras, and Krishi Bhavans are also important institutions engaged in rice development. Agricultural Technology Management Agency (ATMA) is a major non - governmental agency involved in promoting rice farming.

Second objective of the study is to measure the impact of institutional interventions on net income of farmers by supporting production, credit and marketing activities. All the respondents availed assistance under RKVY and Sustainable Development of Rice (SDR) schemes for seeds, fertiliser, training and information. It is found that seed component of SDR and RKVY made positive shift among rice farmers to HYVs in cultivation. Paired t-test was employed to analyse the impact of seed subsidy, which is statistically significant at five per cent level. Cobb-Douglas production function used for analysis with gross income as dependent variable and seed, labour, fertiliser and herbicide as independent variables, observed that labour and seeds are important determinants of income. It implies that seed subsidy has promoted rice production.

Private agencies like money lenders are also prominent among rice farmers. Commercial banks are found to be providing higher per capita credit to farmers in all the three study areas. Cobb-Douglas production model was fitted by taking total production as a function of Gross Cropped Area and credit. It was noted that credit is a highly significant determinant in production.

With respect to marketing, MSP gave confidence to farmers to produce by ensured procurement price and also by stabilising the open market prices. Mann-Whitney U test was used to compare farmers marketing to SUPPLYCO for MSP and to private agencies. Significant difference was found between income of farmers who are supplying their produce to SUPPLYCO and that of supplying to private agencies.

Open ended questions were administered to respondents to analyse the third objective of constraints in rice farming. The responses were classified into four categories, viz., (a) production, (b) finance, (c) marketing and (d) institutional constraints. . Lack of availability of skilled labourers, high wage levels and attack of pests and diseases are the most important production problems. Inclusion of rice farming operations under the National Rural Employment Guarantee Programme (NREGP) can reduce the problem of availability of labour and high wage levels. Adoption and practice of IPM techniques can reduce the major production problems of pests, diseases and weed. Lack of availability of timely and adequate credit is the major financial constraint faced by the farmers. Provision of timely interest free loans and interest subsidies, in adequate amounts will attract more farmers to rice farming. In marketing, delay in realisation of cash from sale proceeds to SUPPLYCO is the important problem, which leads to delayed repayment of credit from private agencies at exhorbitant rate of interest. If the system of 'linking of credit with marketing' followed by Adat Service Co-operative Bank is replicated to the other areas, this problem can be solved to a large extent. The convergence of all subsidies for rice cultivation and strengthening of existing paddy development agencies can reduce the institutional constraints. The study reveals that higher positive institutional

interventions has led to increase in productivity, reduction in cost of cultivation, increase in net income and easy accessibility to subsidies, interest free loans and marketing facilities, as evident in the case of Adat Service Co-operative Bank.

Institutions are instruments of growth. Institutional interventions to support farmers by ways of seed subsidy, MSP and interest subvention have been found to be influencing the net income of farmers positively. The support system has also protected and promoted not only the production and product price but instilled confidence in the minds of farmers and insulated the market against uncertainty. Hence institutions are inalienable input to inspire and insulate the economy. But existing constraints in rice farming showed there are miles to go to provide economic independence to rice farmers.

ANNEXURE

INTERVIEW SCHEDULE

1. Family Details of the Respondent

Sl. No	Name	Sex	Age	Education	Main occupation	Monthly income	Subsidiary occupation	Monthly income
1								
2								
3								
4								

2. Asset Details

Sl.No.	Asset	Area (in cents)	Annual Income
1	Total land holding		
2.	Poultry		
3.	Milch animals		
4.	Fish		
6.	Others		

3. Land Utilisation Pattern

Sl.No.	Type of Land	Area (in cents)
1.	Homestead land	
2.	Land in other Places	
3.	Paddy land	
4.	Vegetables	
5.	Other crops	

4. Details of production

Sl.No.	Crop season	Variety	Production (k.g)	Quantity sold (k.g)	Price (₹/k.g)
1.	Virippu				
2.	Mundakan				
3.	Puncha				
4.	Total				

5. Details of Marketable Surplus

Sl.No	Season	Production (kg)	Own use (kg)	Seed (kg)	Spoilage (kg)	Marketable Surplus (kg)
1.	Virippu					
2.	Mundakan					
3.	Puncha					
4.	Total					

6. Agencies to which the produce is sold

Sl.No.	Agencies	Quantity (in kg)	Price/kg	Total amount	Benefits *
1.	SupplyCo				
2.	Private traders				
3.	Cooperatives				
4.	Consumers				
5.	Others				

Benefits*: (1) Reasonable Price, (2) Speed of procurement, (3) Accessibility, (4) Easiness in Procedural formalities, (5) Overall service

7. Source of financial assistance

Sl.No	Financial Institution	Rate of Interest	Amount	Advantages*	Usage**
1.	Own Source				
2.	Commercial banks				
3.	Cooperative banks				
4.	NGOs				
5.	Money lenders				
6.	Other private parties				

Advantages*: (1) Timely credit, (2) Easy accessibility, (3) Low rate of interest, (4) Repayment facilities, (5) Availability of subsidies

Usage:** a) Purchase of inputs, b) Purchase of implements c) Increase in cultivated area

d) Increase in production, e) Repayment of existing debt f) Other Non agricultural purposes

8. Details on cost of cultivation.

Cost components	Virippu			Mundakan		
	Cost/ unit (₹)	Total consumption (in units)	Total cost (₹)	Cost/ unit (₹)	Total consumption (in units)	Total cost (₹)
1. Material costs						
a) Seeds						
b) Fertilizer						
c) Pesticides Herbicides Fungicides						
2. Labour Costs						

a)Land preparation						
b) Raising nursery						
c) Transplanting						
d) Weeding						
e) Manuring						
f) Plant protection						
g) Harvesting, threshing and processing						
h) Bund & other expenditure						
i) Others						
3. Water management						
4. Post harvest charges						
a) Storage						
b) Transportation						
c) Marketing						
5. Other expenses						

9. Assistance from Agriculture Department

Sl.No.	Scheme	Assistance (in ₹)	Pattern of usage **	Impact @
1.	RKVY (₹ 3000/h.a)			
2.	Sustainable Development of Rice (₹1500/h.a)			
3.	Production Bonus (₹1000/h.a)			
4.	Fallow Land Cultivation (₹30000/h.a)			

** 1) Purchase of inputs, 2) Implements, 3) Agricultural operations, 4) Non agricultural operations

@ a) Increase in area. b) Increase in Production. c) Asset creation. d) Repayment of debt.

10. Benefits availed from various institutions

Institutions	2010-11			2011-12			2012-13		
	Production	Marketing	Opinion	Production	Marketing	Opinion	Production	Marketing	Opinion
Agriculture department									
Panchayath									
Commercial banks									
Cooperative banks									
SupplyCo									

Opinion: Very good, Good, No opinion, Poor, Very poor

11. Details of production before the Seed Subsidy Programme

Sl.No.	Crop season	Variety	Production (k.g)
1.	Virippu		
2.	Mundakan		
3.	Puncha		
4.	Total		

12. Other benefits availed from various institutions

Sl. No	Institutions	Information on improved mgt practice	ToT	Collective bargaining	Marketing support	Financial support
1.	Krishi Bhavan					
2.	Panchayat					
3.	Group Farming Samiti					
4.	Supplyco					
5.	Commercial Banks					
6.	Cooperative Banks					
7.	Kole Development Agency					
8.	The Kerala Land Development Corporation					
9.	Kerala Agricultural University					

13. Details of Minimum Support Price (MSP) and market price

Year	MSP(₹/Kg)	Market Price (₹/Kg)	Amount at which the produce is sold (₹/Kg)
2010-11			
2011-12			
2012-13			

14. What are the main problems in rice farming?

a) Pre production problems b) Production problems c)Post harvest problems

d) Marketing problems e) Institutional problems

15. What are your suggestions to improve rice farming?