

FINAL REPORT

2007-08

FRONT LINE DEMONSTRATIONS AND
ON FARM TRIALS - IMPACT ON
RICE PRODUCTION OF KERALA

Funded by the
State Planning Board, Thiruvananthapuram

KAU
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Chapter 1

INTRODUCTION

- **Background**
- **On-farm trials (OFT)**
- **Front Line Demonstrations (FLD)**
- **Methodology**
- **Presentation of Report**



I. INTRODUCTION

1.1. Background

The paddy sector of our state is experiencing a myriad of problems and consequently the area under rice cultivation is declining at an alarming rate. From the 8.94 lakh ha in 1974 the area declined to 5.07 ha by 1994 (decrease for 20 years is 43 %) and 2.89 ha by 2004-05 (decrease for 10 years is another 43%). The declining trend continues unabated in the state despite the restrictions on paddy land conversions and the concerted efforts in the form of cultivation incentives, input subsidies etc (Table 1.1). The major reason for drastic decline in paddy cultivation is attributed to high cost of production and change over to cash crops. Non-availability of labour, drudgery involved in field operations and problems in procurement also contribute to the decline in paddy cultivation. The compounded effect of these losses on the food base, economy and ecology of the state remained to be ascertained. Recurring floods, ground water depletion, erosion in the wetland biodiversity and changes in microclimate are considered as the direct effect of paddy land conversion.

Table 1.1. Comparison of rice area (ha) in Kerala over the years

Season	1995-96	2004-05	Variation (%)
Virrippu	186676	105349	-44
Mundakan	224643	148893	-34
Puncha	59831	35732	-40

It was in this backdrop the Kerala State Planning Board made its intervention to promote rice production by combating the production related constraints through technical interventions. Frontline demonstrations (FLDs) and on-farm trials (OFTs) were sanctioned in all the districts of the state except Kasargod and Kozhikode. The implementation of the project was entrusted with the Krishi Vigyan Kendras of the respective district through the Directorate of Extension, Kerala Agricultural University.

1.2. On Farm Trials (OFT)

Evaluation of new production techniques under field conditions, elimination of investment on large acreage or costs and evaluation of new techniques for adaptability to each individual farming situation are tested in on-farm trials. A total of 10 OFTs were sanctioned at a total outlay of Rs 3,90503 (Rupees three lakhs ninty thousand five hundred and three only) for the state in 2007-08. Four pests and nutrient management trials, one soil management trial, two variety evaluation trials and three cattle management trials were fixed for the twelve KVKs.

1.3. Front Line Demonstrations (FLD)

Successful field trial results formed the concepts of FLD and the results were demonstrated to educate farmers on the proven advantages of the technology in the

locality. An amount of Rs.20,86,025 (Rupees twenty lakhs eighty six thousand and twenty five only) was sanctioned for a total of 17 FLDs in the state for the year. Scientific rice cultivation, System of Rice Intensification, popularization of varieties-mechanization in rice, nutrient and pest management, group farming and medicinal rice formed the themes for the FLDs implemented by 12 KVKs.

The list of these projects implemented through the various Krishi Vigyan Kendras of the state is presented in Table 1.2.

Table 1.2. List of OFT/FLD sanctioned for the different KVKs of Kerala (2007-08)

No.	Name of KVK	OFT/ FLD	Theme / Title	Amount Sanctioned Rs.	Budget Estimate Rs.
1	KVK, Trivandrum	FLD	SRI (System Rice Intensification)	2,00,000	Critical Inputs -1,40,000 Contingency -60,000
1b		FLD	Use of leaf colour chart (LCC)for applying nitrogen at critical development stage of paddy	50,000	Critical Inputs - 25,000 Contingency -25,000
1c		FLD	<i>Pseudomonas fluorescense</i> in the control of blast, sheath blight and sheath rot	50,000	Critical Inputs - 20,000 Contingency - 30,000
Total Rs. 3.00.000					
2	KVK, KOLLAM	FLD	Comprehensive package for enhancing rice production in Kollam District	1,88,250	Critical Inputs -1,22,000 Field Assitance - 20,000 Training - 10,750 Soil Testing - 1500 POL/hire charges -20,000 Miscellaneous - 2,000 Skilled assistance -12,000
Total Rs. 1.88.250					
3	KVK, IDUKKI	FLD	Optimization of nitrogen fertilizer in rice through LCC based INM approach	13,560	Material/Chemical/Fertilizer cost - 13,560
3b		FLD	SRI for improving productivity of paddy	16,590	Machinery/Material/ Chemical/Fertilizer cost - 16,590
3c		OFT	Management of paddy yellow stem borer	1,700	Material/Chemical - 1700
3d		FLD	Management of paddy blast	6,000	Material/Chemical -6000
3e		OFT	Assess the performance of <i>Glyricidia</i> sp. for control of ectoparasites in farm animals	6,000	Material/Chemical - 6000
3f		OFT	Assessing specific infertility problem in dairy cow and its management (Tackling prolonged calving	5,100	Material/Chemical - 5100

			interval)		
3g		OFT	Assessing the performance of indigenous knowledge for control of Tympany in dairy cattle	3,645	Material/Chemical - 3645
Total Rs.52 595					
4	KVK, THRISSUR	FLD	Mechanised rice transplanting	1,60,000	Rice Transplanter-1,25,000 Labour - 10,000 Chemical/Fertilizer/Fuel - 20,000 Miscellaneous - 5,000
4b		FLD	Cultivation of medicinal rice njavara in the uplands	65,000	Chemical/Fertilizer - 45,000 Labour - 10,000 Miscellaneous - 10,000
4c		OFT	Integrated package for nutrient and pest management in rice	88,667	Material/Chemical/Fertilizer - 75334 Labour - 13333
Total Rs.3,13,667					
5	KVK, MALAPPURAM	FLD	Mechanical paddy harvesting using KAMCO KR120 Reaper	1,00,000	Machinery - 70,000 Labour - 14,000 POL - 2000 Miscellaneous - 14,000
5b		FLD	Mechanical rice transplanting using Yanji Shakti rice transplanter	1,92,000	Machinery - 150,000 Labour - 7000 Material/Fuel - 22,000 Miscellaneous - 13,000
Total Rs.2,92,000					
6	KVK, PATHANAM-THITTA	FLD	Bio-intensive pest and disease management in paddy	89,125	Input cost - 57,500 Training/Field day - 20,000 Overhead - 11625
6b		OFT	Integrated Nutrient Management (INM) in paddy	1,16,524	Input cost - 87,325 Training/Field day - 14,000 Overhead - 15199
6c		OFT	Integrated Crop Management (ICM) in paddy as an alternative to SRI	59,322	Input cost - 31,584 Training/Field day - 20,000 Overhead - 7738
Total Rs.2,64,971					
7	KVK, KOTTAYAM	OFT	Ameliorative Management Techniques for acute soil acidity in direct zone rice crop of Kuttanad eco system	70,000	Skilled Ass/Labour - 24,000 Operational expenses - 30,000 Travelling Allowance - 10,000
Total Rs.70,000					
8	KVK, WAYANAD	FLD	Group farming approach in paddy cultivation	73,000	Material/Chemicals/Operational Charges - 68,000 Miscellaneous - 5,000
Total Rs.73,000					

9	KVK, KANNUR	FLD	Formation of Paddy Task Force for combating labour crisis in rice production	4,58,500	Operational Cost - 22,500 Training/Refreshment - 37,000 Machinery - 3,99,000
9b		OFT	Evaluation of rice varieties resistant to Fe toxicity	7545	Material/Chemicals - 7545
					Total Rs. 4,66,045
10	KVK, ALAPPUZHA	FLD	Integrated nutrient and pest management for improving yield and profitability in rice	2,42,000	Inputs/FFS Kit/Honorarium/Soil Testing/Training/Publication/Contingencies/Overhead - 2,42,000
					Total Rs. Rs.2,42,000
11	KVK, PALAKKAD	FLD	Scientific Cultivation of rice in different rice tracts of Palakkad	1,50,000	Input/Labour - 1,50,000
					Total Rs.1,50,000
12	KVK, ERNAKULAM	FLD	Introduction cum popularization of the proven Pokkali Paddy variety VTL - 6	32,000	Input/Labour - 32,000
12b		OFT	OFT of the new variety of Pokkali paddy, VTL - 7	32,000	Input Labour - 32,000
					Total Rs.64,000
Amount sanctioned for documentation at the Directorate of Extension					Rs.23,472
					Total sanctioned amount Rs.25,00,000

1.4.Methodology

Sanctioned OFTs/FLDs were implemented in selected fields of the respective districts under the co-ordination and supervision of the concerned KVKs. The data on impact analysis was compiled through a pre-tested questionnaire prepared for the purpose (Annexure) and consisted of two parts to collect responses of the implementing agencies and the participated farmers. Apart from the details on socio-economic characteristics of the respondents, data on variables that measured the socio-economic, technological and ecological relevance of the introduced interventions were collected from all the KVKs that implemented the programme. Data on Part B of the schedule was collected from 10 farmers randomly selected from the programme area of each KVK constituting a total sample size of 100 for the state. Simple statistical tools of mean, percentage and t tests were used in the analysis of data to arrive at useful conclusions. Data was collected from 10 KVKs except KVK, Ernakulam and KVK, Kottayam where the sanctioned programmes could not be implemented due to delay in fund release.

The financial statement of the programme implemented in different districts of the state is given as Table 1.3.

Table 1.3 Financial statement

Name of KVK	Amount sanctioned (Rs)	Expenditure (Rs)	Balance (Rs)	Remarks
Thiruvananthapuram	3,00,000	300000	0	
Kollam	1,88,000	147412	40588	
Pathanamthitta	2,64,971	237036	27935	
Alappuzha	2,42,000	224997	17003	
Idukki	52,595	52595	0	
Thrissur	3,13,667	253191	60476	
KVK, Palakkad	1,50,000	147141	2859	
Malappuram	2,92,000	246985	45015	
Wayanad	73,000	69849	3151	
Kannur	4,66,045	457165	8880	Unutilized Rs 7545 sanctioned for OFT
Unimplemented districts		0	0	
Kottayam	70,000	0	70000	
Ernakulam	64,000	0	64000	
<i>Documentation charges at DoE</i>	23,472	23472	0	
Total	25,00,000	2159843	339907	

1.5. Presentation of Report

The report is presented in three chapters. Background of the programme, introductory remarks and the financial statement are included as Chapter one. District wise evaluation of the OFTs and FLDs implemented by the different KVKs of the state based on selected quantitative and qualitative parameters are provided as chapter two. Salient results along with inferences and conclusions derived from the documented perceptions of the farmers who participated in the programme are presented in chapter three followed by Annexure.



Chapter 2

DISTRICT-WISE EVALUATION

REPORT

- **Thiruvananthapuram**
- **Kollam**
- **Pathanamthitta**
- **Alappuzha**
- **Idukki**
- **Thrissur**
- **Palakkad**
- **Malappuram**
- **Wyanad**
- **Kannur**

2. DISTRICT-WISE EVALUATION REPORT

All of the 17 FLDs and 10 OFTs sanctioned for implementation during 2007-08 were completed successfully except the three on-farm trials of Kottayam, Ernakulam and Kannur and one frontline demonstration of Ernakulam. The delay in sanction of funds has been reported as the reason for non-implementation of the trials as the rice cultivation in these districts is confined to first crop season. A concise report of the field implementation details, results and its impact on the rice production scenario of the respective districts of the state is attempted and presented below.

2.1 THIRUVANANTHAPURAM

Rice cultivation is dwindling in Thiruvananthapuram district due to high cost of cultivation and low income from paddy. As an initiative to combat these problems by popularizing technological advancements in rice production, three Front Line Demonstrations were sanctioned to Mitraniketan KVK, Vellanad Thiruvananthapuram for implementation in the district by the Kerala State Planning Board. The details of the sanctioned demonstrations and budget are given as Table-2.1.1.

Table 2.1.1. List of Front Line Demonstrations sanctioned for the district

<i>Sl.No.</i>	<i>Title</i>	<i>Amount sanctioned(Rs.)</i>
1.	System of rice intensification	2,00,000
2.	Use of leaf colour chart (LCC) for visual and subjective indicator for applying nitrogen at critical development stages of paddy	50,000
3	Demonstration of pseudomonas fluorescence in the control of blast, sheath blight and sheath rot in paddy	50,000
	Total	3,00,000

Objectives

Along with the overall objective of reducing cost of cultivation and enhancing profitability, the programme also entailed the following specific objectives.

- ❖ To demonstrate and impart the skills involved in SRI cultivation of rice
- ❖ Demonstrate the use of LCC as a visual and subjective indicator for applying Nitrogen at critical development stages of paddy to assess the need of nitrogen in the paddy field
- ❖ Reducing the indiscriminate use of pesticides and demonstrating growth promotion and prevention of diseases using *Pseudomonas fluorescence*

Season: Three FLDs were successfully demonstrated in farmers' fields during Rabi Season (September 2007 – January 2008)

Location and participation of farmers

A total number of seven hundred (700) paddy farmers were covered through the FLD programmes. Duration for the completion of all the demonstrations was 4 months. Eighteen Panchayaths of Thiruvananthpuram district covered under the FLD programme were Pulimath, Chithara, Uzhamalakkal, Tholikkode, Nettayam, Vellanad, Madavoor, Aryanad, Nagaroor, Madavoor, Kilimanoor, Karavarom, Navaikulam, Pallikkal, Pazhayakunninmel, Kareepra, Odanavattom and Nellanad.

Apart from KVK, which served as the nodal implementation agency, all the Front Line Demonstrations were done with total linkage with the Agricultural Officers of the respective Krishi Bhavans and the Group Farming Samithis of the selected Padashekarams. A list of agencies involved in the implementation of the programme, along with the type of involvement are given as Table-2.1.2.

Table 2.1.2. Agricultural development agencies involved in the implementation of the programme

<i>Name of agency</i>	<i>Type of agency</i>	<i>Type of involvement</i>
KVK	NGO	Nodal implementing agency, Trainings, monitoring, documentation
Krishi Bhavans- State Dept. of Agriculture	Govt. of Kerala	Selection of <i>Padasekharams</i> and organizing farmers meetings
<i>Padasekhra</i> samitis,	Farmer organization	Implementation of the project and joint monitoring
Nitrogen Parameters, Chennai	Private company	Design and supply of LCC in malayalam

Technology dissemination as part of the programme

Trainings were organized as part of the programme in the selected area involving a total of 700 farmers in the selected 18 Panchayats of the district. About nine percent of the total trainings organized by the KVK was on topics related to profitable rice production as part of the programme. A folder in Malayalam on method of application of *Pseudomonas fluorescence* (*Pseudomonas fluorescence upayogakramam*) and a booklet in English on Leaf colour chart based nitrogen management in rice were published as technology dissemination tools.

Major interventions under the programme

- ❖ One Rotary Marker and one Rotary weeder / per farmer was distributed
- ❖ A Leaf Colour Chart (LCC) developed by IRRI, Philippines as a simple, easy to use and inexpensive tool to determine the time of N top dressing to rice specially produced in Malayalam was ordered from Nitrogen Parameters, Chennai
- ❖ Use of *Pseudomonas fluorescence* in the control of blast, sheath blight and sheath rot in paddy

Major activities

In order to achieve the effective implementation of these interventions, the following activities were taken up in the selected area.

- ❖ Training and demonstration of use of rotary marker and rotary weeder
- ❖ Popularization of SRI skills at various stages of crop growth
- ❖ Each FLD farmer selected was given an LCC and he started assessing the nitrogen present in his field at two weeks interval from the 14th day after transplanting
- ❖ While using the LCC, the same farmer took the readings at the same time of the day
- ❖ When six or more leaves read below 4th critical value (CV-4) 35 kg N/ha was applied. When the CV was four or above he decided to skip the nitrogen application
- ❖ Selected farmers were given 2.5 kg *Pseudomonas* in order to manage the high incidence of blast, sheath blight and sheath rot diseases in paddy

- ❖ Paddy seeds used for sowing was treated with *Pseudomonas* (20g/Kg seeds), later when the seedlings were ready for transplanting, seedling treatment was done by drenching the nursery few days before transplanting
- ❖ A third application of *Pseudomonas* as main field spraying over paddy crop (3-5g/litre) at monthly intervals

Impact on rice production

I. System of rice intensification (SRI)

By adopting SRI, the farmer could reduce the seed quantity required to 1/10th of the traditional method and water requirement was reduced by over 50%. By using rotary marker, the farmer could easily plant rice seedlings in correct spacing. By using rotary weeder to remove weeds, the farmer was able to reduce the cumbersome effort involved in weeding. Use of rotary weeder loosened the soil and thereby gave good aeration and root proliferation. It incorporated the weeds into the soil which helped in recycling of weed biomass. As the tillering increased in SRI method, it increased the grain yield by added number of fertile tillers, number of grains per panicle and higher seed weight. The impact of the programme in quantitative terms is given as Table-2.1.3.

Table-2.1.3. Quantitative measures of the impact of the FLD on SRI

a) Yield (Kg/ha)	Average yield of the district – 4700kg/ha	Yield recorded in OFT/FLD 6300 Kg/ha
b) Savings in input (Kg)	Seeds - 72 kg/ha (worth Rs 1500)	Fertilizers Urea - 2450 Kg PPC 5 kg
c) Savings in labour from newly introduced technology (if any, in man days)	06 man days/ha	
e) Change in cost of cultivation (Rs)	Conventional method: Rs 48,000/ha	Average cost of cultivation in the OFT/FLD Rs.45,125/ha

II. Use of leaf colour chart (LCC) in N management

Cost of fertilizer is one of the main factors involved in the cost of cultivation of paddy. Out of the major nutrient elements, nitrogen is usually applied haphazardly by the farmer in excess dosage or in lower amount compared to the recommendation as per package of practices. Usually when nitrogen is applied in excess, it attracts pest infestation and even result in lodging due to excess vegetative growth of the plant. When nitrogen is deficient in the soil, it will affect the over all growth and development of the plant which will eventually result in decrease in yield. Quantitative measures of the impact of the FLD are given as Table-2.1.4.

Table-2.1.4. Quantitative measures of the impact of the FLD on LCC

a) Yield (Kg/ha)	Average yield of the district – 4700kg/ha	Yield recorded in OFT/FLD 6300 Kg/ha
b) Savings in input (Kg)	Seeds - 72 kg/ha (worth Rs 1500)	Fertilizers Urea - 2450 Kg PPC 5 kg
c) Savings in labour from newly introduced technology (if any, in man days)	06 man days/ha	
e) Change in cost of cultivation (Rs)	Conventional method: Rs 48,000/ha	Average cost of cultivation in the OFT/FLD Rs.45,125/ha

A Leaf Colour Chart (LCC) developed by IRRI, Philippines, a simple, easy to use and inexpensive tool enabled the farmer to decide the time and correct doze of N top dressing to rice. For the first time in Kerala, Mitraniketan KVK specially ordered LCC from Nitrogen Parameters, Chennai to produce LCC in Malayalam. This helped the farmers to measure the leaf colour intensity, an indicator of crop need for N and avoided over or under fertilization of N and ensured maximum fertilizer use efficiency. By using LCC any farmer could take apt decision in a short time and apply the nitrogen in fertilizer form according to the need. Each FLD farmer selected was given an LCC

and he started assessing the nitrogen present in his field at two weeks interval from the 14th day after transplanting. While using the LCC, the same farmer took the readings at the same time of the day (8-10 a.m. or 2-4p.m.) with the sun at his back to shade the leaf being measured. The same person took the leaf colour measurement through out the growth period. He selected at random 10 disease free rice plants in a field with uniform plant population. He compared the colour of the youngest fully expanded leaf of the 10 selected plants by placing its middle part on top of the colour strips in the chart. Leaf was not detached or destroyed. When six or more leaves read below 4th critical value (CV-4) he applied 35 kg nitrogen/hectare. When the CV was four or above he decided to skip the nitrogen application. Use of LCC helped the paddy farmers to use nitrogen fertilizer judiciously according to the need of the plant. It avoided wastage of nitrogen fertilizer due to leaching and volatilization when used in excess as practiced in the traditional method. It helped plant to get the nitrogen nutrient at all critical development stages of plant growth, thereby enhancing the yield level. It avoided overgrowth of plant, incidence of pests and prevent plants from lodging.

III. Demonstration of *Pseudomonas fluorescence* in the control of blast, sheath blight and sheath rot in paddy

High incidence of blast, sheath blight and sheath rot diseases were reported as the major reasons for low yield from paddy. The indiscriminate use of plant protection chemicals by the farmers resulted in high cost of production and poor control of the diseases. Often farmers were not able to differentiate between fungal and bacterial diseases and they failed to use the right chemical at the right time.

Pseudomonas fluorescence is a bio control agent having broad-spectrum action against fungal and bacterial diseases. It is cost effective and was recommended as prophylactic application. It also had plant growth promoting action. In order to manage the high incidence of blast, sheath blight and sheath rot diseases in paddy; paddy seeds used for sowing was treated with *Pseudomonas* (220 g/kg. seeds). later when the seedlings were ready for transplanting, seedling treatment was

USE OF LCC



Plate 2.1.1

USE OF LCC



Plate 2.1.2



**GROWTH PROMOTION AND PREVENTION OF DISEASES USING
PSEUDOMONAS FLUORESCENCE**

Plate 2.1.3

USE OF ROTARY WEEDER IN SRI



Plate 2.1.4

USE OF ROTARY MARKER IN SRI



done by drenching the nursery few days before transplanting. A third application of *Pseudomonas* as main field spraying over paddy crop (3-5g/litre) at monthly intervals was also implemented. A comparison of changes in selected quantitative parameters as a result of interventions through the demonstrations is given as Table-2.1.5.

Table-2.1.5. Quantitative measures of the impact of the FLD on *Pseudomonas*

a) Average increase in yield (kg/ha)	6300	34 % increase over average district yield
b) Savings in input (kg/ha)		
Seeds	72	90% reduction
Fertilizers	35	50% savings
Labour (mandays/ha)	06	
e) Change in cost of cultivation (Rs/ha over district average)	2875	6% reduction

Glimpses of the major interventions under the programme for the district have been included as Plates 2.1.1 to 2.1.5.

2.2. KOLLAM

Rice production in the district shows a dwindling trend over the past few years. Statistics on area and production of rice in the district from 2003-06 recorded a reduction of 29 %. As a measure to combat this declining trend and ensure sustainable production and profit from rice farming a Front Line Demonstration on comprehensive rice production improvement through sustainable practices was sanctioned by the State Planning Board during 2007-08 at a total outlay of Rs 1,88,250.

Objectives

The major objective of the programme was to augment production and productivity in rice with possible reduction in the cost of cultivation through meaningful participation of stakeholders. It also served to evolve an effective site specific package for sustainable rice production in the selected *Padashekaram*.

Approaches that were followed in the implementation included

- community based management of resources such as seed materials, labour, farm machinery etc
- community based implementation of transplanting, intercultural operations, plant protection measures, harvesting and marketing

Season: Implementation of the programme was taken up in the Rabi season, October 2007- January 2008

Location and participation of farmers

Vekulam Ela Padasekhara Samithi was selected for the implementation of the programme after detailed consultations with the peoples' representatives and officials of the State Department of Agriculture. After farmer meetings and detailed survey on factors causing fallowing and conversion of paddy lands in the selected area, 31 farmers from four *Elas* under the Samithi covering an area of 6.26 ha was finalized for the programme. The details of the project implementation area are given as Table-2.2.1.

Table-2.2.1. Details of project implementation area

Sl.No.	Name of Ela	Area (ha)	Crop in previous season	No. of farmers
1.	<i>Vekulam</i>	2.48	Fallow	9
2.	<i>Parakkal</i>	1.30	Fallow	7
3.	<i>Alakode</i>	1.40	Fallow	8
4.	<i>Nechoor</i>	1.08	Rice	7
	Total	6.26		31

Apart from KVK, Kollam which served as the nodal implementation agency, the local officials of the State Department of Agriculture, group farming samithis and the Pachyat Raj Institutions played critical roles in programme implementation. The programme promoted close partnerships between these agencies operating in the area and their details along with the type of involvement are given as Table-2.2.2.

Table-2.2.2. Agricultural development agencies involved in the implementation of the programme

Name of agency	Type of agency	Type of involvement
KVK, Kollam	Kerala Agricultural University	Nodal implementing agency, Training
Krishi Bhavan- State Dept. of Agriculture	Govt. of Kerala	Selection of <i>Padasekharam</i> , AESA
<i>Padasekhra</i> samithi	Farmer organization	Co-ordination of farmers, implementation of the project
Pattazhi Grama Panchayat, Dept. of Local Administration	Govt. of Kerala	Supply of seeds and fertilizers

Technology dissemination

Trainings were organized on sustainable rice production practices with thrust on technologies that promoted concepts like community, resources, integration, sustainability and profitability as part of the programme and the entire concept was abbreviated as Comprehensive Rice Production Improvement through Sustainable practices (CRISP). Regular field visits and training programmes on various sustainable cultivation practices in rice conducted for the farmers included field level seminar on IPDM strategies at Pattazhi. Participant farmers in training programmes were exposed to scientific packages on sustainable rice farming, orientation in AESA, integrated pest and disease management and mechanized harvesting. About nine percent of the training programmes organized by the KVK during 2007-08 were conducted as part of the programme. A field-day cum harvest festival inaugurated by the Hon. Minister of Agriculture was also organized as part of the programme. A booklet in Malayalam on *Samagra nelkrishi vikasanam suthira krishi reethikaliloode sankethika vidyayum prayogiganubhavangalum* was published as a means of experience sharing and technology transfer. A detailed report on FLD was also published as part of the programme.

Major interventions

The major technological interventions introduced in the *Padashekaram* as part of the programme for enhancing yield and profitability included the following.

- ❖ High yielding short duration variety
- ❖ Integrated nutrient management (INM)- LCC, chemical fertilizer use as per soil requirement
- ❖ Seed and seedling treatment using bio agents (*Pseudomonas* sp.)
- ❖ Weeding and water management techniques to enhance input use efficiency

- ❖ Agro-ecosystem analysis (AESA) approach for empowering farmers in IPDM principles in pest control
- ❖ Use of mechanized harvester
- ❖ Catch crop of cowpea in the harvested fields

Major activities

In order to achieve the effective implementation of these interventions, the following activities were taken up in the selected area.

- ❖ Demonstration on high yielding rice varieties in the *Ela*
- ❖ Partial mechanization of farm operations especially harvest in paddy
- ❖ Synchronized farm operations
- ❖ Integrated and site specific nutrient management
- ❖ Encourage population of natural enemies of rice pests through IPDM principles
- ❖ Use of bioagents for pest management
- ❖ Need based and integrated pest and disease management strategies
- ❖ Capacity building of farmers in group management and scientific cultivation practices

Impact on rice production

Evaluation of the programme and its results by the participant farmers and the implementing agency proved that the programme effectively demonstrated the efficacy of sustainable practices in rice production. Quantitative measures of the indicators used in the evaluation are given as Table-2.2.3.

Table-2.2.3. Quantitative indicators used in the evaluation of FLD

Quantitative indicators	Measure of change (%)
Reduction in seed rate	33
Reduction in use of chemicals	20
Increase in yield	36
Saving in labour (mandays)	25
Reduction in cost of cultivation	20

Major advantages of the programme as perceived by the implanting agency included the following.

- The concept of Agro Eco System Analysis (AESA) was introduced to the farming community to monitor the positive and negative factors that influence production
- The farming community realized the feasibility, utility and profitability of mechanization of harvesting and threshing
- The community expressed its faith in the positive effects of group farming and participatory resource management
- The programme could emphasize the social, economic and environmental importance of conserving paddy lands and reviving paddy cultivation
- The programme disproved the notion that paddy cultivation is non profitable
- The programme could convincingly prove that paddy cultivation would catch up in the state provided the government instills within the farmers a sense of security and pride
- As an immediate outcome, about fifty new farmers have expressed interest in resuming rice cultivation in the coming season.

Glimpses of the major interventions under the programme for the district have been included as Plate 2.2.1.



Field view of the demonstration plot



Harvest festival organize as part of the programme

Plate 2.2.1

2.3. PATHANAMTHITTA

In order to popularize rice production technologies among the farmers of Pathanamthitta and motivate more farmers into rice cultivation which is confronted with problems of low yield and high cost of cultivation, two on farm trials and one Front Line Demonstration was sanctioned for the district. The programme funded by the State Planning Board was implemented by the Krishi Vigyan Kendra in the selected areas of the district during 2007-08. The details of the OFTs and FLD sanctioned for the district is included as Table-2.3.1.

Table 2.3.1. List of OFT/FLD sanctioned for the district

Sl. No.	OFT/FLD sanctioned	OFT/FLD	Amount (Rs)
1.	Integrated crop management (ICM) in paddy an alternative to system rice intensification (SRI)	OFT	59,322
2.	Integrated nutrient management in paddy	OFT	1,16,524
3.	Bio Intensive Pest and Disease Management in Paddy	FLD	89,125
		Total	2,64,971

Objectives:

1. To demonstrate farmers comparative effect of SRI, ICM and conventional method of paddy cultivation.
2. To demonstrate the farmers on the potential use of bio-fertilizers as an important component in INM for large scale adoption in the district.
3. To demonstrate the farmers and extension functionaries on the potential use of bio-agent and bio-pesticide pest for pest and disease management in rice
4. To compare cost of production, crop growth and yield of SRI and ICM and conventional method of paddy cultivation.

5. To introduce and train the farmers on ICM method of Paddy cultivation.
6. To support the farmers to identify the most cost effective methods of paddy cultivation for larger scale adoption.

Season: The programme was implemented in the second crop season between December 2007- April 08.

Location and participation of farmers

Angadi-Veloor Mundakan Padasekharam of Peringara Panchayath and *Kothavirithi Padashekaram* of Kuttur Panchayath were selected for the implementation of the On-Farm Trials and Front Line Demonstration respectively. The trial was taken up in the selected 24ha of these *Padasekharams* on a group basis directly involving 38 farmers. Apart from KVK, which served as the nodal implementation agency, almost all the major agencies involved in the agricultural development process of the district had critical part in the program. The programme promoted close partnerships between different agricultural development agencies operating in the area and a list of agencies involved in the implementation of the programme, along with the type of involvement are given as Table-2.3.2.

Table-2.3.2. Agricultural development agencies involved in the implementation of the programme

Name of agency	Type of agency	Type of involvement
KVK	NGO	Nodal implementing agency, organizing training programme
Krishi Bhavan- State Dept. of Agriculture	Govt. of Kerala	Selection of <i>Padasekharam</i> , input distribution and field coordination
<i>Padasekhra</i> samithis	Farmer organization	Support in field implementation of the project, farmers level coordination
Kudumbashree Mission	Self Help Groups (SHG)	Conducting OFT

Technology dissemination as part of the programme

Trainings were organized as part of the programme in the selected area involving a total of 385 farmers in and around the selected *Padashekarams* on different aspects of rice production. In order to popularize ICM, a booklet on ICM in paddy is being completed for publication.

Major interventions under the programme

Major technological interventions introduced as part of the programme were

- Bio-intensive pest and disease management by the use of Trichocards, *Pseudomonas* and pheromome traps
- Integrated nutrient management using *Azospirillum*, straight fertilizers and LCC for phasing out N application
- Integrated crop management using SRI techniques, LCC, bio-fertilizers and bio-control agents

Major activities under taken

In order to achieve the effective implementation of these interventions, the following activities were taken up in the selected area.

- ❖ Training and demonstration of use of rotary marker and rotary weeder
- ❖ Popularization of SRI skills at various stages of crop growth
- ❖ Two treatments were compared ie. in SRI, 8 days old seedlings were transplanted at 25x25cm spacing at one seedling per hill after marking with rotary marker
- ❖ Two treatments were compared ie. use of recommended fertilizers as complex and straight fertilizers with 25% N supplied by use of *Azospirillum brasilense*
- ❖ In ICM 12Kg seeds were sown on Mat nursery and 14-16 days old seedlings were planted at two seedlings per hill at a spacing of 20 x20

- ❖ A comprehensive package that included the use of rotary marker, rotary weeder, LCC, biofertilizers, bio-control agents and pheromone traps was popularized

Impact on rice production

I. Integrated crop management (ICM) in paddy an alternative to system rice intensification (SRI)-OFT

Though seed rate used was comparable in both cases, the recorded data indicated higher plant survival, easiness in transplanting, increased number in effective tillers and reduced incidence of pests and diseases in ICM field in comparison with SRI and conventional methods. Yield and related data are included in the Table-2.3.3.

Table-2.3.3. Quantitative measures of the impact of the OFTon SRI

Yield (kg/ha)	District average - 4300	ICM-6500 SRI-5600
Cost involved for nutrient management (Rs/ha)	District average-23,500	ICM-21756 SRI-21844
Savings in input (kg/ha)	ICM	SRI
Seeds	68	72
Fertilizers -Urea	15	15
PPC	2.5	-
Increase in use of organic inputs	Type: Azospirillum Pseudomonas	Quantity: 0.5 kg/ha
Savings in labour from newly introduced technology (if any, in man days)	20 man days/ha (in ICM & SRI)	
Change in cost of cultivation (Rs/ha)	District average 23500	Average cost of cultivation in the OFT/FLD 18000 Rs/ha

II. Integrated nutrient management in paddy (OFT)

Salient observations from the field indicated that soil application of *Azospirillum brasilense* strain AZR 15 taken from Kuttanad soil @ 500g/10kg rice seed after over night incubation and kept for another 6 hours before sowing supplied 25% N requirement of the crop. A comparison of growth characters between plots where straight fertilizers were applied showed a comparable growth characters with the field applied with costly complex fertilizers. Nitrogen application by use of LCC saved Urea by 27.5 kg/ha and reduced pest and disease incidence in the field. Use of straight fertilizers viz. Urea and Rajphos along with azospirillum reduced the fertilizer application cost by Rs.556 and supplemented the micronutrient requirements of the crop compared to fields where complex fertilizers were used. The major outcomes of the trial in terms of quantitative indicators are given as Table-2.3.4.

Table-2.3.4. Quantitative measures of the impact of the OFT on INM

Yield (kg/ha)	District average- 4300	Average under the OFT-7200
Cost of cultivation Rs/ha	District average-23,500	Average under the OFT- 22674
Savings in input (kg/ha)	25	
Seeds	49	
Fertilizers -Urea PPC	1.8	
Increase in use of organic inputs	Type: Azospirillum	Quantity: 4 kg/ha
Savings in labour	Nil	

III. Bio Intensive Pest and Disease Management in Paddy (FLD)

Bio-intensive methods of pest and disease management like use of *Pseudomonas*, *Trichocards*, pheromone traps and *Trichograma* was popularized through field demonstrations. Field spray of *Pseudomonas* against sheath blight could

effectively control the further spread of the disease. As such it avoided the use of any chemical fungicides during the crop. *Trichogramma japonicum* used against stem borer and *T. chilonis* against leaf folder could effectively control the pests and reduced cost of plant protection by 38.6 %. The pest and disease incidence was negligible in demonstration fields compared to conventional fields that showed over 40% disease incidence. Use of trichocard was found very effective, in contiguous area of treatment and in fields where same planting time was maintained along with optimum water level and fertilizer use. However, pheromone traps introduced in the 40th day of planting was not effective against stem borer. A quantitative measure of the out come of the trial is given as Table-2.3.5.

Table-2.3.5. Quantitative measures of the impact of the FLD on pest and disease management

Average cost involved for the purpose Rs/ha	District average-3950	Average under the FLD-2850
Savings in input (per ha)	Nil	
Seeds	Nil	
Fertilizers	Sevin @ 2.5 kg, Monocrotophos @ 600ml, Carbendazim @ 500g	
PPC		
Increase in use of organic inputs	Type: <i>Trichogramma japonicum</i> <i>Trichogramma chilonis</i>	Quantity: 5cc/ha 5cc/ha
Savings in labour (per ha)	4 man days	

However, a precise estimate of the benefit on yield could not be made as the crop was damaged in summer showers which destroyed the outer bunds. Glimpses of the programme from the field has been included as Plate 2.3.1



Field view of the demonstration plot



Field view of the crop damage in natural calamity

Plate 2.3.1

2.4. ALAPPUZHA

Alappuzha is one of the traditional rice production tracts of the state with average yields above the state average. Despite the high yields, the declining trend in paddy production in the state continues unabated in the district also. Though the geographical peculiarities prevalent in the district restrict conversion of paddy lands responses like fallowing and sand mining are quite common, that adversely affect paddy production. Increasing cost of cultivation of paddy and the subsequent decline in profitability are viewed as the major reason responsible for the trend. It was in this context a Front Line Demonstration was sanctioned for the district on Integrated Nutrient and Pest Management for Improving Yield and Profitability in Rice at a total financial outlay of Rs.2,42,000. The major objectives pursued under the programme were as follows.

Objectives

- ❖ To demonstrate the Integrated Nutrient and IPM practices in Rice
- ❖ To increase the awareness, knowledge and skill on identification and promotion of natural enemies/bio control agents through Farmer Field Schools (FFS)
- ❖ To demonstrate value addition of rice and straw for additional income

Season: The programme was implanted in the third crop season between December 2007- April 08.

Location and participation of farmers

The 9th Block *Padasekharam* of Chennithala Panchayath in Mavelikkara taluk, which lies in Upper Kuttanad region was selected for the programme. The trial was taken up in the selected 50 ha of the *Padasekharam* on a group basis involving 113 farmers. Apart from KVK, Allapuzha which served as the nodal

implementation agency, almost all the major agencies involved in the agricultural development process of the district had critical part in the program. The programme promoted close partnerships between different agricultural development agencies operating in the area and a list of agencies involved in the implementation of the programme, along with the type of involvement are given as Table 2.4.1.

Table 2.4.1. Agricultural development agencies involved in the implementation of the programme

Name of agency	Type of agency	Type of involvement
KVK	Kerala Agricultural University	Nodal implementing agency
Krishi Bhavan-Chennithala (Dept. of Agriculture)	Govt. of Kerala	Selection of <i>Padasekharam</i>
9th Block <i>Padasekhra</i> samiti, Chennithala	Farmer organization	Implementation of the Project
RRS, Moncompu (KAU)	Govt. of Kerala	
FACT	Govt. of Kerala	Training
Chennithala - Thriperumthura service co-operative society	Farmer co-operative	Supply of bio-fertilizers, fertilizer and PP Chemicals
National Seeds Corporation	Govt. of Kerala	Supply of seed materials
RAIDCO	Govt. of Kerala	Supply of FFS kit
	NGO	Supply of <i>Pseudomonas</i> and Trichocards
Gandhi Smaraka Seva Kendram		

Technology dissemination as part of the programme

Trainings were organized as part of the programme in the selected area involving a total of 407 farmers in and around the *Padashekaram* on different aspects of rice production. Fourteen percent of the total trainings organized by the KVK was on topics related to profitable rice production related to the programme. A detailed report on the programme entitled integrated nutrient and pest management for improving yield and profitability in rice was published under the programme.

Major interventions under the programme

The major technological interventions introduced in the *Padashekaram* as part of the programme for enhancing yield and profitability included the following.

- ❖ High yielding medium duration variety
- ❖ Integrated nutrient management (INM)-soil testing, LCC, chemical and bio fertilizers(Azospirillum)
- ❖ Seed treatment using bio agents (Pseudomonas sp.)
- ❖ Seedling treatment using bio agents(Azospirillum)
- ❖ Vermicomposting techniques to reduce external inputs
- ❖ Farmer field school (FFS) approach for empowering farmers in IPM
- ❖ Use of tricho cards against stem borer

Major activities

In order to achieve the effective implementation of these interventions, the following activities were taken up in the selected area.

- ❖ Pre-programme documentation of basic data
- ❖ Participatory rural appraisal (PRA) conducted
- ❖ High yielding Paddy Variety Jyothy – 3990 Kg From National Seeds Corporation, Trivandrum
- ❖ Group meetings and training programme conducted regarding general cultivation practices, integrated nutrient management including acidity management, practices for reducing cost of cultivation etc. organized in collaboration with experts of RARS, Kumarakom.
- ❖ Organized training on soil fertility analysis and method demonstrated
- ❖ Representative soil samples collected and analyzed
- ❖ Method demonstration sessions on seed treatment with Pseudomonas

- ❖ Method demonstration on use of bio fertilizers
- ❖ Method demonstration on Vermicomposting
- ❖ Organized Rodent control Campaign
- ❖ Supplies 75% of chemical fertilizers based on soil test recommendation
- ❖ Organizing scheduled Farmer Field schools (FFS) on every Saturday from 7.30 am onwards in which agro-ecosystem analysis, farmer – expert interaction, group discussion and decision making process were
- ❖ Demonstrated the use of Trichocards and adopted them in the *Padasekharam* against paddy stem borer and leaf roller
- ❖ Demonstrated the use of Leaf Colour Charts for application of Nitrogenous fertilizers and the farmers adopted the simple method for the judicious use of N fertilizers
- ❖ Timely practical oriented training programmes conducted on ‘Scientific paddy cultivation’, ‘Integrated Pest management’, ‘Integrated Disease management’ and ‘Vermi-composting techniques’
- ❖ Prophylactic spraying of pseudomonas against diseases in rice
- ❖ Training programmes scheduled for the women farmers/ family members on Profitable mushroom cultivation using paddy straw, Urea treatment for enrichment of paddy straw, value addition of Rice and rice based products
- ❖ Post programme documentation of Impacts, perception of the participants and final Field day and Harvest festival will be conducted during April 2008.

Impact on rice production

Evaluation of the programme and its results by the participant farmers and the implementing agency was done both on quantitative and qualitative terms. The impact of the introduced interventions over the conventional recorded on the

quantitative and qualitative indicators by the implementing agency are furnished in Table 2.4.2.

Table 2.4.2. Quantitative and qualitative indicators for assessing the impact of the programme

Quantitative indicators	Measure (%)
Reduction in use of chemicals	40-50
Reduction in fertilizer cost	25
Reduction in cost of cultivation	10
Reduction in seed rate	20
Increase in yield	150
Qualitative indicators	
Ecosystem based decision making in pest control	
Increase in natural enemy population	
Use of biofertilizers	
Use of Tricho cards and other bio pest control measures	

The programme which enabled the evolution of a location specific strategy for rice cultivation in the area helped in reducing the cost of cultivation by Rs 2000/ha and popularized the use of organic inputs. A comparison of the outcome of the programme with the conventional practices followed in the area was attempted using selected quantitative parameters (Table-2.4.3). Thus the popularization of a comprehensive rice production strategy suitable to the agro-ecological peculiarities of the area could convince many rice farmers who had fallowed their rice fields for many years to take up rice cultivation in a profitable manner.

Table-2.4.3. Comparison of programme outcome with the conventional methods

a) Yield (Kg/ha)	Average yield of the district - 2200 Kg/ha	Yield recorded in OFT/FLD 5500 Kg/ha
b) Savings in input (Kg)	Seeds - 1000 Kg	Fertilizers Urea - 2450 Kg Massuriphos - 3050 Kg Potash - 900 Kg PPC 5 kg
c) Increase in use of organic inputs	Type: Vermicompost Azospirillum Pseudomonas	Quantity: 75 Kg 13 Kg
d) Savings in labour from newly introduced technology (if any, in man days)	3 man days/ha (Reduction in Plant protection)	
e) Change in cost of cultivation (Rs)	Conventional method: 20000 Rs/ha	Average cost of cultivation in the OFT/FLD 18000 Rs/ha

Glimpses of the major interventions under the programme for the district have been included as Plates 2.4.1 to 2.4.2.



Field view of the demonstration plot



Use of LCC in the field

Plate 2.4.1

Glimpses of harvest festival



Plate 2.4.2

2.5. IDUKKI

Considering the agricultural importance of the district a maximum of four OFTs and three FLDs were sanctioned for the district at a total financial outlay of Rs 52,595 by the State Planning Board for implementation during 2007-08. The details of the programme sanctioned for implementation by the KVK, Idukki is included as Table-2.5.1. All the trials were successfully implemented with results that can positively influence the rice production in the district.

Table 2.5.1. List of OFT/FLD sanctioned for the district

Sl. No.	OFT/FLD sanctioned	OFT/FLD	Amount (Rs)
1.	Management of Paddy Yellow Stem Borer	OFT	1700
2.	Assessing specific infertility problem in dairy cow and its management – tackling prolonged calving interval	OFT	5100
3.	Assess the performance of <i>Glyricidia</i> sp. for control of ectoparasites in farm animals	OFT	6000
4.	Assessing the performance of indigenous knowledge for control of tympany in dairy cattle	OFT	3645
5.	System Rice Intensification for improving productivity of Paddy under agro climatic conditions of Idukki	FLD	16590
6.	Optimization of Nitrogen fertilization in rice through L.C.C. based INM approach	FLD	13560
7.	Management of Paddy Blast caused by <i>Pyricularia oryzae</i>	FLD	6000
		Total	52,595

Objectives

The programme tried to achieve the following objectives under the various OFTs and FLDs implemented in the programme.

- ❖ Popularizing SRI to improve productivity of paddy fields and reduce cost of cultivation
- ❖ To demonstrate the efficiency of LCC based fertilizer application in Integrated Nutrient Management approach
- ❖ To demonstrate an Integrated Disease Management strategy against blast disease affecting paddy
- ❖ Monitor the pest stem borer incidence and reduce the use of chemical insecticides by promotion of eco-friendly control measures
- ❖ Assessing specific infertility problem in dairy cow and its management to tackle prolonged calving interval.
- ❖ Assess the performance of *Glyricidia* sp. for control of ectoparasites in farm animals.
- ❖ Assessing the performance of indigenous knowledge for control of tympany in dairy cattle

Season: The programme was implemented in the second crop season of Rabi. (November 2007- April 2008)

Location and participation of farmers

Manjakuzhy Padashekaram of Rajakumary panchayat covering over 25 ha covering 150 farmers was selected for paddy trials. Dairy infertility trials were conducted at Konnathady area in the animals of selected 12 farmers. *Glyricidia* and tympany trials were implemented at Chinnakanal involving 15 farmers. Apart from KVK, which served as the nodal implementation agency, almost all

the major agencies involved in the agricultural development process of the district had critical part in the program. The programme promoted close partnerships between different agricultural development agencies operating in the area and a list of agencies involved in the implementation of the programme, along with the type of involvement are given as Table-2.5.2.

Table-2.5.2. Agricultural development agencies involved in the implementation of the programme

Name of agency	Type of agency	Type of involvement
KVK	NGO	Nodal implementing agency, organizing training programme
Krishi Bhavan- State Dept. of Agriculture	Govt. of Kerala	Selection of area, <i>Padasekhara Sanithees</i> and farmers, joint diagnostic field visits
Grama Panchayat, Rajakumary, Dept of Local Administration	Govt. of Kerala	Technology facilitation and legitimization
<i>Padasekhra samithis</i>	Farmer organization	
Department of Animal Husbandry	Govt. of Kerala	Coordination Support in field implementation of the project Selection of farmers

Technology dissemination as part of the programme

Trainings were organized as part of the programme in the selected area involving a total of 97 farmers directly and more than 200 farmers of the selected area indirectly. About 21% of the total trainings organized by the KVK during 2007-08 was under the programme and 624 farmers of the district participated in these trainings. A field day was also organized as part of the programme in the project area to disseminate the results to maximum farmers.

Major interventions

Major technological interventions introduced as part of the programme included both scientific recommendations in paddy and assessment of popular indigenous knowledge in pest management in cattle.

- LCC based INM approach in paddy
- Package of practices associated with System Rice Intensification (SRI)
- Fertility management in repeat breeder cows following double PGF2 alpha injection
- *Glyricidia* for control of ectoparasites in cattle
- ITK for the control of Tympany in dairy cattle using asafoetida, alum and mustard oil
- *Trichogramma japonicum* (Trichocard) trap, light Trap, pheromone trap in paddy stem borer management

Major activities

In order to achieve the effective implementation of the selected interventions, the following activities were taken up under the programme.

- ❖ Training in SRI techniques
- ❖ Use of bioagents for pest management
- ❖ Use of rotary weeder and marker
- ❖ Need based and integrated pest and disease management strategies
- ❖ Training on importance of light traps, release of egg parasitoid *Trichogramma japonicum* and IPM strategies in Paddy
- ❖ Fertility management in repeat breeder cows following double PGF2 injection
- ❖ About 500 gm of *Glyricidia* leaves mixed with sufficient quantity of water with 30 ml of neem oil boiled after tightly covered in a container. The boiled mixture was applied on the body of the animal after cooling against deltamethalin and farmers' practice

- ❖ Alternative practice of drenching 200 gm of Asafoetida and equal amount of alum (Colourless astringent compound) mixed in 200 ml of mustard oil to the animal against the recommended and farmers' practice

Impact on production

I. Management of Paddy Yellow Stem Borer (OFT)

Management of paddy yellow stem borer using integrated methods of management enabled a situation where no harmful effect on predators and parasitoids or on environment was reported. It also resulted in an economic savings of 18% through reduction in the use of PPC. The data on quantitative indicators that depicted the effectiveness of the interventions under the OFT is given as Table-2.5.3.

Table-2.5.3. Quantitative measures of the impact of the OFT on stem borer management

Yield (kg/ha)	District average- 2558	Under OFT-3750
Savings in input (l/ha) PPC (Fenthion)	2	
Increase in use of organic inputs	Type: Trichocards	Quantity: 20cc/ha
Change in cost involved for the control (Rs/ha)	District average -2060	Cost incurred in OFT -1700

II. Assessing specific infertility problem in dairy cow and its management for tackling prolonged calving interval (OFT)

Synchronization of the estrus of cattle to increase the use of artificial insemination and increase genetic progress by reducing calving interval was the major result of the OFT. This helped in saving money, labour and production cost as four to five artificial inseminations are normally required. Use of PGF2 alpha helped to synchronize estrus and enabled effective breeding.

III. Assess the performance of *Glyricidia* sp. for control of ectoparasites in farm animals (OFT)

Full control of ecto parasites, no allergic as well as photosensitization effect, highly effective and economical, easy to apply, good antiseptic and antidermatitic effect, milk yield improved over prevailing technology. There has been a recorded saving of 75% in the cost for controlling the pest by using *Glyricidia* and the quantitative indicators of its effectiveness is given as Table-2.5.4.

Table-2.5.4. Quantitative measures of the impact of the OFTon control of ectoparasites

Yield (litre/animal/day)	District average - 9	10.5
Savings in input (kg/ha) PPC	Ecto- parasiticide	
Increase in use of organic inputs/ animal	Type: Glyricidia leaves Neem oil	Quantity: 0.5 kg 30 ml
Change in cost involved for the control(Rs/animal)	District average -120	Average cost of cultivation in the OFT/FLD 30

IV. Assessing the performance of indigenous knowledge for control of tympany in dairy cattle (OFT)

Mixture of asafetida, alum and mustard oil given to cattle helped in curing typany. The condition of bloat subsidized very effectively using the indigenous method and time of control was less than 45 minutes. The indigenous practice was proved to be superior to the therapeutic cure prescribed. The adavantages of the ITK in comparison with the recommended practice is given as Table-2.5.5.

Table-2.5.5. Quantitative measures of the impact of the OFTon tympany control

Yield (litre/animal/day)	District average- 9	10.5
Savings in input (kg/ha) PPC	Anti bloat medicine prescribed not used	

Increase in use of organic inputs/ animal	Type: Asafetida Alum Mustard oil	Quantity: 200g 200g 200ml
Change in cost involved for the control(Rs/animal)	District average -140	Average cost of cultivation in the OFT/FLD 30

V. System Rice Intensification for improving productivity of Paddy under agro climatic conditions of Idukki (FLD)

Recorded results showed improvement in the productivity of rice through reduced seed rate and optimized use of water for irrigation. There was an overall reduction in the seed rate requirement by 1/10th of total requirement. The water requirement of the crop was also reduced by 1/10th of total requirement under conventional practices. There was an overall reduction in the cost of cultivation of 6.6% resulting in increased income from rice. Quantitative measures of the superiority of SRI over the popular rice cultivation practices are included as Table-2.5.6.

Table-2.5.6. Quantitative measures of the impact of the FLD on SRI

Yield (kg/ha)	District average - 2558	SRI-3750
Savings in input (kg/ha)		
Seeds	70	
Fertilizers -Urea	30	
PPC	2	
Increase in use of organic inputs	Type: Pseudomonas	Quantity: 2 kg/ha
Change in cost of cultivation (Rs/ha)	District average 20886	Average cost of cultivation in the OFT/FLD 19500

VI. Optimization of Nitrogen fertilization in rice through L.C.C. based INM approach (FLD)

Phasing out of excess Nitrogen application, savings in fertilizer cost, improvement in yield through nitrogen fertilizer use efficiency formed the major components attempted through the FLD. The results from the trial recorded a yield increase of 83 % over farmer practice in the area and also a saving of five man days in labour. Moreover, there was reduced incidence of pests and diseases and reduction in the total quantity of urea use that formed a major cause for environmental concerns in the area. Thus optimization of nitrogen application in rice improved cost benefit ratio and yield. A quantitative measure of various parameters used to assess the impact of the intervention in rice production is depicted as Table-2.5.7.

Table-2.5.7. Quantitative measures of the impact of the FLD on INM

Yield (kg/ha)	District average- 2558	Under FLD-4681
Cost involved for nutrient management (Rs/ha)	District average- 2886	Under FLD-2000
Savings in input (kg/ha)		
Seeds	Nil	
Fertilizers -Urea	30	
PPC	02	
Increase in use of organic inputs	Type: Pseudomonas	Quantity: 2.0kg/ha
Savings in labour from newly introduced technology (if any, in man days)	05 man days/ha	
Change in cost of cultivation (Rs/ha)	886	

VII. Management of Paddy Blast caused by *Pyricularia oryzae* (FLD)

Eco-friendly management of paddy blast reduced the cost of pest control, increased yield, popularised the use of bio-control agents in the area. Apart from the effective control of the Seed borne disease, cost of plant protection was minimized and no threat of pesticidal residue reported in the trial using *Pseudomonas* for the control blast. Both seed treatment and foliar spray of the bio-agent was introduced as part of the programme.

Field view of the demonstration plot



Plate 2.5.1

The quantitative indicators recorded an overall savings of 2 mandays in spraying and two litre per hectare of Edifenphos commonly used for the disease control in the area. As a result of the programme there was a net reduction of Rs 1469/ in the overall cost of cultivation.

Glimpses of the major interventions under the programme for the district have been included as Plates 2.5.1.

Year	Area (ha)	Cost (Rs)	Remarks
2013	1000	100000	Initial cost of spraying
2014	1200	120000	Cost of spraying
2015	1500	150000	Cost of spraying
2016	1800	180000	Cost of spraying
2017	2000	200000	Cost of spraying

2.6. THRISSUR

Thrissur district covers one of the major rice production tracts of the state viz. Kole lands. Taking into consideration the significance of rice crop in the district one OFT and two FLD was sanctioned for the district at a total financial outlay of Rs 3,13,667 by the State Planning Board for implementation during 2007-08. The details of the programme sanctioned for implementation by the KVK, Thrissur is included as Table-2.6.1. All the three trials were successfully implemented with results that can positively influence the rice production in the district.

Table 2.6.1. List of OFT/FLD sanctioned for the district

Sl. No.	OFT/FLD sanctioned	OFT/FLD	Amount (Rs)
1.	Integrated package for nutrient and pest management in rice	OFT	88667
2.	Cultivation of medicinal rice - Njavara	FLD	65000
3.	Mechanized rice transplanting	FLD	160000
		Total	313667

Objectives

The programme tried to achieve the following objectives under the various OFTs and FLDs implemented under the programme.

- ❖ Popularize bio-intensive pest management in rice
- ❖ Popularize integrated nutrient management practices
- ❖ To popularize njavara as a profitable paddy crop
- ❖ To demonstrate the efficiency of mechanization to solve labour problems
- ❖ To improve productivity and reduce cost of cultivation

Season: The programme was implemented in the second crop season of Rabi, (December 2007- February 2008, April 2008)

Location and participation of farmers

Elamutha Kole Padavu of Venkidangu panchayat covering over 15 ha was selected for paddy trials involving 20 farmers directly 300 farmers indirectly. Apart from KVK, which served as the nodal implementation agency, the major agricultural development agencies involved in the program were the State Department of Agriculture and the Padashekara Samithi of the selected Padashekaram. The programme promoted close partnerships between these agricultural development agencies operating in the area and the details of their involvement are given as Table-2.6.2.

Table-2.6.2. Agricultural development agencies involved in the implementation of the programme

Name of agency	Type of agency	Type of involvement
KVK	NGO	Nodal implementing agency, organizing training programme
Krishi Bhavan- State Dept. of Agriculture	Govt. of Kerala	Acted as a link between KVK & Padashekara Samithi
<i>Padasekhra samithi</i>	Farmer organization	Organising farmers for programme implementation

Technology dissemination as part of the programme

Trainings were organized as part of the programme in the selected area in different topics related to rice production. About 42% of the total trainings organized by the KVK during 2007-08 were under the programme and 280 farmers of the district participated in these trainings.

Major interventions

Major technological interventions introduced as part of the programme included package of practices associated with cultivation of medicinal rice- njavara, popularization of bio-intensive cultivation practices through the use of lime, neem

cake, pseudomonas, Azolla, vermi-compost and other bioagents in the pest and nutrient management of rice. As labour was a serious problem affecting rice production, mechanized practices through the use of Yanji Sakthi transplanter and harvester was also introduced.

Major activities under taken

In order to achieve the effective implementation of the selected interventions, the following activities were taken up under the programme.

- Preparation of mat nursery
- Use of transplanter
- Sowing of a green manure crop like daincha during the beginning of first crop season and incorporating at the time first plough
- Dual culture of Azolla with rice crop during 1st, 2nd and 3rd crop
- Application of silica @25 kg/ha as basal dose
- Application of lime @ 600kg/ha in 2 splits
- Seed treatment and spraying of pseudomonas
- Use of neem for pest control
- Producing foul smell in the field at milky stage of the crop (dead body of small animals allowed to decay in the field)

Impact on production

I. Integrated package for nutrient and pest management in rice for Thrissur district (OFT)

Integrated methods of nutrient and pest management through the use of bioagents enabled a situation where no harmful effect on predators and parasitoids or on environment was reported. It helped in augmenting the soil microbial population and its activities to favour plant growth and crop yield. Farmer empowerment in the use of various environment friendly bio-agents in pest and disease management was an added advantage. It also helped in reducing the deleterious effect of

Harvest of *Njavara* demonstration



Plate 2.6.1

chemical pesticides on environment and eco system. These benefits quantified through physical indicators are provided as Table-2.6.3.

Table-2.6.3. Quantitative measures of the impact of the OFT on INM&IPM

Yield (kg/ha)	District average- 4500	Under OFT-6000
Cost involved for nutrient management (Rs/ha)	District average- 2800	Under FLD-2000
Savings in input (kg/ha)		
Seeds	Nil	
Fertilizers	200	
PPC	01	
Increase in use of organic inputs (kg/ha)	Type:	Quantity:
	Pseudomonas	100
	Lime	200
	Neem cake	750
Change in cost of cultivation (Rs/ha)	800	

II. Cultivation of medicinal rice –Njavara (FLD)

Farmers were convinced of the relative advantage of njavara crop in terms of short duration, less management and higher income. Demonstration popularized the use of vermicompost in njavara in the district and a yield of 2.5t/ha against the district average of 1.5t/ha.

III. Mechanized rice transplanting (FLD)

The demonstration could convinced the farmers about the importance of mechanized rice production in solving labour problems and reducing cost of production. The introduction of transplanter could save the labour of 30 women per hectare giving a reduction in the cost of cultivation of Rs.7500. This is in addition to the savings in human drudgery, time and the related advantage in crop growth.

Glimpses of some of the field interventions under the programme for the district have been included as Plate 2.61.

2.7. PALAKKAD

Frontline Demonstration on scientific cultivation of rice in different rice tracts of Palakkad was the programme sanctioned for the district. State Planning Board allotted an amount of Rs.1,50,000 for the implementation of the programme in the district.

Objectives

Transfer appropriate rice production technologies based on the local agro-ecological and socio economic conditions suiting the farmer group needs and aspirations was the broad objective pursued under the programme.

Season: The programme was implanted in the third crop season during December 2007- April 08.

Location and participation of farmers

The FLD was implemented involving 10 farmer organizations from the district covering an area of 5 ha. It was implemented in 10 different locations in Chittur Tatamangalam Municipality and Perumatty Panchayat. Trials were conducted in plots of size 0.5 ha each in four different *Padashekarams* participating more than 421 farmers of the district. Apart from the KVK, which served as the nodal implementation agency, partnership with farmer associations in the selected *Padashekarams* and Krishibhavans under the State Department of Agriculture enabled the effective implementation of the programme. The involved and the type of participation is given in Table-2.7.1.

Table-2.7.1. Agricultural development agencies involved in the implementation of the programme

Sl.No.	Name of agency	Type of agency	Type of involvement
1	Poongottu Padasekera Nellulpadaka Samithi	Farmer association	Field implementation of trials and selection of beneficiaries
2	Paruthikkavu Nellulpadaka Padasekara Samithi	Farmer association	Field implementation of trials and selection of beneficiaries
3	Vilayodi Group Farming Samithi	Farmer association	Field implementation of trials and selection of beneficiaries
4	Ezhuthani Padasekera Committee	Farmer association	Field implementation of trials and selection of beneficiaries
5	Krishi Bawan, Tatamangalam	State Department of Agriculture	Coordinating FFS
6	Krishi Bawan, Perumatty	State Department of Agriculture	Selection of field demonstration plots

Technology dissemination as part of the programme

As part of the programme, trainings were organized benefiting around 350 farmers of the selected *Padashekarams* on different aspects of rice production. Forty five percent of the total trainings organized by the KVK during 2007-08 were on topics related to profitable rice production related to the programme.

Major interventions under the programme

Composite introduction of all scientific methods of rice production as prescribed in KAU Package of Practices was attempted in the selected *Padashekarams* so as to improve yield and reduce cost of cultivation. Major technological interventions introduced in the *Padashekarams* as part of the programme included the following.

1. Planting techniques
2. Integrated nutrient management
3. Integrated pest management

Major activities under taken: Farmer Field Schools were organized at regular intervals for the benefit of all members at *Paruthikkavu Padasekaram*. Need based input distribution along with timely training sessions were also implemented for sustainable crop production.

Impact on rice production

Evaluation of the programme and its results by the participant farmers and the implementing agency was done both on quantitative and qualitative terms. The impact of the introduced interventions over the conventional method recorded on the quantitative and qualitative indicators by the implementing agency are furnished in Table-2.7.2.

Table-2.7.2. Quantitative measures of the impact of the FLD

a) Yield (kg/ha)	Average yield of the district 2891	Yield recorded in the FLD 4900	
b) Savings in inputs (kg)	Seeds: No	Fertilizers: Used as per our POP	PPC: Minimized usage of insecticide because of using trichocard
c) Increase in use or organic inputs		Type: FYM	Quantity: 2.0 t/ha
d) Savings in labour from newly introduced technology (if any, in mandays)		No	
e) Change in cost (Rs/ha)	Average cost of cultivation in the district Rs.29977	Average cost involved for the purpose in the district 25000	



Farmer (Sri. Radhakrishnan) in the demonstration plot



Labors removing weeds from 45 days old crop

Plate 2.7.1

MAKINTAN

Results indicated that need based input distribution coupled with timely training sessions enabled sustainable crop production. Timely supply of critical inputs was the major reason that enabled timely farming operations and better yield. Overall tempo demonstrated the success of group approach in rice. Glimpses of some of the field interventions under the programme for the district have been included as Plate 2.7.1.

Table 2.7.1: Rice Production Programme for the District

Sl. No.	Activity	Area (Ha)	Beneficiaries (No.)
1	Seedling Nurseries	1000	5000
2	Planting	2000	10000
3	Harvesting	1500	7500
4	Post-harvest Management	1000	5000
5	Extension Activities	5000	25000

2.8. MALAPPURAM

Rice covers an area of 14885 ha in the district contributing to a production of 31377 tonnes (Agricultural Statistics, 2005-06), which is indicative of a trend away from rice cultivation in the district. Acute shortage of agricultural labour resulting from the gulf boom, social stigma associated with farm labour, comparatively low wages and drudgery involved have all contributed to the alienation of labour away from agriculture in the district. KVK Malappuram tried to address this problem and convince farmers and agricultural labours the advantage of mechanization in rice farming through the two Frontline Demonstration programmes on mechanical rice transplanting using Yanji Shakthi rice transplanter and mechanical paddy harvesting using KAMCO KR120 reaper at a total financial outlay of Rs 2,92,000. The details of the FLDs sanctioned for the district are given as Table-2.8.1.

Table-2.8.1. Front Line Demonsrations sanctioned for the district

Sl. No.	Title	Amount sanctioned (Rs)
1.	Mechanical rice transplanting using Yanji Shakthi rice transplanter	1,00,000
2.	Mechanical paddy harvesting using KAMCO KR120 reaper	1,92,000
	Total	2,92,000

Objectives

The major objectives pursued under the programme were as follows.

- ❖ To give the awareness about the rice mechanization among the farmers through trainings and demonstrations
- ❖ To demonstrate the working Reaper in Malappuram District
- ❖ To prove the reduction in drudgery and reduction in cost of cultivation over conventional transplanting and harvesting.

Season: Third crop season (December 2007- April08)

Location and participation of farmers

The programme was implemented in 10 ha in Kuttippuram, Maranchery and Triprangode Panchayats and Ponnani Municipality. Harvest festival using reaper was organized in Edachalam *Padasekharam* in Maranchery and Triprangode Panchayats in March and in other areas in April. Around 250 farmers from the selected area were directly involved in the programme, where as many more KVK, Malappuram served as the nodal implementation agency involving State Department of Agriculture which facilitated through the supply of fertilizers and seeds under subsidized schemes.

Technology dissemination as part of the programme

Trainings were organized as part of the programme in the selected area involving a total of 250 farmers in and around the *Padashekaram* on mechanized field operations using transplanter and harvester. Aimed at equipping an ever- ready work force to do the job in the long run, vocational on the job trainings were organized by KVK, Malappuram in mat nursery preparation, transplanting and harvesting of paddy. The mat nursery preparation and transplanting were done by the women trainees alone. Six trainings and demonstrations of Yanji Sakthi Rice transplanter were conducted in an area of 10 ha in the selected Panchayats. Field trainings also covered topics like the stage of harvester use and other operational modalities involved in the use of machinery. A CD on the use of Yanji transplanter is being published for the use of farmers.

Major interventions under the programme

The major technological interventions introduced in the *Padashekaram* as part of the programme for popularizing mechanized field operations and convincing the farmers of its advantages were-

- ❖ KAU Helical Blade Puddler for land preparation
- ❖ Mechanized transplanting using Yanji transplanter

- ❖ Mat nursery preparation
- ❖ Mechanized harvesting of paddy using KAMCO KR 120 M reaper

Major activities under taken:

In order to achieve the effective implementation of these interventions, the following activities were taken up in the selected area.

- In order to equip an ever-ready work force to do the job of mat nursery preparation, transplanting and harvesting of paddy, KVK Malappuram conducted a vocational training program. The mat nursery preparation and transplanting were done by the women trainees alone
- Six trainings and demonstrations of Yanji Sakthi Rice transplanter were conducted in an area of 10 ha (254 acres) in the above said Panchayats in Ponnani Taluk and Tirur Taluk

Impact on rice production

Selected quantitative and qualitative indicators were used in the evaluation of the programme. Reduction in drudgery, reduction in cost of cultivation, savings on labour timely completion of operations and increased crop yield are the major advantages reported by the farmers from the selected area. This motivated many farmers who had abandoned paddy cultivation to take it up cultivation from next year onwards provided they get the work force with the machinery. Many decided to purchase the machine with the help of Grama Panchayats through Padasekhara Samithies. The impact of the introduced interventions over the conventional methods recorded on selected quantitative indicators is furnished in Table 2.8.2. Land preparation of Triprangode with heavy clay soils could be completed 5 days ahead of transplanting by the use of KAU Helical Blade Puddler and could save around 30 % diesel and about 40 per cent time compared with a tractor with cage wheels commonly used for puddling in the area. The savings on labour and



Mat nursery preparation



Mechanized transplanting

Plate 2.8.1



Field view of the demonstration plot



Mechanized harvesting



View of machine harvested field

Plate 2.8.2

reduction in pest damage due to timely completion of operations reduced cost of cultivation by 22% giving an increase of Rs 6670/ in net profit.

Table 2.8.2. Comparison of programme outcome with the conventional methods

a) Yield (kg/ha)	Average yield of the district 2000		Yield recorded in the OFT/FLD 4500
b) Savings in inputs(Kg)	Seeds 84%	Fertilizers Nil	PPC 15%
c) increase in use of organic inputs	Type Nil	Quantity Nil	
d) Savings in labour from newly introduced technology (if any, in man days/ha)	45 women labour in the case of transplanting and 17women labour in the case of reaping		
e) Change in cost of cultivation (Rs.)	Average cost of cultivation in the district	Average cost involved for the purpose in the OFT/FLD	
Rs. 6670/ ha.	Rs. 29,900/ ha	Rs. 23,230/ ha	

Glimpses of some of the field interventions under the programme for the district have been included as Plates 2.8.1 and 2.8.2.



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2.9. WAYANAD

The name Wyanad itself implies that it is a land of paddy fields. However, off late due to problems of high incidence of pests and diseases, unscientific fertilizer application, high labour wages and dearth of skilled labour, farmers are discouraged as not to engage in rice farming in the district. This has been reflected in the decreasing trend of area and production of rice from the district over the past many years. Therefore, technology transfer measures that could convince the farmers about techniques and strategies that can transform paddy into a profitable crop is the need of the hour. As a means towards achieving this, a Front Line Demonstration was sanctioned for the district on group farming approach in rice cultivation. The programme funded by the State Planning Board had a total financial outlay of Rs. 73,000 for the district. The programme was implemented by KVK, Wyanad during 2007-08 in the selected areas of the district with the overall aim of increasing yield and reducing the cost of cultivation. The specific objectives pursued under the programme were as follows.

Objectives

- ❖ Uniform and timely cultivation aspects through group approach
- ❖ Effective crop management in a scientific manner
- ❖ Facilitate farm mechanization, there by overcoming the labour problems

Season: The programme was implemented in the second crop season of Rabi, (December 2007- April 2008)

Location and participation of farmers

Th programme area covered 6 ha in Varadoor paddy ela in Kaniyampetta Panchayat. The trial involved all the 16 farmers of the *ela*. Apart from KVK, which served as the nodal implementation agency, the major agricultural

development agencies involved in the program were the State Department of Agriculture and the Group Farming Samithi of the selected *ela*. The programme promoted close partnerships between these agricultural development agencies operating in the area and the details of their involvement are given as Table-2.9.1.

Table-2.9.1. Agricultural development agencies involved in the implementation of the programme

Name of agency	Type of agency	Type of involvement
KVK	Kerala Agricultural University	Nodal implementing agency, organizing training programme
Krishi Bhavan- State Dept. of Agriculture	Govt. of Kerala	Acted as a link between KVK & Padashekara Samithi and facilitated selection of area
<i>Padasekhra</i> samithi	Farmer organization	Organising farmers for programme implementation

Technology dissemination as part of the programme

Trainings were organized as part of the programme in the selected area involving a total of 200 farmers. Display charts on IPM and IDM in rice was prepared and used in the field trainings organized as part of the programme. TOT aids were also prepared and use on the use of bio-control agents in the district.

Major interventions

Major technological interventions introduced as part of the group approach in rice farming in the district were as follows.

- Uniformity in land preparation
- Group approach and mechanization to reduce the cost of production
- Community nursery
- Soil test based nutrient management
- IPDM practices
- Mechanized cultural operations

Major activities under taken

In order to achieve the effective implementation of the selected interventions, the following activities were taken up under the programme.

- ii. Use of BPH and blast resistant variety seeds
- iii. Uniform land preparation & community nursery
- v. Mechanical transplanting using Yanji-Sakthi Transplanter
- vi. Correcting soil pH using lime
- vii. Fertilizer application based on soil test results
- viii. INM using *Azospirillum*, *Azolla*, and IPDM practices
- ix. Alternate wetting and drying for BPH control
- x. Mechanical weeding with conoweeder
- xi. Mechanical harvesting using VCR, KR 120
- xii. Threshing using axial flow through thresher

Impact on rice production

Farmers are very much satisfied with group farming approach and opined that working as a team promoted enthusiasm and provided opportunity to share the responsibilities arriving at common understanding. They could realize the merits of farm mechanization and also the benefits of cooperative farming. The quantitative measures of the benefits of the programme documented through selected variables are included as Table-2.9.2.

Table-2.9.2. Quantitative measures of the impact of the FLD on group farming

Yield (kg/ha)	District average- 2500	Under FLD-2600
Cost involved for nutrient management (Rs/ha)	District average- 28860	Under FLD-20000
Savings in input		
Seeds (kg/ha)	67.5	
Fertilizers (%)	10	
PPC (%)	30	
Increase in use of organic inputs	Type: <i>Pseudomonas</i>	Quantity: 2.0kg/ha



Mechanized transplanting



Use of Conoweeder



Mechanized harvesting

Savings in labour from newly introduced technology (%)	Transplanting-80 Weeding-25 Plant protection -60 Harvesting-80
Change in cost of cultivation (Rs/ha)	Reduced by 8333 (40% reduction)

Glimpses of some of the field interventions under the programme for the district have been included as Plate 2.9.1.

2.10. KANNUR

An on farm trial on variety evaluation and a Front Line Demonstration on Formation of Paddy Task Force for combating labour crisis in rice production were sanctioned for the district by the State Planning Board for implementation during 2007-08. Due to seasonal limitation, only the FLD on formation of paddy task force could be implemented in the district during the period and was a tremendous success. It had the potential to solve the labour crisis confronted by the paddy production scenario of the state through proper stream lining and policy support. The details of the sanctioned programme are included as Table-2.10.1.

Table 2.10.1. List of OFT/FLD sanctioned for the district

Sl. No.	OFT/FLD sanctioned	OFT/FLD	Amount (Rs)
1.	Evaluation of paddy varieties suited to saline tracts of Kannur	OFT	7545*
2.	Formation of Paddy Task Force for combating labour crisis in rice production	FLD	458500
		Total	466045

* not implemented

Objectives

The Front Line Demonstration on paddy task force was implemented with the following specific objectives.

- ❖ to reduce the drudgery and strain of labourers.
- ❖ to make available timely labour
- ❖ to make paddy labour more attractive and remunerative occupation
- ❖ to reduce social stigma towards labourers and to increase its social status
- ❖ to allure younger generation into farming
- ❖ to make rice cultivation more scientific and productive

- ❖ to reduce cost of cultivation and thereby make paddy cultivation profitable

Season: The programme implementation covered 5 months in the Rabi season between November 07 and March 2008

Location and participation of farmers

The programme was implemented in *Mavichery Padashekaram* covering an area of 40 ha in *Pariyaram* Panchayat. The trial was taken up in 5 ha and involved all the 115 farmers of the *Padashekaram* either directly or indirectly. Apart from KVK, which served as the nodal implementation agency, the major agricultural development agencies involved in the program were the State Department of Agriculture, Grama Panchayat, Raidco and the Group Farming Samithi of the selected *Padashekaram*. The programme promoted close partnerships between these agricultural development agencies operating in the area and the details of their involvement are given as Table-2.10.2.

Table-2.10.2. Agricultural development agencies involved in the implementation of the programme

Name of agency	Type of agency	Type of involvement
KVK, Kannur	Kerala Agricultural University	Nodal implementing agency, Training
Krishi Bhavan- State Dept. of Agriculture	Govt. of Kerala	Facilitated stakeholder meetings
<i>Mavicherry Padashekhra</i> samithi	Farmer organization	Co-ordination of farmers, helped in making available leased land for implementation of the project
Pattazhi Grama Panchayat, Dept. of Local Administration	Govt. of Kerala	Infrastructure support to paddy task force (PTF) and selection of group members
RAIDCO	Govt. of Kerala	Provided uniform and cellular Phone to PTF

Technology dissemination as part of the programme

Trainings were organized for the selected 25 task force members as part of the programme in the selected area. Around 14% of the total trainings organized by the KVK was under the programme. A document incorporating the salient findings of the programme is being prepared for supporting similar programmes in other parts of the district.

Major interventions

Major technological interventions introduced as part of the programme included the following.

- ❖ Scientific cultivation including precision sowing, fertilizer application, integrated weed management and integrated pest management (IPM)
- ❖ Mat nursery preparation and management
- ❖ Operation and maintenance of power tiller, transplanter, reaper and thrasher
- ❖ Group mobilization

Major activities under taken

In order to achieve the effective implementation of the programme, the following activities were taken up under the programme

- ❖ Mechanized rice production training for operation of all the machineries viz transplanter, tiller, weeder, harvester and thresher
- ❖ training on mat nursery preparation and nursery management
- ❖ mechanized rice transplanting
- ❖ Weed management training
- ❖ Use of harvester
- ❖ Group registration and legalization



Field training of Paddy Task Force



Harvest Festival

Plate 2.10.1

Impact on rice production

There was a recorded net increase in yield and savings on labour of Rs 10,050/ under the project. The project proved to be a success as it benefited paddy farmers struggling to find labour for timely completion of works in fields at a lower cost. The effective use of PTF recorded a saving of 92 mandays per ha in rice production. Moreover, there was reduction in the overall cost of cultivation by 34% through the intervention. The advantages of the Paddy Task Force as evaluated by the farmers of the district were as follows.

- ❖ Demonstrated a solution for the non-availability of paddy workers
- ❖ Introduced professionalism in paddy field work
- ❖ Reduced wasteful expenditure on time, inputs, labours and improved yield
- ❖ Elevated the social status and self esteem of paddy field workers
- ❖ Received work orders from other areas to take up farming on contract basis
- ❖ Evolved a viable system for scientific and successful paddy farming
- ❖ Paddy field workers became a target of extension services
- ❖ Revival and sustenance of paddy fields became a felt need of workers
- ❖ Paddy field work became a more attractive and remunerative occupation
- ❖ Attracted younger generation to paddy field work as an occupation

Glimpses of some of the field interventions under the programme for the district have been included as Plate 2.10.1



Chapter 3

INFERENCES AND RECOMMENDATIONS

- **Socio-economic profile of rice farmers m**
- **Inferences**
- **Recommendations**

3. INFERENCES AND RECOMMENDATIONS

Analysis of data collected from the 10 districts where the OFT/FLD programme was implemented during 2007-08 was used to derive valuable inferences about rice farming in the State. The socio economic variable studied indicated a trend in favour of rice farming in the State. A concise report of the variable study and inferences and recommendations on effective technology facilitation and farmer mobilization is presented.

3.1. Socio-economic profile of rice farmers

The average age of rice farmers in the State was 48 years with 35.5% of sample population below 40 years and 50% belonging the middle age category between 40 & 59 years of age. The trend is supportive of the fact that young farmers have not totally abandoned rice crop and through appropriate technological and input facilitation more people can be motivated into rice farming. The average years of experience in rice farming was 22 years and about 27% of the total population was new entrants into rice farming with less than 10 years of experience in rice. Average area under rice farming was estimated to be 1.75 acres which is indicative that for most of these farmers rice forms an important source of income. However 17% of the respondents were leased cultivators who did not own any paddy land of their own but use leased land for cultivation. This is indicative of an emerging trend in favour of promoting leased cultivation in fallow lands using small groups.

3.2. Inferences

State Department of Agriculture and Padashekhara samithies of farmers were the two major agencies involved in facilitating field implementation of the programme throughout the state. An effective functional partnership was found with agencies like Raidco and local administration in some districts like Alappuzha, Kollam etc. which was instrumental in better linkages and results. An overwhelming majority of 95% of respondents favoured the interventions promoted through OFT/FLD programme and were of the opinion that such field oriented programmes are essential in motivating and building confidence among the farmers the use of advanced technologies for higher production. However, 4% of the respondents held apprehension that the use of technological interventions could be successful only in programmes with close monitoring by scientists and extension officials are involved. They felt that under normal field conditions timely availability of inputs will seriously affect its use by farmers.

The yield recorded from all the districts where the programme was implemented indicated an average increase of 113% and reduction in cost of cultivation by an average 25%. The highest reduction in cost of cultivation was recorded in Kannur district where complete mechanization of farming operations through a paddy task force was implemented. A reduction of 34% in the overall cost of cultivation was recorded in the area. Another major outcome of the programme was the reduction in the use of chemical inputs in rice cultivation. Most of the trials involved bio intensive crop production

components like use of Trichocards, Pseudomonas and other low input use methods of IPDM and INM.

3.3. Recommendations

Though the programme succeeded in achieving commendable results through interventions that gave higher yields and profitability in rice farming many field problems related to marketing, water management, infrastructure and value addition were not addressed. As indicated by the suggestions on improvement of the programme by many farmers especially from the districts of Alappuzha and Pathanamthitta, programmes that address the water management problems through irrigation facilities and strengthening of outer bunds of Padashekarams has to be taken up through these programmes. This facilitates the promotion of group based water management that can solve many associated problems hindering rice cultivation. Community nursery and group marketing are concepts that require farmer conviction and as such promoted through Front Line Demonstrations. Paddy Task Force implemented as a FLD by KVK Kannur showed the potential in solving labour problems related to rice production in the district. Similar programmes are recommended for other districts also in future programmes. As most of the districts covered mechanization as a component under the implemented programme, most of the farmers are convinced of the advantage of mechanized operations. Therefore, formation of a trained work force in mechanized operations of farming will be beneficial in promoting rice farming in the state.

Another area that required attention under the programme was the validation of indigenous knowledge in rice farming. With the possible exception of KVK, Idikki none of the districts focused this area, which has effective, time tested and local resource based solutions to many problems. Though use of bio-agents was propagated as an effective pest control measure through many trials, local availability of these inputs will be a limitation in the long term utilization of the technology. Therefore, effective interventions to ensure the availability of bio-agents need to be promoted.

ANNEXURE
Performa for data collection on OFT/FLD trials (2007-08)

PART - A
(To be filled by KVK)

1. Name of KVK		District	
2. Name of OFT/FLD:			
2. No. of farmers directly involved in the OFT/FLD:			
3 Name of Panchayath where the OFT/FLD conducted			
4 Area in which the trial was taken (in ha)			
5. Distance of the trial plot from the KVK			
6. Whether the trail was taken up on Padasekharm basis		Yes/ No	
a) If yes name & area of the Padasekharan involved			
b) No. of farmers in the Padasekharam			
7. a) Agencies involved in the implementation other than KVK		State Department of Agriculture/ NGO/ Padashekara Samithi/ PRI/Others (.....)	
b) Name of Agency		Type of involvement	
8. a) Type of technology introduced			
b) No. of technologies introduced as part of the programme			
c) advantage of the technology of over the prevailing one			
9. a) Total no. of trainings organized by the KVK during 2007-08			
b) No. of trainings organized as part of the OFT/FLD			
c) No. of farmers participated in the trainings organized as part of the programme			
10. Major outcome of the programme in terms of (Fill the relevant columns as per the type of trials)			
a) Yield (kg/ha)	Average yield of the district	Yield recorded in the OFT/FLD	
b) Savings in inputs (kg)	Seeds	Fertilizers	PPC
c) Increase in use or organic inputs		Type	Quantity
d) Savings in labour from newly introduced technology (if any, in mandays)			

e) Change in cost (Rs)	Average cost involved for the purpose in the district	Average cost involved for the purpose in the OFT/FLD	
f) Type of technologies refined as part of the programme (give details)	ITK	Local innovations	Scientific package
10. Major problems encountered in the implementation, if any (Please describe in 3-4 lines)			
11. Have you prepared any publication as part of the program Yes/No	If yes, Type and title of publication (Attach a copy)		
12. Amount allotted for the program	Expenditure incurred	Balance (if any)	

PART B

(To be collected from 10 randomly selected farmers of project area of each KVK)

1. a) Name and address of farmer:	b) Age:
c) Experience in farming (Yrs):	Area under farming (ha):
2. Name of the OFT/FLD implemented in the area:	
3. Name of the farmer in whose plot the OFT/FLD was implemented:	
4. How was the field for FLD/OFT selected in the area:	
5. No. of OFT/FLD meetings in which you participated during the program period:	
6. What is your opinion about the interventions through OFT/FLD: (Give X mark) a) Essential for improving rice production in the area b) Essential but cannot be easily practiced c) No specific advantage d) Cannot say	
7. Any two suggestions to improve the efficiency of the program:	1



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