

Cropping Systems Research Centre, Karamana

Cropping Systems Research Centre, Karamana, Thiruvananthapuram - 695 002

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Station Head	Dr. P. Sukumari, Professor and Head		
Longitude	77° E		
Latitude	11° N		
Nearest City/ Town	Thiruvananthapuram.	Distance from Nearest City/ Town (km)	3
Nearest Railway Station	Thiruvananthapuram.	Distance from Nearest Railway Station (km)	3
Nearest AirPort	Thiruvananthapuram.	Distance From Nearest Airport	
Domestic		Domestic	16
International		International	9

About Station

The Station was started in the year 1955 as Model Agronomic Centre under the Fertilizer Use and Soil Fertility Project envisaged in the Stewart scheme of Simple Fertiliser Trials on Cultivators Field and sponsored by ICAR. It was also functioning as a regional centre of the Central Rice Research Station, Pattambi. Subsequently the station came under the All India Co-ordinated Agronomic Experiments Scheme (AICAES) with which the Fertilizer Use and Soil Fertility Project merged in 1956-57. The station was given the name Model Agronomic Research Centre in 1968 when both the schemes of Fertilizer Use and Soil Fertility Project and AICAES merged with the All India Co-ordinated Agronomic Research Project. The set up of the station underwent a change both in its technical programme and staff pattern in 1968. In 1972 with the formation of Kerala Agricultural university the station was upgraded to the status of a research station and post graduate study centre. In 1989 the station was redesignated as Cropping Systems Research Centre, under the All India Coordinated Research Project on Cropping Systems which was converted to AICRP on Integrated Farming Systems (AICRP on IFS) in 2009. CSRC Karamana is the main Centre of AICRP-IFS in Kerala with one sub centre (On Farm Research Centre- OFRC) presently in Thiruvalla. The OFRC (earlier ECF) is under the administrative control of the main centre. The district covered by OFRC changes once in 5 years. OFRC conducts trials in farmers' field.

Objectives

- Characterisation of the existing farming systems to know the productivity, viability and constraints.
- To develop and validate region- specific Integrated Farming System models for enhanced system productivity, profitability and sustainability.
- To assess relative efficiency of the IFS models in terms of economics, resource use and energy.
- To optimize individual components of IFS in regional perspective.
- Capacity building of stake- holders in Integrated Farming Systems through appropriate trainings.
- Post harvest management and value addition.
- To study the performance of different cropping sequences in rice based integrated farming system involving fish component in terms of soil fertility, energetics and economics
- To develop a suitable integrated nutrient supply system for a cereal based crop sequence .
- To critically evaluate organic farming vis-à- vis farming with integrated nutrient and pest management systems
- To design and identify economically viable and efficient farming practices for resource conservation and counteracting adverse effects of climate change.
- To study the effects of resource conservation technologies on photosynthetic efficiency, biomass production, economic yield, soil hydro thermal regimes and soil health.

Vision

- Develop the station into a nodal centre for advanced research on Integrated Farming Systems
- Develop the station as a centre for research on urban/periurban agriculture
- Establish a training centre to provide training on IFS models, urban/periurban agriculture, terrace gardening, mushroom culture, vermicompost production etc.
- Function as a single window facility for the urban/ periurban farming community of Thiruvananthapuram District (in collaboration with CoA, Vellayani) by establishing
 - ◆ A training Centre for IFS
 - ◆ An Agri-Diagnostic Cum Guidance Center and Bio-Pharmacy
 - ◆ Sales outlet (planting material and quality bio-inputs of KAU)
 - ◆ A mobile sales unit for capital city (KEPCO model)
- Construction of one Modern Guest House cum Conference hall as an university amenity in the capital city.

Mission

- Developing and validating region- specific integrated farming system models ((Rice based and coconut based) for enhanced system productivity, profitability and sustainability.
- Conducting multi-location trials on integrated production systems, bio-energy conversion and organic recycling.
- Create awareness and interest among urban and periurban population including school children, on homestead farming, terrace garden, mushroom production, kitchen garden etc.

Achievements

- Permanent plot experiment on integrated nutrient supply system for cereal based sequence showed that fertilizer requirement can be reduced to 25 per cent during rabi season rice by substitution of 25 per cent RDN as organics during kharif. Substitution of 50% RDN as organics during Kharif season enhanced the yield in sequential cropping of rice (Included in POP).
- Experiment on multiple use of cowpea and nutrient balance in a rice based cropping system showed that raising green manure crop of sunhemp or cowpea significantly enhanced the yield of subsequent crop of rice. Growing grain or vegetable cowpea also resulted in a similar increase in rice yield
- Experiment on multiple use of cowpea and nutrient balance in a rice based cropping system showed that raising green manure crop of sunhemp or cowpea significantly enhanced the yield of subsequent crop of rice. Growing grain or vegetable cowpea also resulted in a similar increase in rice yield.
- Study on integrated weed management in rice based cropping systems showed that summer crop of bhindi or green manure crop of daincha enhanced the yield of subsequent rice crop. Depending on the length of growing period a short duration cassava can also be taken as summer crop without any reduction in the yield of subsequent rice crop. After three year cropping cycle a significant decline in major weed species *Echinochloa crusgalli* was observed.
- In the experiment conducted for developing organic package for system based high value crops REY (Rice Equivalent Yield) of 21 t/ha/annum was obtained in INM treatment. REY of organic farming treatment varied from 16 to 19.2 t/ha/annum. The highest REY was obtained from the second crop of cucumber due to its higher productivity in raised paddy field.
- Use of Machette, Stam F-34 and 2,4-D sodium salt were recommended for weed control in rice
- Studies on integrated weed management in a rice based cropping system showed that in continuously cropped rice fields where weed infestation especially that of 'Kavada' (*Echinochloa crusgalli*) was high, raising a summer crop of daincha, bhindi etc. significantly reduced it's infestation.
- In the cropping system a short duration variety of tapioca could be included after two short duration rice crops
- In the cropping system inclusion of bhindi after two medium duration rice crops in wetlands was highly profitable.
- Application of biofertilizer Azospirillum @ 2.5 kg/ha (mixed with sand or compost in the ratio 1:25) helped in reducing the rate of fertilizer nitrogen application by about 25%
- Sodium as common salt could substitute potassium as Muriate of potash to the extent of 25% for rice in well drained wetland soils.

- Studies on integrated nutrient supply system in a cereal based crop sequence had shown that the rate of chemical fertilizer application could be reduced to half by applying green manures, farm yard manure, green leaf manure etc.
- The results of a study on long range effect of continuous cropping and manuring in a rice based cropping sequence revealed that continuous skipping of phosphorus fertilizers results in a significant reduction in grain yield, stunted growth, reduced tillering and delayed flowering by about two weeks, leading to an increase in crop duration and delayed harvest.

Publications including books, book chapters, research papers etc.

Books

- ❖ Anilkumar, A.S., Jacob, J., Govindan, M., Ambika, P., Suchithra, B.S. and Anusha, A.N. (2013). *Sustainability pathway to Higher Crop Productivity in Kasaragod District*. College of Agriculture, Kerala Agricultural University, Padannakkad, Kasaragod.
- ❖ Anilkumar, A.S., Jacob, J. and Govindan, M. (2013). *Watershed Development and Management for Sustainable Utilization of Natural Resources*. College of Agriculture, Kerala Agricultural University, Padannakkad, Kasaragod.
- ❖ Narwal, S.S., Pavlovic, P. and Jacob, J. (2011). *Research Methods in Plant Sciences, Volume 2: Forestry and Agroforestry*. Studium Press LLC, Houston, Texas. ISBN: 1-933699-66-3 (International)
- ❖ Jacob, J. (2010). *Allelopathic effect of trees in the homesteads of Kerala, India*. Lambert Academic Publishing, Saarbrücken, Germany. ISBN: 978-3-8383-8988-2 (International)
- ❖ Gangwar, B., Varughese, K., Jacob, J., Rani, B., Vijayan, M. and Mathew, T. (2010). *Manual on Integrated Farming Systems*. Kerala Agricultural University and Project Directorate for Farming Systems Research.
- ❖ Jacob, J., Joy, M., Sreekumar, K.M., Umamaheswaran, K., Roy, S. (2007). *Handbook for field level diagnosis and management of diseases, insect pests and nutritional disorders in coconut based integrated farming systems. Vol 1. Coconut*
- ❖ Joy, M., Jacob, J., Sreekumar, K.M., Umamaheswaran, K., Roy, S. (2007). *Handbook for field level diagnosis and management of diseases, insect pests and nutritional disorders in coconut based integrated farming systems. Vol 2. Areca nut*
- ❖ Sreekumar, K.M., Joy, M., Jacob, J., Umamaheswaran, K., Roy, S. (2007). *Handbook for field level diagnosis and management of diseases, insect pests and nutritional disorders in coconut based integrated farming systems. Vol 3. Banana*
- ❖ Jacob, J., Sreekumar, K.M., Joy, M., Umamaheswaran, K., Roy, S. (2007). *Handbook for field level diagnosis and management of diseases, insect pests and nutritional disorders in coconut based integrated farming systems. Vol 4. Cocoa*
- ❖ Joy, M., Sreekumar, K.M., Jacob, J., Roy, S., Umamaheswaran, K. (2007). *Handbook for field level diagnosis and management of diseases, insect pests and nutritional disorders in coconut based integrated farming systems. Vol 5. Pepper, Vanilla & Nutmeg*
- ❖ Jacob, J., Joy, M., Sreekumar, K.M., Umamaheswaran, K., Roy, S. (2007). *Keradhisthitha Vilasambrdayathile Roga, Keeda, Poshaka Prashnangal-Nirnaya Niyanthrana sahayi Vol 1. Thengu*

- ❖ Joy, M., Jacob, J., Sreekumar, K.M., Umamaheswaran, K., Roy, S. (2007). *Keradhisthitha Vilasambrdayathile Roga, Keeda, Poshaka Prashnangal--Nirnaya Niyanthrana sahayi Vol 2. Kamuku*
- ❖ Sreekumar, K.M., Joy, M., Jacob, J., Umamaheswaran, K., Roy, S. (2007). *Keradhisthitha Vilasambrdayathile Roga, Keeda, Poshaka Prashnangal--Nirnaya Niyanthrana sahayi Vol 3. Vazha*
- ❖ Jacob, J., Sreekumar, K.M., Joy, M., Umamaheswaran, K., Roy, S. (2007). *Keradhisthitha Vilasambrdayathile Roga, Keeda, Poshaka Prashnangal--Nirnaya Niyanthrana sahayi Vol 4. Cocoa*
- ❖ Joy, M., Sreekumar, K.M., Jacob, J., Roy, S., Umamaheswaran, K. (2007). *Keradhisthitha Vilasambrdayathile Roga, Keeda, Poshaka Prashnangal--Nirnaya Niyanthrana sahayi Vol 5. Kurumulaku, Vanila & Jathikka*

Book Chapters

1. **Jacob, J.** (2012). Integrated farming systems of Kerala. In: *Entrepreneurship Development and Management for VHSE-Agrpreneurs*. (Eds. Anilkumar, A.S., Govindan, M., Nehru, S.M. and Anilkumar, A.), pp.66-68, College of Agriculture, Kerala Agricultural University, Padannakkad, Kasaragod.
2. **Jacob, J.** Varughese, K. and Rani, B. (2011). Zones of Kerala. Rice based cropping systems. In: *Efficient Alternate Cropping Systems* (Gangwar, B. and Singh, A.K.), pp.250-262, Modipuram, Meerut, India: Project Directorate for Farming Systems Research
3. **Jacob, J.** and Narwal, S.S. (2011). Laboratory bioassay with agroforestry tree parts and rhizosphere soil. In: *Research Methods in Plant Sciences, Volume 2: Forestry and Agroforestry*. (Eds. Narwal, S.S., Pavlovic, P. and Jacob, J.) pp.73-89, Studium Press LLC, Houston (ISBN: 1-933699-66-3)
4. **Jacob, J.** and Joy, M. (2011). Pot Culture Studies in Agroforestry Systems. In: *Research Methods in Plant Sciences, Volume 2: Forestry and Agroforestry*. (Eds. Narwal, S.S., Pavlovic, P. and Jacob, J.) pp.139-155, Studium Press LLC, Houston (ISBN: 1-933699-66-3)
5. **Jacob, J.**, Patil, R.H. and Narwal, S.S. (2011). Multistorey Agroforestry Systems Field Studies. In: *Research Methods in Plant Sciences, Volume 2: Forestry and Agroforestry*. (Eds. Narwal, S.S., Pavlovic, P. and Jacob, J.) pp.187-206, Studium Press LLC, Houston (ISBN: 1-933699-66-3)
6. **Jacob, J.** and Joy, M. (2007). Integrated approach towards coconut based farming systems. In: *Coconut for Rural Welfare* (Eds. P.K. Thampan and K.I. Vasu) pp. 109-106, Indonesia: Asian and Pacific Coconut Community.
7. **Jacob, J.** (2005). Organic farming in small holdings. In: *Organic Agriculture Management-Certification and Inspection* (Ed. Sherif, A.K) pp.123-131, Directorate of Extension, Kerala: Kerala Agricultural University
8. **Kuruvilla Varughese** and Rani, B., 2001. System based low cost production technologies for small farmers of Kerala: In System based low cost production technologies for small farmers: PDCSR, Modipuram.ed. Gangawar, B and Yadav, R. L.
9. **Rani, B.**, Usha, K. Varughese, K., Jacob, J. and Kamala, N. 2005. 'Jeevanulla Manninu Manniracompost'. In CSRC, Karamana Golden Jubilee Celebrations 'Souvenir' p. 71- 74.
10. **Jacob, J.**, Varughese, K., Kamala N., Rani, B., Anila, B. R., Joice, M. J. and Sanoj, S.

N.2005. 'Sambathika Bhadratha Nalkunna Krishi Shaili'. *In CSRC, Karamana Golden Jubilee Celebrations 'Souvenir'* p. 75-80.

11. **Kamala, N.**, Sulochana, K. K., Rani, B., Jacob, J., and Kuruvilla Varughese. Vayalora Vilakalude Mithramaya Fluorescent pseudomonas-nte upayogasadhyathakal. *In CSRC, Karamana Golden Jubilee Celebrations 'Souvenir p. 89-92.*

Other Publications (2005-2012):

Technical Bulletin	:	1
Total Research papers	:	61
Reports for Govt	:	10

Dr. Jacob John developed an interactive CD (Malayalam and English) for diagnosis and management of diseases, insects pests and nutritional disorders in coconut, arecanut, banana, cocoa, pepper, vanilla and nutmeg. **Distributed to the State Department of Agriculture in all Districts of Kerala.** Uploaded on site of Kissan Kerala, Dept of Agriculture.

Sub Projects:

- I. Homestead based IFS (0.2 ha)
- II. Coconut based IFS for upland 0.1 ha and wetland 0.1 ha (0.2 ha)
- III. Rice based IFS-model in wetland (0.2 ha)- model I
- IV. Rice based IFS –model in reclaimed wet land (0.2 ha)- model II

2. Permanent Plot experiment on Integrated nutrient supply system for cereal based crop sequence
3. Development of organic farming package for system based high value crops
4. Investigating rice based farming systems involving fish through suitable land modifications *vis-à-vis* conventional rice based cropping systems
5. Development of innovative farming practices to mitigate the effect of climate change

EAPs

6. Optimisation of organic component in the fertilizer recommendation of amaranthus
7. Classification and characterization of farming systems in district wise agroecological zones of Kerala.
8. Network project on characterization and management of soil fertility with respect to secondary and micronutrients for agro-ecosystems of Kerala - State Plan Project
9. “Participatory development and evaluation of model terrace gardens in urban homesteads
10. “Developing systems recommendation for nutrient, disease and insect pest management in major cropping systems of Kerala”
11. “Developing user friendly weather based calendars for various crops in different agroecological zones of Kerala”

12. “Socioeconomic analysis and farmer participatory development of homestead farms of Kerala”