CMDR Journal of Social Research
(A Biannual Journal of Centre for Multi-disciplinary Development Research, Dharwad)
ISSN: 3049-1797 (Print) (Vol.2, No.1, Jan-Jun 2025, pp.26-32)

Farmers' Innovations in Coconut Cultivation in North Kerala

Jayashree M. P.* and Kalyan Ghadei**

ABSTRACT

Agricultural innovation is the process of using new or existing products or processes to increase the effectiveness, competitiveness, and sustainability of agriculture. Among them, the Farmers' innovations deserve much recognition. It is the responsibility of all Agricultural extension stakeholders to support and popularize them. This paper is a part of such an effort through the PhD research work of the author at Banaras Hindu University, Varanasi during the period 2022 to 2025. The topic of research was Socio-Cultural and Agricultural Relevance of Coconut and its Musical Dissemination, of which, one of the objectives was to Document the farmers' innovations in coconut cultivation and their constraints in furthering the innovation. The study which followed Exploratory method mainly to yield qualitative data, identifies 10 innovations made by 4 innovative farmers and many felt needs and constraints faced by the innovators -2 innovations each under the categories (i) innovations during planting stage of coconut and (ii) innovations for integrated pest and disease management of coconut, 4 innovations under the category (iii) innovations during harvesting stage of coconut, and 2 innovations under the category (iv) innovations in post-harvest technology of coconut. Apart from documentation of innovations, this study has also yielded results on the ranking of constraints faced by the innovative farmers under the categories Physical, Technical, Financial and Marketing constraints, according to their perceptions.

Keywords: Coconut Cultivation; North Kerala; Farmers' Innovations; Categorization; Constraints

*PhD scholar, , Department of Agricultural Extension Education, Institute of Agricultural Sciences, Banaras Hindu University, Varanasi, Uttar Pradesh, India.
*Professor, Department of Agricultural Extension Education, Institute of Agricultural Sciences, Banaras Hindu University, Varanasi, Uttar Pradesh, India.

INTRODUCTION

Farmers' innovations, how much ever meagre they might seem to be, should be given due respect and recognition since they are the time tested outcomes of their own experiences and felt needs in the concerned fields. Even though there are institutions like the National Innovation Foundation (NIF) to promote farmer innovations, it is the responsibility of all Agricultural extension stakeholders to support and popularize them. The mandatory activities of National Innovation Foundation of India (2000) working under the Department of Science and Technology, Govt. of India are to (i) help grass root innovators and outstanding traditional knowledge holders get due recognition, respect and reward for their innovations, (ii) to validate grass root innovations in collaboration with various research & development institutions and agricultural & veterinary universities and (iii) to ensure that such innovations diffuse widely through commercial or non-commercial channels. The National Innovation Foundation, in collaboration with Honey Bee Network announces the National Biennial Grassroots Innovation awards.

OBJECTIVES

From the researcher's personal experience, it was perceived that despite these facilities mentioned above, the farmers' innovations need a better documentation and that the innovator farmers face a lot of constraints in reality. In this backdrop, the objectives of this study were to document and classify the:

(i) Farmers' innovations on coconut and
(ii) Constraints faced by them in furthering their innovation.

This paper highlights some innovations made by farmers in the field of coconut cultivation, details of the respective innovator farmers, and their constraints, categorized as:

- Farmers' innovations for planting stage of coconut.
- Farmers' innovations for integrated pest and disease management of coconut.
- Farmers' innovations for harvesting stage of coconut.
- Farmers' innovations in post-harvest technology of coconut.
- About the innovators
- Constraints faced by the innovators

METHODOLOGY

The study followed Exploratory research method which is a preliminary and unrepresentative sampling study of any social unit in order to ascertain the chief elements composing it and as a rule, to prepare the way either for a systematic general survey or for some intensive enquiry respecting one or more aspects of the unit. In short, the researcher seeks to gain familiarity or to achieve new insights into the problem. North zone of Kerala state, the land of coconuts was selected purposely as the location of study. Respondents included coconut farmers, agricultural stakeholders and scholars, public as well as farmer innovators. Responses were collected through Google forms and interviews. The 265 respondents of this study were asked if they were aware of any innovator / innovation in the coconut sector. From the responses obtained, 10 innovations made by 4 innovative farmers could be identified. Further, these farmers were asked to rate a list of constraints provided in a questionnaire, as per their perception. Scores were given as 3, 2 and 1 for the remarks Major, Moderate and Minor. Interviews with innovator farmers were video graphed as far as possible and uploaded to a You Tube channel named 'Jaya palms' launched exclusively for this research work. The link of one such video on Remote controlled coconut climbing machine innovated by Prakashan Thattari available in You Tube (Jaya Palms, 2024).

About the Innovators:

Following were the innovator farmers included in the study for data collection:

- Simon George, is a progressive farmer from Kannur district of North Kerala who was also a member of the Scientific Advisory Committee of ICAR Krishi Vigyan Kendra, Kasaragod (2011).
- Prakashan Thattari is a farmer cum Physics graduate from Kozhikode district of North Kerala who after retirement from the Department of Commercial Taxes in 2009 runs his own firm named Prakatech in Mayanad, Kozhikode. He hit upon the idea to manufacture a coconut climbing machine following the huge success of his innovation 'Wonder climber' for harvesting arecanut. He was also motivated by the fact that the entire state was experiencing an acute labour shortage of coconut climbers.
- Late Dar. M. J. Joseph alias Appachan from Kannur district of North Kerala (survived by his son Francis Joseph, who carries forward the innovation) was a school dropout but an innovative farmer who learnt from his surroundings. He tried several innovations but most popular of them even today remains the Chemberi model

coconut palm climber. 'Dar' (Distinguished Agricultural Researcher) was an honorific title conferred on M.J. Joseph, who was adjudged as the Best Farmer Scientist in the first Farmers' Science Congress by Kerala Agricultural University. He had bagged many awards for this innovation including the 7th National Grassroots Innovation Awards which was awarded posthumously.

- P. V. Divakaran is a progressive, innovative farmer who has done a lot of innovations in agriculture. A resident of Kadinjimoola in Nileswaram block of Kasaragod district of North Kerala, he is well known to the public as a Farmer Scientist and is a much sought after resource person in agricultural seminars, schools, colleges, etc. He is an expert coconut climber and toddy/neera tapper also.

RESULTS AND DISCUSSION

The collected data about the Farmers' innovations were documented and categorized as follows:

- **Innovations at Planting**
  a) Polybag filling device for coconut nurseries by Simon George
  b) Pot mover for coconut nurseries by Simon George

(a) Polybag filling device for coconut nursery:

According to S. George (personal communication, April 11, 2023), this is a device used to fill large polybags of size 5x7 or 6x8 inches. With this device, 350 bags can be filled in an hour. Normally 2 persons can fill only 80 bags per hour. With this device, two persons can fill 1000 polybags per day. Cost of the device is Rs.10,000 / unit.

(b) Pot mover for coconut nursery:

This device helps to move heavy pots from one place to another in coconut nurseries. Using the levers at the handles, one can lift and drop pots / polybags upto 50 kilogram weight at a time even without touching them. The cost of the device is Rs. 3500 / unit. This innovation had won second place in Farmers' Science Congress of KAU in 2008.

- **Innovations for Integrated Pest and Disease Management**

a) High rocker sprayer by Simon George
b) Compost making using grubs of Rhinoceros beetle by P. V. Divakaran

(a) High rocker sprayer:

This device can be used to spray pesticides and fungicides effectively on tall trees, coconut and arecanut palms. It is a modification of the usual rocker sprayer by virtue of an additional controlling system. The device has great appreciation among the coconut farmers since it saves time and labour which is a major constraint in the integrated pest and disease management sector. Usually with rocker sprayer, the spray reaches to a height of 8 m. With this attachment, which is a pole of 8 m length, an additional 8m height can be achieved in the spraying process. The additional attachment device costs Rs. 500.

(b) Compost making using grubs of Rhinoceros beetle, the major pest of coconut:

This innovation is the preparation of compost using grubs of rhinoceros beetle (*Oryctes rhinoceros*) which is a major pest of coconut causing extensive damage to young emerging spindle leaves when not controlled effectively. The adult female lays eggs in cow dung pits or heaps. According to the innovator P. V. Divakaran, he adds fallen leaves of coconut and other byproducts as substrates for making compost. The grubs which come out of the eggs in the cow dung pits / heaps feed on these coconut byproducts and produce high quality compost, meanwhile growing into adult beetles. During this process, the pit / heap should be covered with closely knit nets to prevent the adult beetles from flying out of the compost pit. The trapped adult beetle dies there itself. In this process, one can get good compost meanwhile saving the coconut palm from the adult beetle. Another method is collecting grubs and incorporating them into vermicomposting pits. Here, the added advantage is that the earthworms devour the pupal stage of the grubs (at 6 months age) thus avoiding the necessity of using nets to control the adult stage. On the other hand, the grubs are not detrimental to the earthworms at any stage of its growth. Detailed story of this innovation was published in the NIF – Honey Bee Network collaborated publication in 2009.

- **Innovations at Harvesting stage**
  a) Remote controlled coconut climbing machine by Prakashan Thattari
  b) Manually operated coconut climbing machine – 'Kera picker' by Prakashan Thattari
  c) Chemberi model coconut climber by Dar. M J Joseph Chemberi
  d) Arm / foot protector for coconut climbers by P V Divakaran

(a) Remote controlled coconut climbing machine:

When the traditional coconut climbers have almost vanished and when the machine aided climbing process still has many drawbacks, this innovation, if the required assistance is provided to the innovator, will surely be a game changer. This is a remote controlled coconut climbing device fabricated by Prakashan Thattari from Kozhikode. It was originally innovated in 2010 and was later modified manifold into a device weighing 13kg.

It had received patent in 2010. The machine invented using the theory of robotics, mechanical and electrical engineering, will climb the coconut tree in a zigzag way by virtue of a remote controller. It works on a rechargeable battery or power backup generator. It can easily climb even a 100-feet tall coconut tree. When the machine reaches the top, the knife is activated with the remote controller. The sharp knife can be turned to any direction depending upon the position of the nuts or bunches to be harvested. The prototype of this machine was demonstrated by the innovator during July, 2011 at ICAR Krishi Vignan Kendra, Kasaragod, as a part of its monthly programme series named 'Farmer-Scientist Led Monthly Interface Series' to the witness of more than 300 participants and the innovation received wide coverage through mass media.

Even in 2022, after 13 years of the innovation, the innovator was facing the constraint of insufficient funds to develop a refined prototype, though he had got some financial assistance from ICAR and technical support from TNAU during the initial stages. He is optimistic that once the flawless prototype is developed, it will be of huge demand from all over the coconut growing countries.

(b) Manually operated coconut harvester - Kera picker:

This is a coconut harvesting device innovated by Prakashan Thattari which works on the principle of 'rope and pully'. The innovator who is known for his successful innovation, the 'Wonder Climber' for harvesting arecanut was motivated by its success and fabricated a similar one for harvesting coconuts and named it 'Kera picker' (Kera = coconut). The device costs Rs. 8000 per unit and is much appreciated by farmers.

(c) Chemberi model Coconut climbing machine:

The coconut climbing device innovated by Dar. M.J. Joseph Muthukulathil, Chemperi in Kannur way back in 1977 is an easy to use multipurpose palm climbing device. Even unskilled persons can climb palms effortlessly using this machine. Since his demise in 2013, the device is being fabricated by his sons. One of them, Francis Joseph mentions that the device is of very high demand among the farming community, but the device is not being included in government schemes - had it been done, they could have had a bulk purchase. The reason he assumes for this is that their products are comparatively costlier owing to the high quality raw materials used in fabrication. Their steel machine costs Rs.3000 where as the iron machine costs Rs.2200. Francis claims that the device is technically perfect to such an extent that even safety belt is not required while climbing. He mentions that even Coconut Development Board Kochi, who should have promoted innovative farmers, did not opt for this device being supplied to the trainees during their state wide project Friends of Coconut Tree or FoCT.

(d) Arm and foot protector for coconut palm climbers:

This innovation was done in 2012 by P. V. Divakaran from Kasaragod district of North Kerala. The device can be tied to hands and legs while climbing the palm manually so that we can prevent skin hardening and thickening which usually occurs in coconut tree climbers. The innovation has received appreciation from the District Medial Officer, Kasaragod. It won special prize in the KSCSTE Rural Innovators Meet in 2018 organised by Kerala State Council for Science, Technology and Entrepreneurship, Thiruvananthapuram, Kerala and MSSRF in 2018. According to the innovator and few other traditional climbers, the harvesting of coconut in Kerala used to be done once in 2 months. But in course of time, the frequency of harvest has reduced and one of the major reasons behind this is the injuries and bruises that occurs on the skin of the climbers and the money they have to spend on treatment of these in the long run. It was is in this back drop that he came up with an arm and foot protecting device for coconut palm climbers. The device is a leather strap which can be wrapped and fixed tight around arms, heals and ankles. It is durable and doesn't create any irritation to the skin.

- **During Post-harvest technology**

a) Foot operated coconut dehusker by Prakashan Thattari
b) Coconut cracking device by Prakashan Thattari

(a) **Foot operated coconut dehusker:**

In North Kerala, dehusking of coconuts is usually done with devices called *kathiyal*or *paara*, both being laborious. This device innovated by Prakashan Thattari from Kozhikode in 2022 is foot operated. Hence, the

user gets a better balance and becomes able to exert more force. With this, on an average, 240 coconuts can be dehusked per hour. Cost of the device is Rs.1250 / unit.

(b) **Coconut cracking device:**
In North Kerala, coconuts are usually cut open with a knife called *kathiyal* holding the coconut in one hand. It requires a lot of skill, otherwise would be dangerous. Here is the relevance of the innovation by Prakashan Thattari from Kozhikode. The coconut cracking device developed in 2019 can be operated by sitting in a chair or in standing position. Dehusked coconut is placed on a flat surface of the device and when a rope is pulled down, it cuts the coconut into two equal halves. With this device, 700 coconuts can be cut open in an hour. Cost is Rs.10,000 / unit.

CONSTRAINTS FACED BY INNOVATIVE FARMERS

Responses obtained from 4 farmer innovators regarding categorization of the constraints are furnished below:

Table 1: Responses of farmer innovators regarding constraints experienced

Sl. No	Types of constraints	No. of innovators who categorized the constraints as		
		Minor	Moderate	Major
1	**Physical**			
a	Difficulty to carry heavy machines for demonstrations to farmers' fields	1	2	1
b	Lack of transport facility to reach to farmers' fields	2	2	
c	Lack of space to mass multiply the product	1	2	1
d	Health issues	2	2	
e	Fading enthusiasm with time	2	1	1
2	**Technical**			
a	Lack of scientific knowledge to upgrade the prototypes	4		
b	Lack of support from experts to make the innovation fool proof		2	2
c	Lack of infrastructure for mass multiplication of invented machineries	2		2
d	Lack of approval of technology by subject experts		2	2
e	Complicated procedures for certification			4
3	**Financial**			
a	High cost of production due to quality raw materials	1	2	1
b	Heavy cost for mass multiplication		1	3
c	Lack of support from Government		1	3
d	Lack of support from NGOs		1	3
e	Inappropriate patency policies	1		3
4	**Marketing**			
a	Lack of advertisement		2	2
b	Lack of bulk orders		1	3
c	Competition with established brands	1	1	1
d	Lack of inclusion of the product in the Government schemes for farmers		1	3
e	Lack of institutional support		1	3

Following was the ranking of the different constraints within their respective groups (Table 1 and 2).

Within Physical constraints:

- Difficulty to carry heavy machines for demonstrations to farmers' fields and lack of space to mass multiply the product ranked first.
- Fading enthusiasm with time ranked second.
- Lack of transport facility to reach to farmers' fields and health issues ranked third.

Within Technical constraints:

- Complicated procedures for certification ranked first.
- Lack of support from experts to make the innovation fool proof and lack of approval of technology by subject experts ranked second.
- Lack of infrastructure for mass multiplication of invented machineries ranked third.

- Lack of technical knowledge to upgrade the prototype of their innovations ranked fourth.

Within Financial constraints:

- Heavy cost for mass multiplication, lack of support from Government and lack of support from NGOs ranked first.
- Inappropriate patency policies ranked second.
- High cost of production due to quality raw materials ranked third.

Within Marketing constraints:

- Lack of bulk orders, Lack of inclusion of the product in the Government schemes for farmers and lack of institutional support ranked first.
- Lack of advertisement ranked second
- Competition with established brands ranked third.

Table 2: Types of Constraints and corresponding parameters

Sl. No	Types of Constraints	Score Frequencies				total score	Ranking within Types
		f1	f2	f3	f4		
1	**Physical constraints:**						
a	Difficulty to carry heavy machines for demonstrations to farmers' fields	1	2	2	3	8	1
b	Lack of transport facility to reach to farmers' fields	1	1	2	2	6	3
c	Lack of space to mass multiply the product	1	2	2	3	8	1
d	Health issues	1	1	2	2	6	3
e	Fading enthusiasm with time	1	1	2	3	7	2
2	**Technical constraints:**						
a	Lack of scientific knowledge to upgrade the prototypes	1	1	1	1	4	4
b	Lack of support from experts to make the innovation fool proof	2	2	3	3	10	2
c	Lack of infrastructure for mass multiplication of invented machineries	1	1	3	3	8	3
d	Lack of approval of technology by subject experts	2	2	3	3	10	2
e	Complicated procedures for certification	3	3	3	3	12	1
3	**Financial constraints:**						
a	High cost of production due to quality raw materials	1	2	2	3	8	3
b	Heavy cost for mass multiplication	2	3	3	3	11	1
c	Lack of support from Government	2	3	3	3	11	1
d	Lack of support from NGOs	2	3	3	3	11	1
e	Inappropriate patency policies	1	3	3	3	10	2
4	**Marketing constraints:**						
a	Lack of advertisement	2	2	3	3	10	2
b	Lack of bulk orders	2	3	3	3	11	1
c	Competition with established brands	1	2	2	3	8	3
d	Lack of inclusion of the product in the Government schemes for farmers	2	3	3	3	11	1
e	Lack of institutional support	2	3	3	3	11	1

CONCLUSION

Farmers are always chasing new technologies. It is a huge responsibility of the part of the Government and Research institutes to support them. The Proceedings of the National Academy of Agricultural Sciences mentions about the scope of Integrated Agricultural Research for Development which attempts to harness science to address complex multifunctional agricultural objectives and to engage farmers and their communities in the process. Innovations across a broader spectrum of policies and technologies are needed to confront the complex array of challenges in agriculture. Recognition through awards does not mean everything to an innovator farmer. Farmer enthusiasm should not be put off at any cost. Physical, technical, financial and marketing constraints should be resolved. Unless mass multiplied, there is no room for export or even lateral spread of the technology at the grass root level. Farmer innovators are basically and ultimately farmers only. Their innovations will definitely be farmer friendly; because, nobody understands a farmer better than a farmer.

REFERENCES

Anonymous. (2009). Using pest to make vermicompost. *Honey Bee Network*, 20(1), 18.

Fairchild, H. P. (1977). *Dictionary of sociology*. Littlefield, Adams and Company.

ICAR Krishi Vigyan Kendra, Kasaragod. (2011, May). *Farmers' monthly interface series: Farm mechanisation* [Brochure]. ICAR KVK, Kasaragod.

ICAR Krishi Vigyan Kendra, Kasaragod. (2011, September). Farmers' monthly interface series: Ecofriendly agriculture [Brochure]. ICAR KVK, Kasaragod.

Jaya Palms. (2024). *Jaya Palms #21 coconut climbing robot farmer's innovation Prakashan Thattari [Video]. YouTube.* https://youtu.be/0ilp7razdim?si=grle7eoceaz-uddm

National Innovation Foundation – India. (2013). *Tree climber*. https://nif.org.in/innovation/tree-climber/495

Sayer, J. (2013). Agricultural innovation to protect the environment. *Proceedings of the National Academy of Sciences,* 110 (21). https://www.pnas.org/doi/full/10.1073/pnas.1208054110

The New Indian Express. (2011, June 2). Now, a remote-operated coconut plucker. *News18.* https://www.news18.com/news/india/now-a-remote-operated-coconut-plucker-372756.html