



# Coconut climbing methods and devices: A participatory analysis of constraints and strategies

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## Abstract

Socio-economic characteristics, extent of knowledge about integrated management of selected pest and diseases of coconut and technical efficiency of mechanical climbing devices were analysed in a study conducted among 87 coconut climbers in Kasaragod District. Matrix scoring, one of the Participatory Rural Appraisal tools, was employed to elicit data for the participatory assessment of the climbing devices. Among the climbers 22 per cent were illiterate, 57 per cent had primary school level of education, eight per cent were landless and 64 per cent were having only 10 to 50 cents of land holding. Only 14 per cent of the climbers used mechanical devices for climbing coconut palms. Seventy four per cent of the climbers attended to plant protection measures, mainly control measures for bud rot disease and rhinoceros beetle, apart from harvesting and crown cleaning. Except one climber, none of them had attended any training on PP measures in coconut. Majority of the climbers did not possess the required level of knowledge about the control measures recommended against bud rot disease and rhinoceros beetle infestation. The average time taken to set the device on the tree was more for the Chemberi Joseph model of climbing device but it took less time for climbing up the tree. CPCRI model was assessed better on the dimension of safety for the climber and simplicity in the design of the device. Chemberi Joseph model was assessed better on the dimensions of less drudgery involved in climbing, suitability for using under all weather situations and cost of the device.

*Keywords:* Socio-economic profile characteristics, coconut climbing methods, participatory assessment

## Introduction

The traditional way of climbing coconut palm is quite tedious, risky and requires lot of skill. Earlier days, skilled labourers belonging to certain communities were engaged in climbing coconut palms for harvesting nuts, crown cleaning and toddy tapping. Due to various socio-economic factors, the number of such traditional skilled palm climbers is steadily declining. Difficulty to get the service of skilled coconut climbers in time and their high wage rate are perceived as important constraints experienced in coconut farming by the cultivators. It was a challenge to the technology developers to fabricate a simple, safe and easy to use mechanical device for climbing coconut palms. Few agencies, including a farmer innovator, have developed mechanical devices for climbing coconut palms, which are being used by many climbers. Attempts made for training unemployed rural youths for coconut climbing using mechanical devices is well appreciated by various agencies (Thamban and Mathew, 2006). However for effective

use of technologies, pest and disease management in particular, training on these aspects is also to be imparted to climbers who actually perform the operations. Many of the climbers do not possess adequate knowledge on various aspects of pest and disease management technologies thereby adversely affecting the effectiveness of crop protection measures resulting in crop loss. In this background, a study was conducted to analyze the personal and socio-economic profile characteristics of coconut climbers, extent of their knowledge about integrated management of selected pest and diseases of coconut, and to analyse the technical efficiency and other desired features of mechanical climbing devices.

## Materials and Methods

Locale of the study: The study was conducted in Kasaragod District in Kerala State where the National Agricultural Innovation Project (NAIP) is being implemented by CPCRI covering the major coconut growing tracts of the District.

**Respondents:** Data were collected from 87 coconut climbers representing eight coconut clusters in Kasaragod District where the NAIP is being implemented by CPCRI and nine youths who attended training on coconut using mechanical devices for the first time thereby making the total sample size 96.

**Data collection:** The data on profile characteristics and level of knowledge were collected from 87 climbers using a pre tested interview schedule. Knowledge level of climbers on plant protection measures in coconut was assessed by analyzing their knowledge on various aspects of management of bud rot disease, the common disease and rhinoceros beetle, common pest against which the recommended plant protection measures are carried out with the help of climbers. Data on technical efficiency of mechanical climbing devices in terms of time taken to climb palms were collected from nine youths attending training on climbing for the first time for three types of mechanical coconut climbing devices viz., Chemberi Joseph model developed by a farmer innovator, model developed by CPCRI and model developed by TNAU. The Participatory Rural Appraisal tool Matrix scoring, was employed among a group of 15 climbers having representation to traditional climbers, climbers using mechanical climbing devices and youths attending training on climbing for the first time to elicit data for the participatory assessment of the above three climbing devices. Suggestions for improvement of the device was separately obtained from climbers who were already using Chemberi Joseph model of climbing device which is the only model somewhat popular among the climbers.

## Results and Discussion

### *Socio-economic profile characteristics of coconut climbers*

The age distribution of coconut climbers indicated that 50 per cent of them belonging to the middle age group (i.e., 35 to 50 years); one-fourth each are in the age group below 35 and above 50 years. The literacy rate of climbers indicated that only 23 per cent were illiterate. The trend in educational status of climbers can favourably be utilized to formulate appropriate training programmes, especially on crop protection aspects of coconut.

Traditionally, in Northern parts of Kerala coconut climbing was mostly the occupation of people belonging to certain backward communities like Thiyya (Ezhava). The present study also revealed that three fourth of the climbers were belonging to backward communities. However, the fact that about 15 per cent of the climbers

were belonging to forward castes indicate the social change that is happening and also probably the realization by the unemployed people of such communities that coconut climbing can be a remunerative occupation.

Study revealed that palm climbing alone was the occupation for 41 per cent of the climbers. During the lean period, especially rainy season, climbers do find employment in farming related activities (31 per cent). However, it is worthwhile to note that even during rainy season palms can be climbed if mechanical climbing devices are used. But only 14 per cent of the climbers presently use climbing devices, while majority (86 per cent) adopts the traditional method for climbing palms. This indicates the need to popularize the use of mechanical climbing devices among the climbers. Farming is a part of occupation for 20 per cent of the climbers. Among the climbers, 27 per cent are having holding of size more than 50 cents (Table 1). Eight percentage of the climbers are landless and 15 per cent of them are having holdings of size less than 10 cents. The pattern of distribution of climbers according to the size of land holding clearly indicate that the present population of climbers are from resource poor background and they surely require assistance and encouragement to improve their livelihood so as to sustain their field of activity in palm climbing. In line with the general trend in Kerala State, about half of the climbers were having family size of two to five.

**Table 1. Holding size classification of climbers**

Farm size	No.	Percentage
Landless	7	8.05
Less than 10 cents	13	14.94
10-25 cents	23	26.44
26-50 cents	20	22.99
51 cents to 1acre	12	13.79
Above 1 acre	12	13.79
Total	87	100.00

By default all respondents are members of grama sabha, the grass root level forum to discuss and suggest interventions under the decentralized planning programme of grama panchayat. However, only 38 per cent of them attend the grama sabha meetings regularly (Table 2). This trend has been reported through out the State. To enhance the quality of decentralized planning process the level of participation of members is to be improved. Only 16 per cent of the climbers are having affiliation to labour unions, but among those who are members of labour unions majority (64 per cent) regularly attend the union meetings indicating their higher level of involvement. The pattern of social

**Table 2. Pattern of social participation of coconut climbers**

Organization	Member (%)	Regular in attending meeting (%)	Office bearer (%)
Grama sabha	100.00	43.68	0.00
Labour union	16.09	64.28	1.15
Self Help Groups	10.34	77.78	0.00
Co-operative society	27.59	29.03	0.00
Farmer Organisations	2.30	50.00	0.00

participation of climbers indicates the amenability of organizing them into labour banks.

Though climbing fetch high wage rate, only 2 per cent of the respondents reported to have a monthly income of more than Rs.7500: majority of them (70 per cent) are having a monthly income below Rs.50000. Forty four per cent of the respondents climb on an average 30 to 50 palms a day. There were a few climbers who were climbing 100-150 palms per day. Depending on the physical endurance status and expertise in climbing the average number of palms climbed per day vary between climbers, which are reflected in the distribution pattern of climbers under the study also.

Majority of the climbers (69 per cent) received 150 to 300 man days of work in a year. About six per cent of the climbers were engaged for more than 300 man days of work. Agricultural labour and spraying against Mahali disease of arecanut were the important avenues of income for the climbers during the lean season, especially during rainy days.

Majority (77 per cent) of the climbers collect on an average 5 to 10 rupees per palm as climbing charges. Most of the coconut growers complain about the high wage rate of climbers. However when the farmers' opinion was presented to the climbers their response was that their job involved lot of drudgery and risk and the rate they charge is worth for it. There is clearly a dearth of skilled climbers to meet the demand of labour for harvesting and plant protection operations in coconut (Anithakumari *et al.*, 2002). More rural youths are to be attracted to this avenue of employment opportunity to meet the demand and also there is the necessity for organizing labour bank to channelise the available labour force to the needy farmers. The labour bank can have healthy interaction with coconut farmers or coconut farmers' clusters in the locality to evolve consensus on issues like wage rate, quality of work etc.

Item of works attended: All the climbers attended to harvesting and crown cleaning operations while only 60 per cent of them attended to plant protection operations. Among the plant protection measures control

methods of bud rot and rhinoceros beetle are the major items they were attending to (60 and 54 per cent, respectively). A sizeable proportion (62 per cent) of climbers who attend to plant protection measures informed that they used to give suggestions to the farmers on the control measures to be carried out. However, except one climber, none of them have attended any training programme on crop protection aspects.

### ***Knowledge about plant protection measures***

Knowledge level of climbers on plant protection measures in coconut was assessed by analyzing their knowledge on different aspects of management of bud rot disease; the common disease and rhinoceros beetle; common pest against which the recommended plant protection measures are carried out by the farmers with the help of climbers. It was revealed that the climbers did not possess the required level of knowledge about the control measures recommended against bud rot disease and rhinoceros beetle infestation, the major plant protection measures they attend to (Table 3). The fact that they used to give suggestions to the farmers on the control measures to be carried out clearly indicate the need to need for organizing training programmes for the coconut climbers on crop protection aspects of coconut.

**Table 3. Level of knowledge of coconut climbers (%) on control of bud rot disease and rhinoceros**

Item	Bud rot	Rhinoceros beetle
Symptom of the infection/infestation	100.00	100
Causal agent of bud rot disease / life cycle of rhinoceros beetle	7.69	5.77
Name of plant protection chemicals	19.23	3.85
Dosage	7.69	3.85
Method of application	5.77	3.85
Time/schedule to be followed for IPM/IDM	7.69	1.92
Mechanical method of rhinoceros control	-	100

### ***Technical efficiency of mechanical climbing devices in terms of time taken to climb palms***

Data on technical efficiency of mechanical climbing devices in terms of time taken to climb palms are presented in Table 4. To make a comparison of the three mechanical devices, observations were recorded for the time taken for setting the device, to climb a height of 5 m and climb down and finally to detach the device from the tree. Analysis of the data (Table 4) indicated that the TNAU model took significantly less time compared to other two models. Its advantage over Chemberi Joseph model is the significantly lesser time taken for setting and detaching the device. There is no significant difference between these two models for climbing up and down.

**Table 4. Technical efficiency of mechanical climbing devices in terms of time (in seconds) taken to climb palms**

Time taken	Chemberi Joseph model	TNAU model	CPCRI model
To set the device on the tree	318.5	78.3	307.8
To climb up 5 m	63.4	100.1	182.0
To climb down from 5m height	89.5	73.0	101.4
To detach the device	251.0	48.3	282.0
Total time taken	722.4	299.7	873.2

### *Participatory assessment of climbing devices*

The results of participatory assessment of climbing devices are presented in Table 5. Climbers delineated 12 attributes to be considered for matrix scoring in the participatory assessment of the mechanical devices for coconut climbing and these attributes were given differential weightage scores considering their degree of importance. Safety for the climber and less drudgery in using was the two attributes which were given highest weightage. Chemberi Joseph model of climbing device ranked first based on the pooled score obtained on the attributes considered for comparative assessment. It was assessed superior to the other two models on seven attributes viz., suitability for using under all weather situations, cost of the device, less drudgery in using, easy climbing to the crown portion of the tree from the device after reaching the top, less tear and wear for the device, causing no bruises to the body of the climber while using and facility for easy climbing down on emergency situations. CPCRI model was assessed better on the dimensions of safety for the climber, suitability to climb coconut trees having slanting or bent trunk, simplicity in the design of the device, easy to repair and facility for easy climbing down on emergency situations. TNAU model can be improved by modifying the design for better safety and less drudgery in using. During the training session, the participants opined that while climbing down the palm TNAU model results in lot of drudgery due to the weight being exerted on thigh muscles. CPCRI model scored low on cost of the device because the safety attachments are costly. The major disadvantage of Chemberi Joseph model was that it was not suitable for climbing coconut trees having slanting or bent trunk. The climbers felt that it was not easy for climbing to the crown portion of the tree from the CPCRI model after reaching the top, which is reflected in the low score obtained by the model on that particular dimension. Participatory assessment of climbing devices clearly indicated the scope for improving the climbing devices on the attributes on which they scored low as discussed above.

**Table 5. Participatory assessment of climbing device**

Sl. No.	Attribute and weightage	Matrix score (Range 0-10) and weighted score		
		Pooled score of traditional climbers, climbers using mechanical device and youth attending training on climbing for the first time	Joseph model	TNAU model
1	Safety for the climber (10)	240	130	260
2	Suitability for using under all weather situations (9)	270	153	180
3	Cost of the device (8)	208	184	184
4	Suitability to climb coconut trees having slanting or bent trunk (8)	168	192	208
5	Less drudgery in using (10)	270	190	250
6	Easy climbing to the crown portion of the tree from the device after reaching the top (8)	200	176	152
7	Easiness to carry (9)	216	216	270
8	Less tear and wear for the device (7)	189	168	161
9	Simplicity in design (7)	168	189	210
10	Causing no bruises to the body of the climber while using (9)	243	216	216
11	Easy to repair (9)	225	198	243
12	Facility for easy climbing down on emergency situations (8)	192	168	192
	Total	2589	2180	2526

### *Suggestions for improvement of climbing device*

Specific suggestions for improving the climbing device was separately obtained from climbers who were already using Chemberi Joseph model of climbing device which is the only model somewhat popular among the climbers. Most of them felt that the weight of the machine is on the higher side and needs to be made lighter to reduce the drudgery while climbing. Though many people found the climbing easy, time taken to fasten and unfasten the climbing device to and from the palm was another major concern. Safety of the machine, in case of any mechanical failure, was another concern expressed by the users. An additional half ring could be provided at the base to provide more stability to the machine. Two cables, each one for the left and the right legs, needs to be attached to the palm for the present climbing device. Instead of two cables, if one could do the work, fastening process would be much easier and faster. Many of the climbers were not comfortable with existing locking system and wanted an improvement to the same. Many a times it was noticed that the locking system get loosened and machine get slipped when the climber

leaves the machine and goes to the crown of the palm for works such as crown cleaning, pollination etc. Many users of the machine expressed their difficulty in using the machine in trees with bend. Cover of the foot rest in the present model is made up of plastic. Some of the climbers want it to be replaced with a more comfortable and durable material. Initial cost of the machine was not a concern for the users. However, many felt that the cost of the cable, when purchased as a spare, is pretty high. Many times it was difficult to get a quality cable in the local market.

### **Conclusion**

The study revealed the need for appropriate programmes for attracting youth towards coconut climbing as an occupation to provide the required labour force very much critical in coconut farming, need to popularize the use of mechanical climbing devices among the climbers and the need for

organizing training programmes for the coconut climbers on crop protection aspects of coconut. It is also required to organise labour bank to channelise the available labour force to the needy farmers. The labour bank can have healthy interaction with coconut farmers or coconut farmers' clusters in the locality to evolve consensus on issues like wage rate, quality of work etc. The participatory analysis of climbing devices clearly indicated the scope for improving the climbing devices on the desirable attributes for better efficiency.

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