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FROM SKILL TO SURVIVAL: A STUDY ON THE SUSTAINABILITY OF COCONUT TREE CLIMBERS IN PALAKKAD DISTRICT OF KERALA, INDIA

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Abstract

The coconut sector provides livelihood to numerous coconut growers and workers involved in various stages of production chain. Coconut cultivation and harvesting involve the engagement of both skilled and unskilled labourers. Among the skilled labour, coconut tree climbers play a crucial role in supporting the coconut sector. They undertake high risk to pluck coconut from the coconut tree and to perform other maintenance and protection activities such as crown cleaning, pest and disease management, pruning and fertilization. Given their indispensable role, the present study examines the livelihood and job sustainability of coconut tree climbers in Palakkad district of Kerala, India. Seventy male coconut tree climbers were selected for the study using non probability convenient sampling method. The findings reveal that all the respondents are middle-aged and older individuals, with majority having school education. Majority of the climbers (68.57%) were engaged in coconut tree climbing for 9-12 months in the previous year, earning a minimum of Rs.35 per tree to a maximum of Rs.75 per tree. A climber earns an average of Rs.1,226 per day. Income from climbing is the primary source of income for 48.57%, while for around 9% of the respondents, climbing income alone contributes 100% of living income. Concerningly, majority of the respondents do not use any safety equipment while climbing and none have enrolled in the Kera Suraksha Insurance scheme. Although economic and occupational aspects are relatively stable, the need to ensure risk mitigation strategies is essential.

Keywords:

Coconut Climbers, Sustainability, Climbing Device

1. INTRODUCTION

Coconut tree is widely cultivated in India, especially in the southern states of Kerala, Tamil Nadu, Karnataka and Andhra Pradesh. India is the third largest coconut-producing country in the world as of 2023 and contributes around Rs.30,795.6 crore (US$ 3.72 billion) to the country's gross domestic product (GDP) during financial year 2023 [8]. The coconut sector provides livelihood to many coconut farmers and workers involved in various stages of cultivation, harvesting and processing of coconut. Coconut climbers play a crucial role as a skilled labour in the coconut supply chain, as it enables the movement of produce from the cultivators to the market for ultimate consumption. Traditional coconut climbing, a high-risk manual work which was previously passed down through generations as a hereditary occupation, can be made safer with the use of a portable climbing device [5]. However, climbing has now become uncommon, with very few taking on the traditional profession [3]. The major reason for decline in the number of climbers is the physical challenges and risk involved in the occupation [6]. Coconut Development Board (CDB) has initiated a program called 'Friends of Coconut Tree' (FoCT) to train and equip unemployed youth to climb coconut tree with specially developed climbing machine. CDB has also introduced Kera Suraksha Insurance scheme for the coconut climbers to mitigate the risk involved in the profession by financial and medical coverage.

Coconut climbers are an inevitable part of coconut production chain. They engage not only in harvesting of coconut but also in the overall maintenance and care of the palm. A study on socio-economic aspects, working conditions, wage, challenges and the sustainability of the climbers is therefore significant.

1.1 OBJECTIVES OF THE STUDY

- To know the socio-economic profile of the coconut climbers
- To study whether coconut climbing is a sustainable employment opportunity

2. METHODOLOGY

Both primary data and secondary data were used for the study. Non-probability convenient sampling method was used to collect the primary data. The sample size was chosen as 70. Interview schedule along with observation was used to collect the data from the respondents. The secondary data were collected from journals, government reports and websites. The pilot study was conducted among 10 respondents, and the necessary modification was made in the interview schedule.

2.1 SCOPE

The study was undertaken among the male coconut palm climbers in Palakkad district of Kerala. The study covers both traditional coconut climbers and climbers using climbing device. Women climbers were excluded from the study.

2.2 HYPOTHESES

1. There is no significant relationship between age and number of coconut trees climbed in an hour.
2. There is no significant association between age classification and method of climbing used.
3. There is no significant association between educational qualification and method of climbing used.
4. There is no significant association between method of climbing and level of climbing income.

2.3 STATISTICAL TOOLS

The following statistical tools are used for the study: Mean, median, range, percentage, correlation, Friedman test and chi-square.

2.4 LIMITATIONS OF THE STUDY

- Only 70 samples were chosen for the study.

- Only Palakkad district of Kerala is studied.

3. REVIEW OF RELATED LITERATURE

Baral et al. [2] conducted a study on physical discomfort of coconut farmers of Odisha. The study aimed to quantify and analyze the level of musculoskeletal discomfort experienced by coconut farmers in coastal districts of Odisha, particularly during climbing and plucking operations. Fifty-six coconut farmers (aged 25–55 years) with 5 to 15 years of experience in climbing and plucking coconuts, comprised the sample of the study. The study used Lehmann method to estimate energy expenditure (kcal lost) during climbing and plucking, Quick Exposure Check (QEC) to evaluate postural exposure and musculoskeletal risk, and the postures during climbing and plucking operations were analyzed. The study concludes that coconut climbers in Odisha are exposed to very high risk of musculoskeletal discomfort, especially during climbing operations. The study suggests the use of climbing devices to reduce strain and training farmers in safe climbing techniques.

Venkatesha et al. [15] in their study on perceived impact of coconut climbing equipment on income generation aims to assess the income generation potential of coconut climbing equipment among trained individuals and the constraints faced by users in employing the equipment for livelihood activities. A structured interview schedule was used to collect data from 70 randomly selected trainees who underwent the "Friends of Coconut Tree" (FoCT) training program of Mandya district, Karnataka. Statistical tools such as frequency and percentage were used to analyse the collected data. The study showed that majority of the respondents earned approximately Rs.10,000 per annum using the coconut climbing equipment. Major constraints faced by the respondents included health issues like knee, thigh, and shoulder pain and the seasonal nature of the work.

Sridhar et al. [13] conducted a study aimed at improving the safety and overcoming coconut harvesting constraints in response to labour shortages and injury risks associated with traditional climbing methods in India. The research highlights the dangers faced by unprotected climbers and the limitation of FIM model coconut tree climbing device. To address these, the authors designed a modified coconut tree climber featuring both upper and lower components optimized for stability, comfort and adaptability to various tree sizes. The upper part included a seating arrangement with a triangular gripping mechanism, while the lower part employed a footrest secured with a semi-circular gripping pad and iron rope for variable trunk diameters. The developed equipment was evaluated in the field by unskilled operators and demonstrated that the modified climber enabled safe and efficient operation, achieving a capacity of approximately eight trees per hour. Although climbing with the new device takes longer than manual climbing, it allows anyone to climb safely without any special skills. This innovation presents a viable, low-cost solution to labour issues in coconut harvesting.

The study by George et al. [6] aimed to assess the health status of traditional coconut tree climbers. It investigates the occupational hazards such as medical emergencies, changes in Body Mass Index (BMI) and dermatosis due to climbing. The study focused on the relationship between years of climbing experience and changes in body mass index (BMI), incidence of injuries and withdrawal from the occupation. Quantitative survey method was used to collect data from 240 male climbers under the age of 55 from districts in Kerala and Tamil Nadu between 2006 and 2008. Statistical tools such as One-way ANOVA and Bonferroni's test were employed to analyze BMI variations across experience groups.

The study found a significant decline in BMI with increased years of climbing, with the most experienced group (Group 4) exhibiting Grade 1 thinness. Occupational dermatosis was widespread, particularly among climbers from Tamil Nadu. About 35.5% of the climbers reported falls, with injuries ranging from Colles fractures to spinal damage. Notably, even experienced climbers were frequently injured. Furthermore, 7.9% of the climbers withdrew from the profession due to occupational hazards, including injuries and cosmetic stigma. The authors suggest introducing mechanized or animal-assisted climbing methods to reduce human risk and emphasize the importance of rehabilitating traditional climbers after two decades of service.

4. ANALYSIS AND DISCUSSION

4.1 SOCIO-ECONOMIC PROFILE OF THE RESPONDENTS

Table.1. Descriptive statistics on Age

Statistics	Age
Mean	49.80
Median	49.00
Range	28.00
Minimum	37.00
Maximum	65.00

Source: Computed data

The Table.1 shows that the mean age of the respondents is around 50 and the median is 49. The minimum age of the respondents is 37 and the maximum age is 65.

The age classification of respondents shows that the majority (71.4%) belong to Generation X (45-60 years old). A smaller proportion (20%), belong to Generation Y (29-44 years old) and only 8.6% are from the Baby Boomer (61-79 years old). This distribution implies that coconut tree climbing is predominantly performed by middle-aged workers, with declining participation among older generations and limited entry from younger ones, possibly due to the physical demands and occupational risks associated with the job.

Table.2. Educational qualification

Categories	Number	Percentage
No schooling	6	8.57
Schooling	62	88.57
Graduate	2	2.86

Source: Primary data

The Table.2 shows that majority of the respondents (88.57%) have schooling.

Table.3. Household income

Statistics	Income
Mean	3,70,944
Median	3,86,000
Range	4,39,000
Minimum	1,47,000
Maximum	5,86,000

Source: Computed data

The Table.3 reveals that the mean household income of the respondents is Rs.3,70,944 and the median is Rs.3,86,000. The annual family income of the respondents varies between Rs.1,47,000 and Rs.5,86,000.

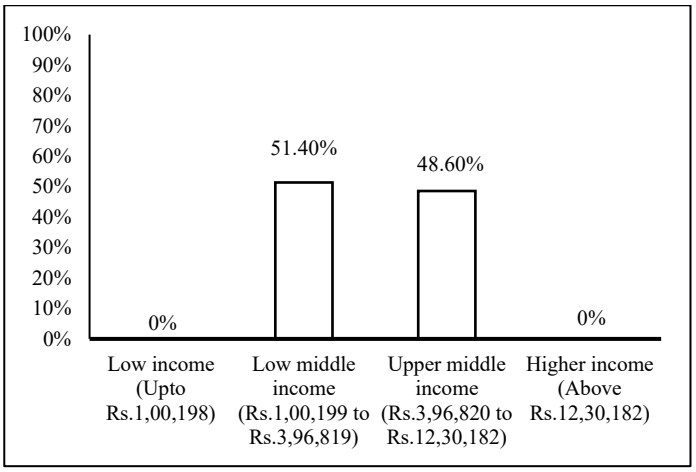

Fig.1. Classification of annual household income (Source: Primary data)

The Fig.1 shows that majority (51.40%) of the respondents belong to low middle income category (Rs.1,00,199 to Rs.3,96,819) and the remaining 48.60% under the upper middle-income category (Rs.3,96,820 to Rs.12,30,182). None of the respondents fall under low-income category earning upto Rs.1,00,198 and higher income category of more than Rs.12,30,182 annually.

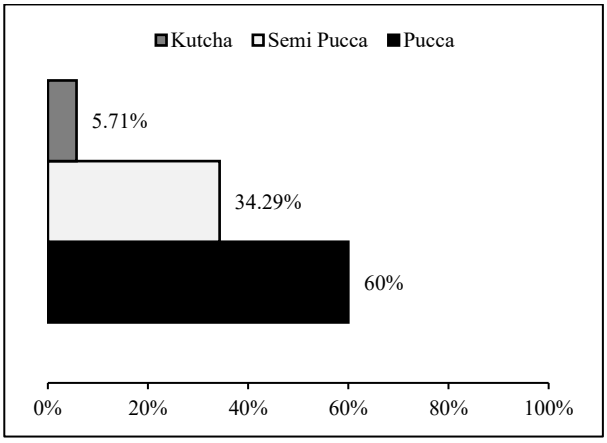

Fig.2. Type of house (Source: Primary data)

All respondents reported living in their own houses. Among them, majority (60%) reside in Pucca houses, 34.29% in Semi Pucca houses and 5.71% in kutcha houses (Fig.2). This indicates that most respondents enjoy relatively stable housing conditions.

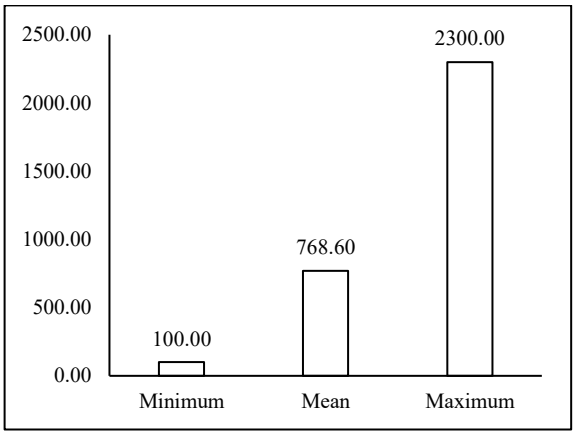

Fig.3. Built up area (in square feet) (Source: Computed data)

The built-up area of respondent's houses ranges from 100 sq. ft. to 2300 sq. ft., with an average of about 769 sq. ft., indicating moderate housing size among the respondents (Fig.3).

4.2 SUSTAINABILITY OF COCONUT TREE CLIMBING AS AN EMPLOYMENT OPPORTUNITY

4.2.1 Economic Sustainability:

Table.4. Duration of coconut climbing (months in a year)

Duration	Number	Percentage
1-3 months	2	2.86
4-8 months	20	28.57
9-12 months	48	68.57

Source: Primary data

Majority of the respondents (68.57%) were engaged in coconut climbing for 9-12 months, followed by 28.57% who worked for 4-8 months in the previous year.

Table.5. Frequency of coconut climbing (Days in a month)

Frequency (Days in a month)	Number	Percentage
Up to 10 days	14	20.00
11-20 days	24	34.29
21-30 days	32	45.71

Source: Primary data

Maximum (45.71%) of the respondents climbed 21-30 days in a month, indicating that coconut climbing is a regular and continuous livelihood activity for many respondents.

The wage for climbing coconut tree ranges from a minimum of Rs.35 per tree to a maximum of Rs.75 per tree. The average rate is Rs.53, while the median rate is Rs.55, indicating that half of the climbers earn Rs.55 or less per tree and the other half earn more (Fig.4). The climbers also often obtain in-kind benefits like tea, snacks and coconuts along with monetary wages.

The average number of coconut trees climbed in a day is 32. A climber earns on an average Rs.1,226 per day. Whereas the earnings of the respondents range from Rs.480 per day to Rs.2,750 per day. The wide variation in earnings arise from the number of trees climbed per day, physical ability, experience, use of climbing device and regional wage differences.

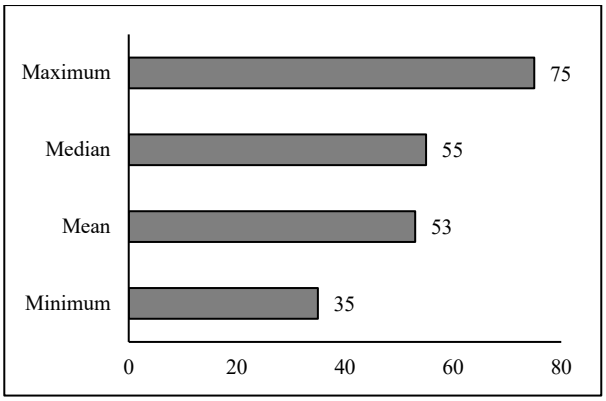

Fig.4. Earnings of climbers (Rs./Tree) (Source: Computed data)

On an average, earnings from coconut climbing contributes up to 52% of the total household income of the coconut tree climber. Income from climbing is the primary source of income for 34 out of 70 respondents (48.57%). It is the only source of income for only 4 respondents (5.71%).

For around 9% of the respondents, climbing income alone contributes 100% of living income. Living income is defined by Global living wage coalition as "The net annual income required for a household in a particular place to afford a decent standard of living for all members of that household. Elements of a decent standard of living include: food, water, housing, education, healthcare, transportation, clothing, and other essential needs including provisions for unexpected events". In India, the living income benchmark value is periodically released for 8 places. Of the 8 places, living income benchmark value for Nilgiris is taken for Palakkad. According to Living Wage Update [10] report of Living Wage Coalition for Nilgiris Rural Tamil Nadu, India, the cost of decent standard of living for a family is Rs.23,701. The corresponding annual value is Rs.2,84,412.

4.2.2 Occupational Sustainability:

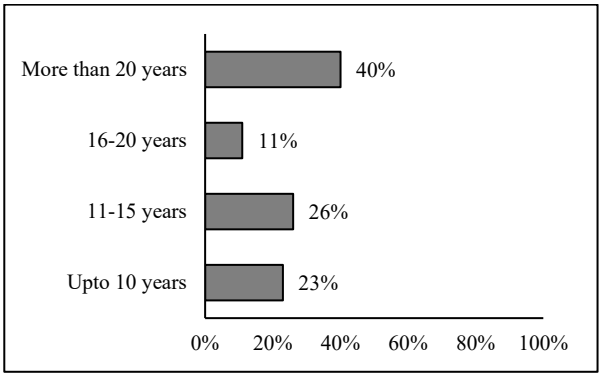

Fig.5. Number of years of occupation (Source: Primary data)

Maximum number of respondents (40%) are involved in the coconut climbing for more than 20 years. The ability to continue in the field for longer years show occupational sustainability with experience and skill.

Fig.6. Mechanical Climbing device

Further, the study reveals that majority (60%) of the respondents are climbing coconut tree using mechanical climbing device, indicating reduced physical risk. Climbing coconut palm with climbing device is easier for even less experienced people, while traditional coconut climbing requires high skill and body strength. Though studies say that climbing using climbing device is slower in comparison to traditional climbing method, the physical strain and risk of falling is low.

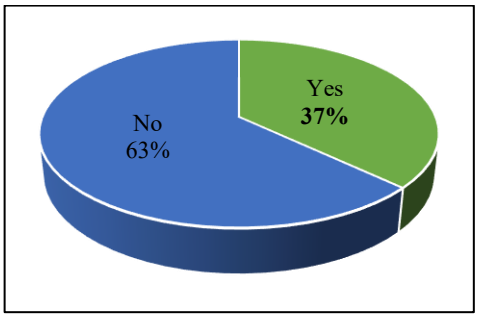

Fig.7. Rate of Accidents (Source: Primary data)

Thirty-seven% of the respondents reported that they have met with accidents like bee attack and falling down (Fig.7). It indicates a moderate but not negligible level of physical risk involved in the occupation.

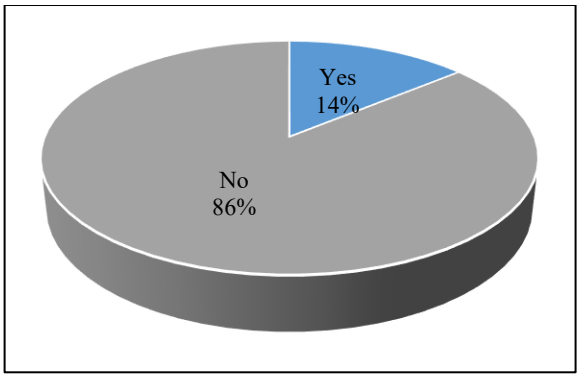

Fig.8. Use of Safety Equipment (Source: Primary data)

Majority of the respondents (86%) does not use any safety equipment like safety belt or helmet, this shows low occupational sustainability, as the majority are exposed to high physical risks (Fig.8).

4.2.3 Kera Suraksha Insurance Scheme:

In India, the Ministry of Agriculture and Farmers Welfare through the Coconut Development Board launched the Kera Suraksha Insurance Scheme to provide insurance coverage to coconut tree climbers, Neera Technicians, and Coconut Harvesters against accident-related risks, including death. The scheme offers a sum assured of Rs.7 lakh against accident-related risks. The annual premium is Rs.956, with Rs.717 covered by the Board and Rs.239 paid by the beneficiary [12]. In the current study, none of the respondents reported having personal accident insurance scheme [12], which exposes climbers to full financial risk in case of accidents or injuries.

Fig.9. Harvesting by Traditional Climber

4.2.4 Challenges Faced by Coconut Climbers:

The challenges faced by coconut climbers were ranked based on the mean rank. The lowest mean rank indicates the most severe challenge. The results show that the major challenge faced is physical strain and health issues (Mean Rank: 2.17) ranked first, followed by bee attack (Mean Rank: 2.37) ranked second, risk of falling (Mean Rank: 3.80) in the third place. Exposure to extreme weather (Mean Rank: 4.23), shortage of work in rainy season (Mean Rank: 4.69), limited safety equipment (Mean Rank: 5.23) and lower wages (Mean Rank: 5.51) were ranked fourth, fifth, sixth and seventh places respectively.

Table.6. Ranking of challenges faced

	Mean Rank	Rank
Physical strain and Health issues	2.17	I
Bee attack	2.37	II
Risk of falling	3.80	III
Exposure to extreme weather	4.23	IV
Shortage of work in rainy season	4.69	V
Limited safety equipment	5.23	VI
Lower wages	5.51	VII

Source: Computed data

4.2.5 Friends of Coconut Tree (FoCT):

The FoCT programme implemented by CDB in the year 2011 aims to develop a professional group of youth for plucking and plant protection operations in coconut palm [14].

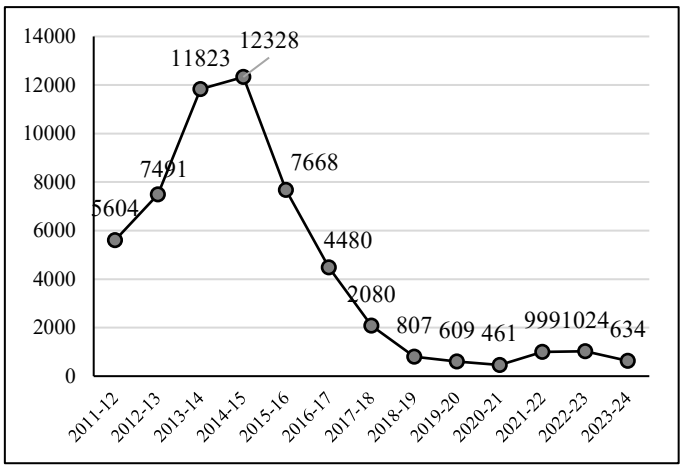

Fig.10. Number of youths trained from 2011 to 2024 (Source: Coconut Development Board)

The number of people trained to become palm climbers under the FoCT (Friends of Coconut Tree) scheme of Coconut Development Board during the period from 2011–12 to 2023–24 shows a fluctuating but overall declining trend. The number of trainees completed training increased steadily from 5,604 in 2011–12 to a peak of 12,328 in 2014–15, reflecting the initial success and strong response to the scheme. However, after 2014–15, there was a steady and steep decline in participation, dropping to 807 in 2018–19 and reaching the lowest level of 461 in 2020–21. In 2021–22, there was a marginal increase by 999 and 1,024 in 2022–23, but again a fall to 634 in 2023–24.

Among the respondents, 80% have attended the FoCT training for coconut tree climbing using climbing machine and other palm management practices. They were given coconut climbing device for free as part of the training. However, only 60% of the respondents use the climbing device for coconut palm climbing, probably due to the convenience and familiarity of the traditional climbing method.

4.2.6 Relationship Between Age and Number of Coconut Trees Climbed in an Hour:

To know the relationship between age and number of coconut trees climbed in an hour, Pearson Correlation tool was used. The analysis shows r (70) = -0.269, p = 0.117. Since the p value is more than 0.05, there is a no significant relationship between age and number of coconut trees climbed in an hour.

4.2.7 Association Between Educational Qualification and Method of Climbing Used:

To know the association between education qualification of the respondents and method of climbing, Chi-Square test was used. The analysis shows $\chi^2 = 0.771$, df = 2, N = 70, $p>0.05$ (p = 0.680). Since the p value is not less than 0.05, there is no

significant association between educational qualification and method of climbing used.

4.2.8 Association Between Age Classification and Method of Climbing Used:

To know the association between age classification of the respondents and method of climbing, Chi-Square test was used. The analysis shows $\chi^2 = 2.984$, df = 2, N = 70, $p>0.05$ ($p = 0.225$). Since the p value is not less than 0.05, there is no significant association between age classification and method of climbing used.

4.2.9 Association Between Method of Climbing and Level of Climbing Income:

To know the association between method of climbing and level of climbing income of the respondents, Chi-Square test was used. The analysis shows $\chi^2 = 0.224$, df = 1, N = 70, $p>0.05$ ($p = 0.636$). Since the p value is not less than 0.05, there is no significant association between method of climbing and level of climbing income.

4.3 COMPARATIVE ANALYSIS

Fig.11. Comparison of wage (Rs./hour) (Source: Secondary data)

The data on wage rates shows that the average hourly wage of coconut climbers (Rs.464) is much higher than the wage for other skilled labour of Rs.106 (carpenter II class wage rate for Palakkad district provided by Department of Economics and statistics of Government of Kerala is considered) and the minimum wage (Rs.104). This indicates that climbing is a relatively better-paying occupation compared to many other rural jobs. However, the wage from palm climbing and other wage categorises cannot be compared without considering the high level of risk taken in climbing. The average working hours per day for a coconut palm climber is around 4 hours, whereas for other workers it is 8 hours.

5. SUGGESTIONS

5.1 TO THE GOVERNMENT AND POLICYMAKERS

- Organise welfare schemes for coconut climbers to ensure insurance coverage, regular health check-up, pension and other benefits.
- Provide awareness and ensure participation in existing welfare schemes like Kera Suraksha insurance to reduce the financial risk by accidents.
- Provide climbing device and safety equipment at subsidised rate.
- Implement standard wage rate that include premium for risk taken.

5.2 TO THE CULTIVATORS

- Provide fair and timely payment to the service provided by the palm climber.
- Provide adequate refreshments like drinking water and snacks to the climber.
- Maintain coconut trees and surrounding properly to make climbing less risky.

5.3 TO THE CLIMBERS

- Coconut climbers are strongly recommended to use mechanical climbing devices to reduce the physical strain and the risk of falling.
- Coconut climbers should enroll in the Kera Suraksha Insurance scheme to ensure financial protection against accidents and health risks associated with climbing.
- Take safety measures such as helmets, belts, gloves and other personal protection equipment during climbing.
- Attend training programmes to update skills and reduce physical strain.

6. CONCLUSION

Coconut climbing is a high-risk physically demanding occupation which is becoming rarity with passing years. Younger individuals are unwilling to take up this job because of the physical strain and the risk involved. The study shows a reasonable level of economic and occupational sustainability of the occupation provided adequate safety and welfare measures are implemented. Climbers should be promoted to attend skill trainings and awareness programmes conducted by CDB and other authorities. Further, to promote occupational sustainability and to reduce financial risk caused by accidents, climbers should be encouraged to use mechanical climbing devices and enroll in Kera Suraksha Insurance scheme. Younger generations should be supported to through subsidies and trainings to take up this job. Ensuring access to affordable safety equipment, regular medical check-ups and other welfare measures will not only enhance the well-being of climbers but also ensure the long-term sustainability of this essential occupation.

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