# Training On The Use Of Young Areca Nut Slicing Machine To Increase The Work Capacity Of Areca Nut Slicing

Rio Valery Allen[1*], Yuni Ernita[1], Sri Aulia Novita[1]

[1]*Agricultural Mechanization Technology Study Program, Payakumbuh State Agricultural Polytechnic, Indonesia*

*Correspodnidng author: Rioallen59@gmail.com*

***Abstract.*** *The post-harvest processing of areca nut (Areca catechu L.) in Fifty Thousand Kota District, which has a plantation area of 1,254 ha with a production of 196.12 tons/year, is often done manually, especially at the stage of slicing young areca nuts into thin slices. The manual method using knives or cutters is time-consuming (8 minutes/kg) and carries a high risk of cuts. However, sliced areca nuts have a higher selling price and low water content (0.9%), which increases farmers' sales by up to 45% compared to whole nuts. Therefore, this community service activity (PkM) aims to overcome these problems through training and demonstrations on the use of young areca nut slicing machines to 15 participants from farmer groups at the FRD Pinang Raya SME, Mungo, Limapuluhkota Regency. The methods used include coordination, needs assessment, machine testing, and participatory practical training. The results of the activity showed that this training successfully improved the participants' understanding and skills in operating and maintaining the machine. This technology transfer has been proven to increase time efficiency and productivity, producing faster and more uniform pineapple slices compared to the manual method. Overall, this PkM has succeeded in empowering the community through practical solutions to post-harvest processing problems, contributing to increased processing efficiency and the potential for economic improvement for partners.*

***Keywords*** **:** *young areca nut slicing machine, working capacity, post-harvest, technology transfer, productivity*

## 1. INTRODUCTION

The areca nut plant (*Areca catechu* L.) belongs to the Arecaceae family (palms). Morphologically, areca nuts have a single, perpendicular stem, and can reach a height of 15–20 meters. The leaves are pinnate compound with a frond length of 1–2 meters. The fruit is oval round with a diameter of 3–5 cm with a green outer skin that will turn reddish-orange when ripe (Nabila, 2024). Areca nut plants are widely found in tropical Asia, especially in India, Bangladesh, Sri Lanka, Myanmar, Malaysia, Indonesia, and Papua New Guinea. In Indonesia, areca nuts thrive in almost all regions, especially in Sumatra, Kalimantan, Sulawesi, and Papua. areca nut can grow at an altitude of 0–1,400 meters above sea level, with an annual rainfall of 750–2,500 mm and an optimal temperature of 20–32 °C (Agustin, 2022).

Areca nut has considerable economic potential in the international market. The demand for areca nut exports continues to increase, especially to South Asian and Middle Eastern countries. Indonesia is one of the largest areca nut producers in the world. Areca nut is sold commercially in fresh, processed, and dried forms (Nahak, 2019). Areca nut is used by 0.6–1.2 billion people worldwide, which covers 10–20% of the world's population (Fakdawer, 2023). Areca nut is traded

by medicinal plant traders in the market as a traditional medicine, while areca nut that is used as an export commodity is areca nut in the form of seeds that do not have coir (Suheiti, 2023).

The main chemical components of areca nut are alkaloids, phenols, polysaccharides, amino acids, and terpenoids (Frengki *et al*., 2025). The main alkaloids in areca nut are arekolin, arekaidine, guvacholine, and guvasin. Areca nut contains 0.3 - 0.6% alkaloids, 15% red tannins, and 14% fats (*palmitic, oleic, stearic, capric, caprilyc, lauric, miristic acid*), starch, and resins. Increasing the added value of areca nut can be done through processing into derivative products such as areca nut extract, areca nut fiber, and processed herbs (Azima, 2018).

The area of areca nut plantations in Limapuluhkota Regency reaches 1,254 ha with a production of 196.12 tons/year (BPS Limapuluhkota Regency, 2024). Areca nuts in Limapuluhkota Regency are traded after being dried either intact, halved, or thinly sliced (Chain, 2023).  According to Gea (2023), these three types of areca nut processing have different selling prices. The selling price of thinly sliced areca nut is higher than whole areca nut and halved. This is because areca nut that is thinly sliced has a low water content of 0.9%. This increases farmers' sales by 45% compared to the sales of whole and halved areca nuts.

The process of slicing areca nuts manually using a knife or cutter takes a long time, which is 8 minutes/kg, with a high risk of work, namely incisions.  Based on this, it is necessary to develop areca nut slicing equipment that can speed up the slicing process, reduce the risk of work accidents, and increase the capacity of areca nut slicing (Irfansyah, 2022).

A prototype of a young areca nut slicing machine needs to be developed as a solution to overcome the problem. The development of agricultural machinery is becoming a trend in modern agricultural production because the application of machinery can overcome labor shortages and working hours and increase productivity. The development of young areca nut slicing machines will provide more effective, efficient solutions, create added value, and increase competitiveness.

## 2.  METHODS

Community service activities were carried out at UMKM of Usaha Pinang Raya FRD, Mungo, Lareh Sago Halaban District, Limapuluhkota Regency, West Sumatra. The target of the training in PKM is a farmer group located in Lareh Sago Halaban District with a total of 15 participants. The method of activities carried out in community service is in the form of training and demonstrations in the use of young areca nut slicing machines so that they can increase the understanding and knowledge of participants.  Service activities are carried out in several stages, including the coordination stage with local farmers, coordination with MSME actors, and the stage of determining the time and place of the training.

## 3.  RESULTS AND DISCUSSION

### Preparation Stage

The training on the use of young areca nut slicing machines carried out by the service team has an initiative so that farmer groups in the district. Mungo was able to increase its production capacity by switching from the traditional to the mechanical way.

The stages begin with survey activities and analysis of partner needs. Visiting partner locations (farmer groups and UMKM) to collect data and current areca nut processing conditions. This activity is also to find out the availability of areca nut slicing machines that are available and

needed. Survey activities are also to find out the knowledge and skills of the target in the use of machines. Location survey activities can be seen in Figure 1.



**Figure 1.** Location Survey

The next stage is to conduct a trial of the young areca nut slicing machine that will be taken to the training location. This activity is to ensure that the young areca nut slicing machine that will be used in the training functions properly and in accordance with the needs of partners. The next stage is to carry out initial coordination and socialization. At this stage, the schedule, place, and list of trainees are determined. Distribute invitations and activity information.

**Implementation Stage**

The implementation stage starts from providing verbal and visual material on the importance of efficient post-harvest processing of areca nuts, as well as an introduction to the components and working principles of the slicing machine. The preparation of the tools and demonstration materials can be seen in Figure 2.

**Figure 2.** Preparation of Demonstration Tools and Materials

The next stage is the demonstration. At this stage, the Service Team demonstrated how to operate the young areca nut slicing machine correctly and safely, starting from the preparation of ingredients to the results of the slices. Furthermore, the trainees were asked to take turns practicing machine operation under the guidance of the team (*Learning by Doing*).

Furthermore, education and practice on how to maintain the machine daily and periodically (cleaning, lubrication, knife sharpening) and work safety procedures (using gloves, avoiding moving parts). After conducting the demonstration, then make a comparison between the manual method and the use of machines to show the partners a real increase in productivity. Not forgetting that at the end of the session, the Team opened a discussion session to answer questions, overcome obstacles that arise during practice, and provide solutions to potential engine operational problems.

**Monitoring and Evaluation Stage**

At this stage, the team documents all stages of activities, records the outputs achieved, and prepares recommendations for the sustainability of the program.

## 4. CONCLUSION

Community Service (PkM) activities that focus on Training and Counseling on the Use of Young Areca Nut Slicing Machines have been successfully carried out in accordance with the planned stages, ranging from survey to evaluation. Training and counseling involving demonstrations and participatory practices have succeeded in improving the understanding and skills of the target community (farmer groups/UMKM) in operating, maintaining, and maintaining work safety when using a young areca nut slicing machine.

The existence of technology transfer in the form of a young areca nut slicing machine and training in its use has been proven to increase the time efficiency and productivity of areca nut processing. Based on the trial, the slicing process can be done faster and produce areca nut slices that are more uniform and quality than the manual method.

In addition, the target community also shows high enthusiasm and commitment to adopt this new technology in the daily production process. The implementation of this activity has

succeeded in providing a practical solution to the problem of slow processing of betel nut manually.

Overall, these PkM activities have achieved their goal of empowering the community through appropriate technology transfer, which contributes directly to improving processing efficiency and potential to improve the economy of partners.

## ACKNOWLEDGEMENT

## BIBLIOGRAPHY

Agustin, F. (2022). The Effect of Cow Manure Compost Fertilizer on the Growth of Betel Nut Seedlings (*Areca Catechu* L.) on the Ultisol soil planting medium. http://repository.unbari.ac.id/2558/1

Azima, F., Putera, P., Oktaviyani., Zulfani, R., Hernando, R. (2018). Design and Build a Horizontal Type Young Betel Nut Slicing Machine. Journal of Agrotechnics, 1(2), 63-76. https://www.agroteknika.id/index.php/agtk/article/view/23/6

Chain, J., & Arif, M. (2023). Designing the Slingshot and Slingshot. *Journal of ARTI (Industrial Engineering Design Applications), 18*(1), 72-79. https://doi.org/10.52072/arti.v18i1.537

Fakdawer, N. S., Boari, Y., & Walilo, M. (2023). Identification of the Source and Impact of Areca Nuts in Papuan Culture (Case Study of Areca Nut Traders at Youtefa Market, Jayapura City). *Critical*, *32*(2), 164-175. https://doi.org/10.24246/kritis.v32i2p164-175

Frengki, F., Lubis, A. N., Hamny, H., Wardhani, L. D. K., & Aisyah, S. (2025). Screening of Bioactive Compounds of Areca Nuts (*Areca Catechu* L.,) as Antibiofilms against Glycosyltransferase Enzymes Produced by Streptococus Mutans. *Veterinary Journal*, *26*(3), 410-430. https://doi.org/10.19087/jveteriner.2025.26.3.410

Gea, N., & Gea, K. (2023). Cultivation of areca nut plants (Areca catechu L) specific to nursery techniques in Ombolata Village, Afulu District. *Haga: Journal of Community Service*, *2*(1), 100-104.  https://mail.jurnal.uniraya.ac.id/index.php/HAGA/article/view/936/845

Irfansyah, M., Lubis, Z., Oppusunggu, K., & Nurdiana, N. (2022). The process of making a rotary knife model rotary knife slice machine with a capacity of 25 kg/hour. *IRA Journal of Mechanical Engineering and Its Applications (IRAJTMA), 1*(2), 65-73. https://doi.org/10.56862/irajtma.v1i2.12

Nabila, R., Wardhani, H. A. K., & Ratnasari, D. (2024). Study of yard fruit plants in Sengkuang Village, Sintang, West Kalimantan. *Edumedia: Journal of Teacher Training and Education*, *8*(1), 26-35. https://doi.org/10.51826/edumedia.v8i1.1134

Nahak, M. S., & Nubatonis, A. (2019). Analysis of Raw Areca Nut Marketing in Pt. Timor Mitra Niaga, Wederok Village, Weliman District, Malacca Regency. *Agrimor*, *4*(3), 34-37. https://doi.org/10.32938/ag.v4i3.677

Suheiti, S. K., Ardi, H., Putri, I. W., & Medionovianto, D. (2023). Harvest and post-harvest betang betara. *Plantation Bulletin*, *1*(3), 16-20. https://epublikasi.pertanian.go.id/berkala/index.php/wartabun/article/view/3460/3538