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COMMUNITY EMPOWERMENT THROUGH PRODUCT INNOVATION: COCOPEAT AS A SUPERIOR GROWING MEDIUM FOR URBAN FARMING TO IMPROVE THE ECONOMY OF MAMUJU REGENCY

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Abstract

This Community Service program partners with the community in Sumare Village, Simboro District, Mamuju Regency, which is one of the villages inhabited by farmer groups. Based on initial observations, the farmer groups still rely on traditional methods without adopting modern agricultural technologies such as plastic mulch, drip irrigation, greenhouses, or planting media such as Cocopeat. Production is often a burden, especially when fertilizer prices rise and superior seeds are scarce on the market. Many farmer groups rely on middlemen to obtain fertilizer/seeds, with a burdensome post-harvest payment scheme. One product resulting from the use of coconut fiber is cocopeat. Cocopeat is a processed product of coconut fiber waste, where the separation of coconut fiber produces coconut powder that can be used as a planting medium. The main target is to create new household-scale business units and urban farming communities based on cocopeat, so as to be able to encourage additional income, open informal jobs, and strengthen community food security. The Cahaya Tani Farmer Group has utilized coconut fiber waste to reduce environmental pollution while being an alternative good planting medium for plants.

Keywords: Cocopeat, Economy, Farmers, Urban Farming

INTRODUCTION

The Sumare village community is active and open-minded, welcoming any innovations that benefit their village. Therefore, we conducted outreach and training on the use of coconut fiber waste as a growing medium (cocopeat), especially for vegetables and fruits. According to Irawan and Kafiar (2015) and Agustin (2010), cocopeat has the ability to absorb water and loosen the soil. This indicates that the community needs nutrients sourced from vegetables and fruits in order to achieve a balanced diet. According to research by Cahyo et al (2019), cocopeat can be used as a substitute for topsoil planting media.

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Figure 1. The Sumare Village Partner Environment in Collecting Coconut Fiber as Raw Material for Cocopeat

This program optimizes local potential (coconut husk waste) into high-value commodities through cocopeat product innovation and urban agriculture. Thus, it strengthens the country's defense and security system and promotes national independence through self-sufficiency in food, energy, water, creative economy, green economy, and blue economy.

Figure 2. Program Coordination and Implementation Process

The main target is to create new household-scale business units and urban farming communities based on cocopeat, thereby generating additional income, creating informal jobs, and strengthening community food security. According to Ramadhani's (2018) research, the use of cocopeat and chicken manure fertilizer has a significant effect on the leaves of tall mahogany seedlings, but has no significant effect on diameter growth. With this intervention, the program not only targets ecological and technological aspects, but also socio-economic aspects in growing the economy through urban farming in Mamuju Regency, West Sulawesi Province. According to Setiawan & Sumiyati (2017), cocopeat's high water retention capacity allows it to influence the physical and chemical properties of soil. Cocopeat also contains organic and mineral elements, namely pectin, hemicellulose, ansd protein (Uliyani, 2022).

IMPLEMENTATION METHOD

There are five activities carried out in this PKM program. The stages of each activity include the following technical explanations:

1. Socialization
    a. Socialization of farmers' knowledge about sustainable cocopeat technology.
        1) Socializing farmers' knowledge about cocopeat technology is very important to improve their understanding and skills in utilizing coconut fiber waste as an economically valuable planting medium.
        2) Through extension, training, and mentoring activities, farmers can learn about the benefits of cocopeat as an environmentally friendly planting medium, proper processing techniques, and how to apply it in sustainable cultivation.
        3) This socialization not only encourages innovation in agricultural practices but also strengthens farmers' competitiveness in facing the challenges of agricultural modernization.
    b. Socialization of farmers' skills in using, maintaining, and repairing technological equipment.
        1) Proper Use
            a) Before using a tool or machine, read and understand the instructions for use.
            b) Use equipment according to its function so that it lasts longer and is not easily damaged.
            c) Always pay attention to work safety, for example, wear gloves or protective gear when operating machinery.
        2) Routine Maintenance
            a) Clean the equipment after use, especially from mud, fertilizer residue, or water to prevent rust.
            b) Check the condition of the oil, fuel, bolts, and cables before reuse.
            c) Store the equipment in a dry and safe place to avoid damage.
        3) Simple Repairs
            a) Learn how to perform minor repairs, such as replacing filters, tightening bolts, or cleaning fuel lines.
            b) If there is major damage, immediately take it to a repair shop or technician; do not force it to be used.
        4) Benefits for Farmers
            a) The equipment is more durable and does not break down quickly.
            b) Maintenance costs are cheaper than having to frequently buy new ones.
            c) Work productivity increases because the tools are always ready to use.
    c. Socialization of SME function optimization and product promotion media
        1) Increase understanding of the benefits of cocopeat, how to use it, and product promotion strategies.
        2) Presentation on cocopeat products, their advantages over other planting media, and market opportunities.
        3) Utilizing social media (Instagram, Facebook, TikTok, WhatsApp Business), marketplaces (Tokopedia, Shopee), and SME websites
        4) Creating product labels with attractive designs and clear information (benefits, how

to use, environmentally friendly certification).

5) Designing a regular agenda (e.g., monthly) to monitor progress and provide updates on the latest promotional strategies.

2. Training
   a. Training on making tempeh drinks: Providing demonstrations on how to make cocopeat
   b. Developing a module for physical activity implementation guidelines in farmer groups
      1) Watching several physical activities via video
      2) Giving farmer groups the opportunity to share ideas for physical activities that can be done in the production of cocopeat products
   c. Training and development of promotional media: Demonstrating how to design product promotional media using Canva and other applications
3. Technology Application
   a. Raw Material Preparation

      Coconut fiber collection: sourced from coconut waste, collected from plantations, markets, or coconut processing facilities. Cocopeat media has micro pores that can inhibit greater water movement, resulting in higher water availability (Istomo & Valentino, 2012). Initial cleaning: the husks are separated from impurities (sand, soil, plastic) to ensure a cleaner result. Initial drying (if necessary): husks that are too wet are dried in the sun first to reduce their water content.

   b. Grinding Process

      Feeding into the coconut fiber crusher: coconut fiber is fed into the machine. Fiber crushing and separation: the machine separates long fibers (cocofiber) and fine powder (cocopeat). Automatic/manual sorting: cocopeat is separated from cocofiber using a sieve on the machine or a manual sorting stage.

IMPLEMENTATION STAGES

This PKM activity will take place from June to September 2025. The stages of the activity that have been implemented include:

Preparation Stage

1. Processing of permits and administration of PKM activities

Figure 3. Together with the Community and Farmer Groups

Permit management and administration of community service activities are important stages before the program is implemented, as they concern legality, coordination, and acceptance by the target community. The permit for PKM activities at the Cahaya Tani Farmer Group Partner was processed on June 20, 2025. This activity also received a permit on July 4, 2025, from the Cahaya Tani Farmer Group Partner to implement Community Empowerment Through Product Innovation of Cocopeat as a Superior Planting Medium for Urban Farming to improve the economy of Mamuju Regency.

2. Development of training modules and evaluation instruments

   The team has developed training modules that improve the knowledge and skills of partners in adopting environmentally friendly modern agricultural technology, skills in using, maintaining, and repairing coconut fiber grinding machines, the manufacture of protective equipment in the cocopeat production process, and training in creating business accounts on social media. Serya Evaluation instruments in the form of assistance, monitoring, evaluation, and periodic innovation for the sustainability of partner businesses. In order for the innovations offered by universities to run smoothly, the responsible role of partners is greatly needed.

Implementation Stage

Implementation of training activities

1. Technical explanation of PKM activities

   In the technical explanation, several things will be conveyed to partners, including: (1) Preparation of partner groups, (2) Program socialization, (3) Program implementation methods, (4) Post-training assistance, (5) Program monitoring and evaluation.

2. Training Implementation

   The technicalities of the process are as follows:

   a. Modern Cocopeat Production

      The steps involved are: (a) Preparation of tools and materials, (b) Coconut husks from mature coconuts, (c) Separation of usable husks from damaged or contaminated husks. (d) Coconut husks are fed into the Cocopeat Coconut Husk Grinding Machine, (e) Fibers are collected for other industries (mattresses, brushes, etc.), (f) Cocopeat is filtered to produce various sizes (fine, medium, coarse). (g) Corrections are made by additional rinsing or mixing with dolomite/agricultural lime. Cocopeat is packaged in 25-50 kg bulk bags for distribution, (h) and Cocopeat is packaged in 25-50 kg bulk bags for distribution, resulting in more consistent quality, high production volume, minimal manual labor, and environmental friendliness (recycling coconut waste).

   b. Health Assistance

      The assistance steps are: (a) Preparation of the necessary tools and materials, (b) determining the context, (c) risk identification, (d) risk assessment consisting of risk analysis and risk evaluation, (f) risk control, (g) communication and consultation (h) monitoring and review.

   c. Marketing Assistance

      The steps for creating social media are: (a) creating Facebook, Tiktok, and Instagram Business accounts, (b) optimizing profiles, (c) creating interesting content, (d) and utilizing all types of content.

d. Partner Participation

Partner participation is as follows:

1) Partners support the implementation of the PKM program
2) Partners prepare members who are directly involved in the implementation of the program
3) Partners prepare the tools and materials to be used in the activities
4) Partners strongly hope for this activity
5) Partners are enthusiastic about this activity and hope for guidance and input from PT in improving and enhancing future groups.

Figure 4. Socialization of Cocopeat Production with the Team and Partners

Monitoring and Evaluation Implementation Stage

Evaluation of program implementation and program sustainability:

1. Pre-training: reviewing partners' knowledge on how to utilize modern cocopeat production innovations to create competitive and high-value products.
2. Training: reviewing partners' progress and knowledge related to utilizing innovations to create competitive products and improve health knowledge, as well as reviewing social media development.After training: 1) Observing the extent to which partners apply their knowledge of utilizing modern cocopeat production technology to create competitive and high economic value products, as well as observing the extent to which partners apply their knowledge of how to create good innovative products, 2) Partners' sincerity in carrying out activities in the field, and 3) Evaluation to see the comparison of improvements in knowledge and skills in improving health quality.

RESULTS AND DISCUSSION

The application of appropriate technology to the community is one of the strategic steps in increasing the added value of local products and optimizing the utilization of existing natural resources. Through the innovation of the Multifunctional Coconut Husk Grinding Machine for Cocopeat and Grass Chopping, the community, especially farmers and SME actors, can process agricultural waste that has been underutilized into products with high economic value. This machine provides a practical solution to overcome the problem of coconut fiber waste while meeting the needs of animal feed and planting media.

Table 1 Indicators of Goal Achievement and Benchmarks for Problem Solving Partners

Partner Issues	Internal Assessment Indicators (Levels 1–5)	Prospects for Partners
1. Farmers' lack of knowledge about sustainable cocopeat technology. 2. Farmers' lack of skills in using, maintaining, and repairing technological equipment. 3. Farmers' lack of understanding about the importance of physical health. 4. Farmers' lack of skills to effectively take care of their own health. 5. Farmers' lack of knowledge about crop marketing practices.	1. Level 1: Very low (knowledge not yet acquired by farmers). 2. Level 2: Low, skills in using Cocopeat technology equipment. 3. Level 1: Very low, unable to properly manage their own health. 4. Level 2: Low, understanding of the importance of physical health. 5. Level 2: Low, sustainable marketing practices.	1. Increased knowledge and skills in adopting sustainable Cocopeat innovation technology. 2. Improving skills in using, maintaining, and repairing the innovative technology equipment used. 3. Increased awareness of the importance of health. 4. Increased knowledge and skills in health care. 5. Partner groups have knowledge of good marketing practices using social media.

This multifunctional machine innovation focuses not only on increasing productivity, but also on sustainability. Coconut husks processed into cocopeat can be used as a growing medium for horticulture and hydroponics, while chopped grass and straw can be directly used as animal feed or compost. Thus, this machine provides dual benefits, supporting both the agricultural and livestock sectors.

Figure 5. Making Cocopeat with the Team and Partners

The application of this technology also involves an educational approach, where the community receives assistance in operating the machines, maintenance, and utilization of processed products. This is important so that innovation does not stop at the procurement of equipment, but can actually be used optimally and sustainably. Knowledge transfer is an important part of the activity, so that the community can independently operate and develop businesses based on this technology.

The following are the expected outcomes:

1. Increased knowledge and skills of partners in terms of modern agricultural innovation technology, namely cocopeat, using a coconut fiber grinding machine.
2. Increased knowledge in maintaining personal health, skills, and ability to prevent risks that can harm oneself.
3. Enhanced knowledge of partners in business management related to sales through e-commerce.
4. Creation of activity videos to be published on the LPPM UNIKA YouTube channel.
5. Creation of posters.
6. Publication on the online media platform “sorotanpena.id”.
7. Publication of a journal article to be submitted to the Journal of Community Service.

CONCLUSION

The technology product resulting from this activity is a Multifunctional Coconut Husk Grinding Machine for Shredding Grass, which is designed to process coconut husk waste into cocopeat and can also be used as a grass shredder. This machine is capable of separating fibers (cocofiber) and fine powder (cocopeat) more quickly, while also shredding organic materials.

With the application of this technology and innovation, it is hoped that the community can develop competitive productive business units, both locally and globally. The multifunctional coconut fiber grinding machine is a concrete example of how research and technology-based service can have a broad impact, creating new jobs, increasing community income, and strengthening regional food security and the economy.

The sustainability of the cocopeat production program using coconut fiber grinding machines can be achieved through the implementation of a consistent SOP-based production system, increasing human resource capacity through continuous training, and strengthening both local and export marketing networks, so that SMEs are able to maintain product quality while expanding their market. This program also needs to be supported by product innovation, the use of environmentally friendly technology, and regular monitoring and evaluation in order to increase efficiency and competitiveness and provide sustainable economic and environmental impacts.

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