ISSN (print) : 2722-2934
ISSN (online): 2722-3043
BUBUNGAN TINGGI
Jurnal Pengabdian Masyarakat

Increasing Sago Flour Production Capacity Through Sago Drying Media

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Abstract: The production of sago flour by the numembo farmers group has great potential for improvement in both quality and quantity. To achieve this, an essential aspect that needs enhancement is the sago flour drying medium. Through the Community Partnership Program (PKM), the team and partners successfully increased the productivity of sago flour production with the aid of an improved sago flour drying medium, resulting in a twofold increase in output. The methods used in the PKM included socialization, training, and assistance. The numembo farmers group was involved in designing the sago flour drying equipment and participated in the evaluation of the trial runs. These activities provided benefits by boosting the productivity and quality of sago flour and strengthened the local economy by producing more competitive market products.
Keywords: drying media; production capacity; sago flour

Received: 15 December 2023 **Accepted:** 12 July 2024 **Published:** 10 November 2024
DOI : https://doi.org/10.20527/btjpm.v6i4.11161

How to cite: Wahyudhi, C. A., & Fatchuroji, A. (2024). Increasing sago flour production capacity through sago drying media. *Bubungan Tinggi: Jurnal Pengabdian Masyarakat*, 6 (4), 889-894.

INTRODUCTION

The sago plant (*Metroxylon sp*) holds significant importance as a carbohydrate source. It is a staple food in various regions of Indonesia, such as Maluku, Papua, and parts of Sulawesi (Dewayani et al., 2022; Sholahuddin et al., 2018; Sidiq et al., 2022). Sago is a favoured commodity among the community and serves as an alternative to rice in daily consumption (Ansar et al., 2021; Ernawati et al., 2018). The abundant availability of sago plants in several districts of South Papua, with white and red sago varieties, makes it a plentiful commodity. The high market demand for sago flour as a basic food ingredient has increased the acceptance of the products produced by the Numembo Farmers Group in the market.

Sago flour, extracted from the trunk of the sago tree (*Metroxylon spp*.), plays a crucial role in the daily lives of the local community as the basic ingredient for various traditional food products (Arifin et al., 2024; Hasbullah et al., 2024; Mardhiah & Fitrika, 2017). However, the drying process of sago flour often poses a major challenge in maintaining its quality and shelf life.

Drying is a critical step in sago flour production as it determines the resulting flour's moisture content, microbiological stability, and functional characteristics.

Effective drying techniques extend the product's shelf life and retain sago flour's nutritional value and sensory quality (Jimoh et al., 2023; Joardder et al., 2021). Traditionally, sago flour is dried naturally by sundrying (Kusuma et al., 2013; Mangallo & Dedi, 2022). However, this method has several limitations, including dependence on weather conditions, long drying times, and the risk of contamination by dust or microorganisms.

The community partnership program (PKM) aims to support the Numembo Farmers Group in utilizing modern drying media for sago flour production, which can benefit the local community. First, implementing efficient drying technology can increase sago flour's production capacity and quality, thereby providing economic value to local farmers and entrepreneurs. Second, appropriate drying technology can reduce postharvest losses and extend the product's shelf life, which is crucial for food security in remote areas.

Based on the issues faced, it was agreed that the main focus of the Community Partnership Program (PKM) is to create a sago dryer. The goal is to introduce and implement efficient and hygienic sago flour drying technology to the local community. Through socialization, training, and assistance, the community is expected to utilize this technology to improve the productivity and quality of sago flour and strengthen the local economy by producing more competitive market products.

Socialization is the process of individuals learning and internalizing values, norms, culture, and social identity through interaction with their social environment (Macionis & Plummer, 2006). Socialization is conducted after the team and partners have agreed upon the preparation process, communication, and cooperation. All members of the farmer's group follow this socialization, which discusses how the sago drying media is made, used, and developed to enhance productivity. After the socialization phase, the next stage is training.

Training is a process aimed at enhancing participants' knowledge, skills, and attitudes to achieve specific objectives. In this context, training is not merely the transfer of information but also involves developing interpersonal skills and a deep understanding of the work that can support the increased productivity of the produced sago flour. Beyond this, the team also provides further assistance to partners.

Mentoring, which focuses on potential development, helps individuals identify their strengths and talents and plan strategic steps to optimize these potentials. This mentoring process will include monitoring and evaluation stages. Monitoring is the ongoing observation of program implementation to collect relevant data and information. Meanwhile, evaluation involves an in-depth analysis of the program's results and impact. These steps are essential for empowering partner groups, especially in addressing various problems that may arise during their business development.

METHOD

The PKM activities were conducted with the Numembo Farmers Group, located at Jl. Ternate Gg. Syekh Yusuf, over six months, from the observation stage to the evaluation. Two lecturers, three students, representatives from Rumah BUMN, village officials, and partner representatives conducted this activity. The method implemented in this PKM program uses Participatory Action Research (PAR), and several stages have been conducted, including socialization, training, and assistance.

RESULTS AND DISCUSSION

This PKM activity focused on helping partners increase the production capacity of sago flour using sago drying media.

Socialization

In the initial stage, the team conducted a socialization activity attended by ten members of the numembo farmers group. During this session, the team discussed and provided an overview of using technology to support sago flour drying. It was acknowledged that the previous sago flour drying process still used simple and makeshift equipment, namely wooden tables covered with clear plastic sheets. The drying process took 23 days in hot weather with a production rate of 30 kg per batch. This motivated the team to help improve production by providing drying equipment that could double the sago flour production. Similar efforts were made by Linda, who found that drying boxes could be used for semifinished drying and did not alter the properties of the processed sago. Safaruddin et al. (2023) also reported in his journal that socialization activities enabled women's farmer groups to utilize sago flour as a raw material for chips and various cookies, which could serve as an alternative to flour, especially in the event of a flour shortage in the market.

Figure 1 The beginning drying equipment

Figure 1 shows the current drying equipment used by the partners. This equipment is used for drying processed sago flour. It can only hold 3 tunings, or equivalent to 30 kg of sago flour, and requires up to 3 days of sun drying in hot weather and up to 7 days in cloudy weather.

Referring to the partner's problem related to the sago drying media, the team and the partner agreed to create a more effective and efficient drying medium. The resulting medium, as shown in Figure 2, illustrates the equipment's creation process, which includes procuring raw materials, assembling, and finishing, taking at least two weeks. The equipment was made using 30x15 hollow iron with a thickness of 1.5mm, 2x4 galvanized iron pipes, 3mm thick tread iron plates,

wheels for easy mobility, and door hinges, as depicted in Figure 2.

Figure 2 Construction process of the medium

After the sago drying medium was successfully created, the team needed to transport it to the partner's location. The distance was considerable, and the access roads were limited, requiring the team to carry it cooperatively, as seen in Figure 3. The access road to the partner's location could only be traversed on foot or by motorcycle. Fellow students assisted the team in moving the sago drying medium.

Figure 3 Process of transporting the sago drying medium

Training

The next stage involved the team providing training on sago flour processing using the jointly developed drying medium. The goal was to enhance skills in utilizing the medium to increase productivity. Similar efforts were made in a service project by Mailoa & Tulalessy (2022), where participants were trained in producing cakes using sago flour. This training helped participants better understand and address potential errors. This aligns with the results of Mangallo & Dedi (2022), whose journal explains that training increased partner skills, such as processing pulp from 7% to 80%, operating machinery to 67%, making briquettes from 13% to 80%, and food processing from 10% to 90%.

Figure 4 Current drying medium

Assistance

The partner already uses the current sago drying medium, as shown in Figure 4, and has undergone trial phases for three weeks. During these trials, the sago drying process improved, with the new medium holding up to 6 tumang or 60kg of sago flour. This provides a significant increase for the partner, whose processed products are shown in Figure 5. Similar assistance was conducted by Arifin et al. (2024), the assistance helped develop participants' entrepreneurial skills to create a self-reliant generation.

Assistance was continuously provided in collaboration with Rumah BUMN, which contributed to the success of this PKM activity. The product became a typical Merauke souvenir available in gift shops.

Several steps were successfully achieved during the implementation of this PKM, including the PKM socialization, which went smoothly as expected. The program received positive support from village officials, Rumah BUMN, and the farmers' group as partners. The partners' enthusiasm was evident in their collective spirit, involving members of the farmers' group, their families, and neighbours.

Figure 5 Sago flour product

The team's next step was to provide training and assistance in using the sago drying medium, along with guidance on continuously improving the productivity of the produced product. It is hoped that this activity can inspire the women in the Numembo farmers' group, encouraging them to be more proactive

and productive in the sago flour production.

Each party involved in the implementation, such as the Numembo farmers' group, lecturers, Rumah BUMN, village facilitators, and students, played their roles equally. The detailed stages and methods of activity implementation can be outlined as follows:

1. Socialization
   Socialization was conducted with partners through Rumah BUMN in Merauke Regency. The PKM implementation with the Numembo farmers' group began with the symbolic handover of the drying medium, an introduction to the medium, instructions on its use and function, and a simulation of using the medium.
2. Training
   The training was conducted with partners by simulating and practising sago drying using the prepared medium.
3. Assistance
   During the assistance phase, the team continued to build communication with partners, responding to issues and other problems that might arise during the sago flour drying process and striving to help the Numembo Farmers Group with their needs.
4. Monitoring and Evaluation
   In this phase, the team visited the partners to observe and evaluate whether the provided medium helped increase productivity and to engage in discussions and reciprocal assessments regarding the implemented program.

CONCLUSION

The results of the PKM implementation show that the Numembo farmers' group has developed skills and knowledge in sago flour processing, while the productivity level of sago flour continues to increase with the use of the medium designed by the team. The hot weather in Merauke also contributed positively by speeding up the sago flour drying process.

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