



Application of Appropriate Technology, Good manufacturing Practice (GMP), Sanitation Standard Operating Procedures (SSOP) in Developing Innovative Regional Superior Products (PPUD) from Processed Coconut Fruit and Nuts

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ABSTRACT

Regional Superior Product Development Program activities in Carangsari Village, Petang District, Badung Regency, Bali were carried out in the Sari Nadhi Business Study Group. The processing of agricultural products, especially coconuts into coconut oil, has been produced and marketed by partners, but has not been intensive, and partners want to have new superior products by processing local agricultural products, especially coconuts and nuts to support Carangsari Tourism Village. Partners do not have knowledge in the field of business management, so they experience obstacles in managing production and marketing. Solutions carried out to solve the problems faced by partners are: Providing Appropriate Technology in processing products made from coconut and nuts; Provide knowledge on Good manufacturing Practice (GMP), Sanitation Standard Operating Procedures (SSOP), storage and packaging, marketing, business management; and provide assistance with processing equipment and business capital. The output targets that have been achieved are Appropriate Technology of Coconut and Legumes Processing

1. INTRODUCTION

1.1. Research Background

Carangsari Village, which is known as a tourist area, has 10 (ten) traditional hamlets/banjars, namely Dusun Samuan Kangin, Dusun Samuan Kawan, Dusun Mekar Sari, Dusun Bedauh, Dusun Pemijian, Dusun Senapan, Dusun Anggungan, Dusun Sangut, Dusun Beng and Dusun Telugtug [1]. Geographically, Carangsari Village has a great deal of agricultural potential. It has a sizable expanse of rice fields, and nearly 70% of its inhabitants continue to make a livelihood as rice field and plantation farmers.

The plantation crops developed consist of cocoa, durian, rice, coconut, and secondary crops dominated by beans, which are primarily used to satisfy daily needs and sold in the surrounding village area [1]. To support traditional/religious

ceremonies, the majority of coconuts planted by the community in Carangsari village are of the inner coconut type (*Coccus nucifera*), while others are planted from early maturing or hybrid coconut types. Each family head, particularly those who own a moor, has a coconut plant sufficient for his or her requirements [1]. However, due to the large number of coconut plants, there is sometimes an overabundance and they are not utilised effectively, resulting in the abandonment of harvested or fallen coconuts.

As one of the potential crops located in the Carangsari village at this time, the price of coconut fruit is extremely low. Even at harvest time, the price of coconut fruit is only IDR.2000 to IDR. 4000 per fruit, whereas the expense of climbing is quite expensive at IDR.20,000 per tree. Due to the low price of the coconut fruit they produce, it is necessary to consider alternative refining methods in order to increase the economic value of coconut fruit and thereby the community's income.



1.2. Literature Review

Coconut is one of the agricultural products with a high economic value if further processed, as almost all plant parts, particularly the fruit, are amenable to further processing. In addition to coconut oil, various processed products can be made from coconut fruit, including dried grated coconut, copra, coconut sugar, coconut milk, nata de coco, coconut water syrup, coconut sauce, chips, coconut jam, and preserved coconut milk, among many others [2]. The old coconut fruit contains high calories, amounting to 359 calories per 100 grammes; half-aged coconut meat contains 180 calories per 100 grammes; and young coconut meat contains 68 calories per 100 grammes. The average calorific value of 100 grammes of coconut water is approximately 17 calories. Green coconut water, compared to other types of coconut, contains the highest tannin or antidote (anti-toxin). The composition of the chemical content contained in coconut water includes ascorbic acid, or vitamin C; protein; fat; hydrate charcoal; calcium; and potassium. Minerals contained in coconut water are iron, phosphorus, and sugar, consisting of glucose, fructose, and sucrose [3].

Nuts are also a potential agricultural product of Arangsari and its surroundings. This type of agricultural product is also widely sold in the village market, which is located on the side of the main road in Carangsari village and is planted by the community as a crop rotation. However, these types of agricultural products are only consumed fresh and have not been processed into other products, so it is necessary to think about making preparations that can add innovative products to support Carangsari Tourism Village in the future. In Indonesia, there are more than 12,000 types of beans, including peanuts, green beans, kidney beans, black beans, cowpeas, pigeon peas, bogor beans, chickpeas, soy beans, and capri beans. Meanwhile, in Maluku, it is not certain how many types of beans are planted. Bean crops have spread widely in various provinces and have been well cultivated. The beans cultivated by the community are erect-type and creeping-type, short-lived, and clumping plants, with a variety of species planted [4].

Implementation of the Regional Superior Product Development Programme (PPPUD) associates with 1 (one) Business Learning Group (KBU) named "Sari Nadhi", which was established on November 23, 2018 in Banjar Bedauh, Carangsari Village, Badung Regency. The group consists of 12 members led by Ni Nyoman Sutantri, and has been granted a decree by the Perbekel of Carangsari Village through Decree No. 39 of 2018, which was issued specifically to process coconut fruit produced by the local community into traditional Balinese "Tandusan" oil and Virgin Coconut Oil (VCO). However, along with the establishment of Carangsari Village as one of the Tourism Villages in Badung Regency by the Village Head, the fostered group asked the Faculty of Agriculture of Warmadewa University to produce other processed products using local agricultural products produced by the community, specifically coconut-based products and nuts produced by farmers. The objective is to create processed culinary items that can serve as icons or "souvenirs" of Carangsari Village as a tourism village. The majority of KBU "Sari Nadhi" members are housewives without permanent employment; some are also cultivators. It is anticipated that their efforts to establish a business with assistance from the PPPUD programme will increase their income. Being a member of the KBU is not viewed as a part-

time profession, but through this Community Service activity, the Carangsari Village community in the "Sari Nadhi" KBU will be able to process coconut and nuts as one of the primary agricultural products. With community service activities funded by Warmadewa University, it is anticipated that the community will gain skills and knowledge in managing local natural resources, as well as an entrepreneurial spirit, allowing them to create business opportunities related to the Carangsari Village region. This local agricultural product processing training activity is anticipated to result in improved and more effective production management [5][6]. Partners are also taught about work management and business management so that they can effectively manage their time and operate their business, thereby increasing family income and welfare [7][8]

1.3. Objective

The objective of this activity for partners is to increase partner knowledge and proficiency in processing local coconut fruit and nuts produced in the partner's region in order to enhance community welfare [6]. The touch of efficient technological innovation in the processing of innovative Balinese products is anticipated to provide high added value for fostered partners who can market their own products to support the culinary tourism industry. Good manufacturing practises (GMP), sanitation and hygiene processing (SSOP) must be met for food products to be secure for human consumption [9].

2. MATERIALS AND METHODS

The implementation of this activity was held at the "Sari Nadhi" Business Learning Group in Banjar Bedauh, Carangsari Village, Petang District, Badung Regency, Bali Province.

2.1. Methods

The method of implementation of PPPUD activities Training on processing coconut fruit and nuts into innovative products will be planned by: (1) Discussion method to find out the real problems experienced by partners; (2) The face-to-face method and providing counselling, so that partners gain knowledge about processing coconut fruit and nuts with manufacturing methods that can be done with simple tools, understanding of sanitation and hygiene processing, product packaging and labelling as well as entrepreneurship and business management; (3) Direct practice in the form of training, guided by instructors from among lecturers, alumni and students who have taken courses in Plantation Product Processing Technology and Nut Processing Technology, so that partners can directly make the products provided; (4) Interviews, discussions, and questions and answers regarding the problems encountered by partners, as well as planning activities that illustrate the solution steps for the problems faced by partners.

The team will provide the partners with modules containing information on how to transform coconut fruit into a variety of commercially valuable products, as well as counselling and modules on supporting materials, including sanitation and hygiene processing, packaging and labelling, marketing, entrepreneurship, and business management.

In order to carry out the training, equipment was donated to collaborators to assist in the production of products that will be implemented.

(5) Implementation of training and practise in creating coconut and nut-based products, product packaging, and labelling; (6) A final evaluation will be conducted on the service material provided to partners from the time of product manufacturing, packaging, and labelling through its marketing distribution in order to increase community revenue.

2.2. Partner Participation

- Partners who become trainees must adhere to all agreements made in accordance with the letter of intent to collaborate on this PPPUD activity.
- Partners are expected to be disciplined, to adhere to all agreements, and to carry out the entire succession of planned activities until their conclusion.
- At the conclusion of this activity, companions should be able to teach other community members how to maximise the potential of coconut and nuts.
- Partners are expected to be able to practise and continue the business successfully after the activity concludes, and the initiated business can grow.

3. RESULT AND DISCUSSION

The Covid-19 pandemic situation is indeed a consideration in its implementation in order to meet the requirements of the health procedures specified in carrying out PPPUD activities in the first year of 2022 and requires an extra approach so that partners, banjar officials and village officials are willing to carry out the activities that have been designed, while still considering and adjusting the activities being carried out by the community in Banjar, especially members of the Sari Nadhi Business Learning Group (KBU) who are partners in this programme. At the meeting, it was also agreed that those who would be invited at the opening ceremony would be limited to a limited number and held at the Banjar Bedauh Hall, Carangsari Village so that participants, invitees and the service team could apply health protocols considering that there is currently a covid-19 pandemic. It was also accompanied by inviting the Director of the Village-Owned Enterprise (Bumdes) who had just been appointed to facilitate small and medium enterprises in Carangsari Village. In this case Bumdes will be cooperated to market the results of small business activities including products produced by KBU "sari nadhi" in Banjar Bedauh.

The opening ceremony for community service activities by taking the PPPUD program in the first year was held on Tuesday, 17 May 2021 by taking place at the Banjar Bedauh Hall, attended by all members of the KBU "Sari Nadhi", Kelihan Dinas and customary kelihan Banjar Bedauh, the Head of Carangsari Village and also invited the Director of Village-Owned Enterprises (Bumdes) in the hope that they can be assisted in marketing and distributing products produced by fostered partners. The activity continued with the delivery of material, namely material on coconut and nut processing with appropriate technology packages and process improvements at processing stages to improve product quality in the form of serundeng with coconut pulp material from squeezing coconut milk in making VCO, peanut serundeng and technology for making capri beans in packaging, consumer protection, sanitation, hygiene, product packaging and labelling, policies and the importance of licensing processed products for the community, entrepreneurship, institutional strengthening, partnerships and marketing and the

concept of governance for bookkeeping to calculate profit and loss.



Figure 1. Processed Coconut and Legumes Products by Business Study Group (KBU) "Sari Nadhi"

3.1. Economic and Social Impact

Economic and Social Impact of the Business Study Group (KBU) "Sari Nadhi" As a fostered service team from the Food Science and Technology Study Programme FP Unwar since 2019, its activities have had a social impact by increasing the surrounding community's awareness that by maximising the potential of local agriculture, it will be able to increase employment opportunities and can increase positive community activities to increase family income. Especially now that the COVID-19 pandemic has had widespread economic and social effects on the larger community. KBU "Sari Nadhi" has been a pioneer and a model for other communities outside the group regarding efforts to increase economic activity and provide positive social impact so that unemployed people can partake in attempting to earn extra income. In addition, KBU Sari Nadhi has demonstrated that although the majority of its members are elderly, the elderly in KBU are not only active members of the organisation.

Each family head in Carangsari Village, particularly those who have moor and land that is not planted with rice, has, on average, coconut plants and other moor plants such as bamboo and fruit plants to meet their own requirements. In the interim, following the rice-planting season, land crops are typically planted with legumes to fertilise the soil in rotation. However, because there are so many coconut plants, there is sometimes overproduction and improper utilisation, resulting in the abandonment of harvested or fallen coconuts in the field. As one of the potential crops found in the village of Carangsari, the price of coconut fruit is presently very low. Due to the low price of the coconuts they produce, the service team in Carangsari Village has developed alternative strategies to enhance the economic value of local coconuts.

Economically, the innovation of refining coconuts into VCO oil has resulted in an increase in the value of local coconuts in Carangsari Village, particularly in Banjar Bedauh. People today typically process their coconuts into Virgin Coconut Oil (VCO), which is the hallmark product of KBU "Sari Nadhi" (sponsored by the Unwar service team in 2019); the remainder of the sorting is then refined into crude coconut oil. From the oil processing procedure, a substantial quantity of coconut pulp is produced, which is then processed by Mitra into innovative preparations in

the form of spiced serundeng, a combination of nuts, while preparations derived from nuts are processed as processed kapi beans.

3.2. Partner Contribution

This Community Partnership Programme activity has run smoothly thanks to the good cooperation between the service team and the activity partners, namely KBU "Sari Nadhi" who enthusiastically participated in this activity, so that the partners have contributed to the success of this activity. The contributions of partners to the implementation of activities are:

- a. Partners with full discipline and responsibility, obey all agreements and carry out all series of activities until all activity plans end.
- b. Partners have contributed to this activity by providing training venues and preparing coconut raw materials that will be used in training.
- c. Partners are fully disciplined and responsible, adhere to all agreements and carry out all series of activities until all activity plans end.
- d. Partners who are training participants have complied with all agreements that have been made in accordance with the letter of intent to cooperate in this PPPUD year I activity.
- e. After the end of this activity, partners are expected to be able to pass on their skills to other community members to utilise the potential of coconut and nuts in Carangsari Village.
- f. After the activity ends, partners are expected to be able to practice and continue the business well and the business that was initiated can develop.
- g. The products produced later can be marketed to many areas so that the turnover of partners increases.

3.3. Constrains

Since the signing of the contract for the implementation of the 2022 community service programme between the Head of the Warmadewa University Community Service Institute and the Head of the Community Service Team Number: 161/Unwar/LPM/PD-14/2022, that in general the implementation of the Regional Superior Product Development Programme (PPPUD) activities from the survey to the implementation of activities in May-July 2022 has been going well. The implementation of this community service activity can run well and smoothly thanks to the good cooperation between partners, the service team and official and customary officials with the principle of achieving common goals, namely to improve community welfare and raise the potential of existing local agriculture and utilise it properly into products with higher economic value to jointly support and prepare instruments and complementary support for the establishment of Carangsari Village as a Tourism Village. However, the implementation also did not escape some constrains.

The constrains that occurred included:

- 1) Restrictions on community activities, in accordance with public health protocols, with an emphasis on staying at home to prevent the spread of the virus by avoiding gatherings and masses. Community service activities must actively recruit local collaborators and officials. In order for partners and customary / official officials to be willing to carry out activities while still implementing sound health protocols, a suitable strategy is required.

- 2) The business capital is still very minimal considering KBU "Sari Nadhi" Banjar Bedauh which was only established in 2018. The capital owned is only collected from the profits from the sale of products made and has not been touched by capital assistance from any party.
- 3) Community activities in the field of customs and religion, particularly in Banjar and Traditional Villages, frequently conflict with PPPUD service activities, so they must be taken into account and well-coordinated when planning the schedule for this community service activity. On the one hand, community activities can continue as normal, and on the other, this PPPUD activity can still achieve its goals.
- 4) Due to the various routine activities of each KBU member as an activity partner, it is sometimes necessary to adjust the activity schedule so that all partner members can attend this activity.
- 5) Training and counselling materials that have yet to be modified and have never been utilised by partners, requiring partners to recalibrate to the newly introduced techniques. For the safety of the food ingested by the community, the hygienic and sanitary aspects of processing and quality must be considered even if the products trained appear simple and may have already been manufactured.

The production equipment is still quite rudimentary and relies solely on basic tools, making mass production impossible. The fostered partners are organisations that empower the elderly, as the majority of KBU members are geriatric. Duration of activities and daily conditions must be taken into account.

Each family head in Carangsari Village, particularly those who have moor and land that is not planted with rice, has, on average, coconut plants and other moor plants such as bamboo and fruit plants to meet their own requirements. In the meantime, after the rice-planting period, typically to enrich the soil through crop rotation, legumes are planted. However, because there are so many coconut plants, sometimes there is overproduction and they are not utilised effectively, so harvested or fallen coconuts are abandoned in the field. As a potential crop located in the village of Carangsari, coconut fruit is currently very inexpensive. Due to the low price of the coconuts they produce, the service team in Carangsari Village has developed alternative strategies to enhance the economic value of local coconuts.

Economically, the innovation of refining coconuts into VCO oil has resulted in an increase in the value of local coconuts in Carangsari Village, particularly in Banjar Bedauh. The most popular product of KBU "Sari Nadhi" (sponsored by the Unwar service team in 2019) is Virgin Coconut Oil (VCO), which is typically produced from coconuts. The remainder of the separation is then refined into virgin coconut oil. From the oil processing procedure, a substantial quantity of coconut pulp is produced, which is then processed by Mitra into innovative preparations in the form of spiced serundeng, a combination of nuts, while preparations derived from nuts are processed as processed kapi beans.

4. CONCLUSION

Based on the activity's implementation results, the following can be concluded: Except for facilitating in Bumdes Desa Carangsari Village, which is still in progress, and facilitating P-IRT, which is still awaiting the evaluation process of the products produced so that it satisfies its administrative requirements, the target

outputs of this PPPUD year I activity have been delivered to partners. The pupils have participated in the training with zeal and self-control, as evidenced by their participation in the activities. The training for making products in the form of coconut-based preparations and nuts can be carried out efficiently, and apprentices are competent at making these products. Continuous counselling and mentoring is required so that the fostered partners can conduct business activities in a sustainable manner.

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