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Development of Innovative Taro-Based Product Management with Zero-Waste Concept to Increase the Independence of PKK Wanagiri

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A B S T R A C T

The development of innovative products is growing rapidly, producing a variety of processed products that are increasingly diverse. Taro tubers are one of the potential foodstuffs to be developed. Besides having carbohydrate components, Taro also contains other components that are good for health. Taro has the disadvantage of itching when consuming taro due to the oxalate compounds contained in it. This has resulted in people being reluctant to process taro. This problem was experienced by one of the groups in Wanagiri Village, namely the Prosperous Family Empowerment Group (PKK) Wanagiri, which is located in Sukasada District, Buleleng Regency, Province Bali, Indonesia. The partner does not yet know the taste of taro and does not have innovative product management made from taro. Solutions to overcome such problems are: providing knowledge regarding the cultivation and processing of taro, providing training on the processing of taro products (bread, nuggets and jams) and how to package, market and handle processing waste. The method used is active community participation. Community Self-Reliance Activities (KKM) in Wanagiri Village have been running smoothly. The added value of the Wanagiri PKK group and their standard of living has increased. Taro-based innovative product development with a zero-waste concept can be applied. Knowledge of how to process taro into bread, nuggets, chips and jam, product packaging, and marketing can help people to increase self-sufficiency. Mentoring activities should be carried out on an ongoing basis so that groups can independently make products (chips, bread, nuggets and jam), wider marketing and ultimately increased welfare.

1. INTRODUCTION

1.1. Research Background

The process of processing food into innovative food products is currently growing rapidly producing a variety of processed products that are increasingly diverse. Effective and efficient processing of innovative food products is synonymous with food processing with the concept of zero-waste to support *the green economy*[1][2]. Food processing to empower rural communities is an effort to develop community independence and welfare. The priority of community needs in increasing knowledge about production management, skills, and awareness in utilizing resources through programs, activities and assistance is essential

following RO Law Number 6 of 2014[3]. Village development is an effort to improve the quality of life and life of the village community.

Wanagiri Village is located in Sukasada District, Buleleng Regency. Most of the people's livelihoods are as farmers. The population is 3111, Male 1620 and Female 1491. The area of Wanagiri Village is 1575 Ha which consists of plantations of 1122 Ha, moor 11.50 Ha, housing 28.25 Ha, the rest of the offices. The location and boundaries of Wanagiri village are north of Ambengan, Git-git, Sambangan, and Panji villages. East of Pegayaman Village, south of Pancasari Village, west of Gobleg Village, Banjar District. The distance from the Village Government to the District is 20 Km, Regency 22 Km, Province 57 Km. The number of Hamlets is 3 (three) including Banjar Dinas Yeh ketipat, Banjar Dinas Bhuanasari and Flood Dinas



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Asah Panji. Wanagiri Village is a merger of three hamlets/banjars, which were previously other villages, namely: Banjar Dinas Asah Panji, Banjar Dinas Bhuanasari and Banjar Yeh Ketipat. Wanagiri Village has a variety of natural potentials that need to be developed, one of which is taro tubers.

Women as mothers who play a role in the use of rural resources can be used as an example because mothers are role models for their children. The role of women as husbands' companion wives can be done well if there is openness and cooperation. Women in the era of development are significant in their role, because they are considered to be at a productive age. Various development activities in the education sector create housewives to think creatively, develop themselves to become quality women. The government has sought women's empowerment by involving various parties such as the Ministry of Women, women's institutions, and universities to facilitate training and financing for women's development[4].

In Wanagiri village, there is the Wanagiri PKK group. The location of this group is far from the crowd and is still somewhat behind in terms of skills. The activities carried out by PKK mothers range from social gatherings, sports, dance exercises, beating exercises, food exercises and others. Because of its remote location, this group still really needs support so that the empowerment of its women can foster an entrepreneurial spirit and requires assistance so that members have supporting activities that can help increase income.

This ability will later be practiced to meet the needs of the family in addition to the desire to have your own business (entrepreneurship). This desire is supported by the proximity of the market located in Sukasada District which is known for selfie tourism objects, views of crocodile lake and Tamblingan and 3 waterfalls. Processed taro food products that use makeshift ingredients, namely taro which has not been used commercially. Besides being rich in cultural arts, the island of Bali is also rich in various processed foods. In fact, many of the typical Balinese snacks or snacks are favored by foreign and domestic tourists[5].

Maintaining processed food made from tubers is the duty and responsibility of all parties in reducing or suppressing the use of wheat flour in the food sector. Taro processed food processing has better development prospects and opportunities. The type and quality of raw materials and auxiliary materials vary greatly in the food processing process. Food product technology is conventionally characterized by a picture where products are processed with poor sanitation and hygiene levels, use raw materials with a low level of quality or freshness, food safety is not guaranteed, technology is used for generations, and families manage businesses with inadequate management capabilities[6]. Therefore, it is necessary to develop food processing with several improvement efforts to apply basic feasibility in food processing[7]. Aspects of production management, namely quality management and safety of raw materials and products, need to be studied for business development, packaging development and product marketing[8]. With the problem of the variety of processed taro food processing processes, it is necessary to implement basic feasibility to produce quality taro processed food[9][10].

The Wanagiri Village PKK group is chaired by Mrs. Komang Budiantini, formed in 2000 with 20 members. The group's activities only help to process taro into chips with regular plastic packaging without any effort to maintain quality and extend shelf life. This group does not yet have knowledge of good taro

processing especially for itch relief, nor does it have knowledge of packaging, management, entrepreneurship and marketing. Taro chips that have been packaged/produced usually in addition to being marketed to markets around the village, are also taken by middlemen at relatively low prices. With community service activities funded by the Ministry of Education and Culture Higher Education Technology Research Republic of Indonesia, the Wanagiri PKK Group hopes to have skills and insights in managing natural resources and maintaining local wisdom and having an entrepreneurial spirit, so as to increase independence to open wider business and marketing opportunities[11][12].

Training activities on the processing of innovative taro-based food products, it is hoped that the group will be able to produce and market innovative products made from taro more broadly and a good packaging process so that quality can be maintained, longer shelf life and broader marketing. Partners are given knowledge about the utilization of taro skin waste by-products of taro processing into organic fertilizer. Partners are also given knowledge about production management, so that they can independently manage time and run the business as well as possible, thus will be able to, independently increase income and family welfare.

Through the collaboration between Warmadewa University and the Wanagiri PKK, it is hoped that it can provide solutions to the problems faced by the Wanagiri PKK. This service activity aims to develop the community, especially the Wanagiri PKK group which is economically and socially independent, helps create peace and comfort in community life and improves skills (soft skills and hard skills).

1.2. Literature Review

Taro is a commodity crop of tubers that are often a source of carbohydrates[13]. Carbohydrates in taro are about 70-80% so they can be used as a substitute for flour[14]. In addition, taro also has other nutrients such as proteins and vitamins. The macronutrient and micronutrient components of taro include: energy 98 Cal, protein 1.9 g, fat 0.2 g, carbohydrates 23.7 g, calcium 28.0 mg, phosphorus 61 mg, iron 1.0 mg, vitamin A 3 RE, vitamin C 4.0 mg, vitamin B1 0.13 mg, water 73.0 g, 85% edible ingredients[15]. Taro has a slowness, namely the onset of itching on the tongue or throat if the processing is not right. The itching is caused by oxalate compounds contained in taro[14]. Oxalate compounds can be reduced by soaking taro in brine or whiting[16]. The taro products are mostly processed simply such as boiled, fried, steamed, steamed and made chips due to ignorance of the taro processing technology. The diversity of taro tubers utilisation is necessary to maximize existing resources and become an alternative processed product on the market[17]. Taro can be processed into bread, nuggets and jam.

Bread is one of the most popular food products by the public. Bread is made from a mixture of high protein wheat flour, eggs, salt, sugar and yeast. A mixture of such ingredients will form a dough that can rise. The dough can rise as a result of the gluten being formed. This gluten is formed from the glycine and glutenin proteins contained in the basic ingredient of bread making, namely wheat flour[18]. The gut cannot digest gluten protein, so it is another alternative by substituting taro on bread dough. Taro has potential as a source of flour and starch[18].

Consume identic bread by using jam. Jam is one of the most preferred food companions by the public[15]. Jam is usually made from fruits but this time it is made from taro. The characteristics of jam affect the raw materials used. Jam can be added to thickening agent, citric acid and other food additives during manufacturing. Generally, am is added with thickening agents such as cornstarch or cornstarch, CMC, or pectin.

In addition to being used as a substitution ingredient in bread and jam, taro can also be processed into nuggets. Nuggets are an innovative product from chicken meat that is loved by all circles, especially children[19]. The nuggets are made from wheat flour, seasonings, and chicken. But this time wheat flour was replaced with taro. The nugget texture produced from this chicken takas nugget is much chewier than nuggets. The processing of taro into nuggets greatly increases the use value of taro [19].

1.3. Research Objective

The objectives of this community self-reliance activity include: 1) improving the quality of the variety of processed taro products, 2) providing knowledge of the application of basic feasibility and sanitation so that the product is cleaner, 3) providing appropriate technology in the processing process of taro processed food products, 4) improving skills in making taro processed food so that it can be marketed in supermarkets, 5) providing knowledge about good packaging techniques, product labelling, storage and marketing, 6) providing knowledge and skills about handling taro processing production waste into organic fertilizer, 7) providing equipment assistance so that the types of processed food become more diverse, 8) increasing the spirit of entrepreneurship and business management

2. MATERIALS AND METHODS

2.1. Materials and Equipment

The Wanagiri PKK group will be given a set of knowledge on insights on postharvest handling, processing taro into various products, how to develop taro products, including how to package, store products so that their shelf life remains longer. Partners are also provided with knowledge of entrepreneurship and product marketing. The knowledge package provided is expected to improve the skills and competencies of group members in developing taro innovative product management.

To support the process of developing taro product management by processing taro into various products and how to cook it, the following infrastructure is needed: 1) Leaflets containing how to process various taro processed products. 2) Schedule of activities and time required. 3) Processing tools for the practice of making various taro preparations. 4) Consumables are ingredients used to make taro noodles, taro nuggets, bread and taro jam.

2.2 Application

The implementation method is the pattern or system of actions to be carried out or the sequence and stages that need to be carried out in carrying out community service activities. The methods that will be implemented include coaching, training, mentoring, structured consultation on various obstacles in an effort to provide added value for partners. The implementation process determines the achievement of the objectives of the implementation. One way for that goal to be achieved is by using appropriate methods. Method is one of the tools to achieve goals—methods in relation to the achievement of implementation goals in order to be included in long-term memory. Method is an aspect that can smooth the implementation path to what has been formulated. Various methods that can be applied in the implementation of community service include: lectures, questions and answers, discussions, demonstrations, modeling, inquiry, simulation, games, role-playing, and others. Such methods can be implemented separately or implemented in combination according to the capabilities and characteristics of the material studied.

This KKM activity program is carried out by means of training through the method of lectures and discussions, demonstrations and training, and question and answer. a) Lecture and Discussion Method: This KKM activity will begin with giving lectures and counseling to homemakers of the Wanagiri PKK Group members. These mothers were gathered in a room with the implementation team to give a talk on the activity material. The material provided is related to processing taro into taro chips, taro nuggets, taro bread, and taro jam. This activity aims to provide theoretical knowledge to mothers about the material of the activities to be carried out. The activity was then continued with the Discussion method to deepen respondents' understanding of processed taro products, and learning media. During the implementation of this activity, more pictures and explanations were shown about processed taro products into taro chips, taro nuggets, taro bread, and taro jam in the hope that respondents could understand more quickly. 2) Demonstration and Training Methods: Demonstration and training activities are follow-up activities carried out by KKM implementers on lectures and discussions that have been carried out. This activity is carried out by demonstrating the process of processing taro into taro chips, taro nuggets, taro bread, and taro jam.

3. RESULT AND DISCUSSION

3.1. Result

Community self-reliance activities (KKM) entitled the development of innovative taro-based product management with the concept of zero-waste to increase the independence of PKK Wanagiri have been running smoothly. This activity was carried out in the form of counseling or theoretical studies to provide an understanding of the development of zero-waste-based taro product management, product manufacturing, providing equipment assistance, providing knowledge about packaging and labeling on taro products, product marketing and entrepreneurship. (Figure 1). The activity continued with direct technical practice of making chips, bread, nuggets and taro jam

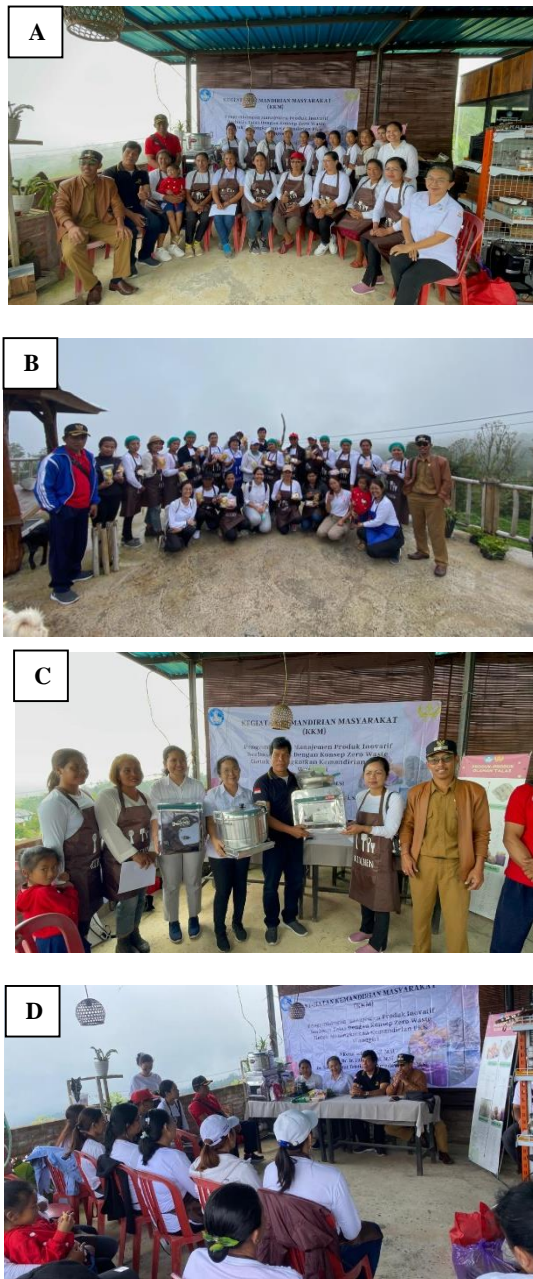


Fig 1. KKM Participants (A, B), Handover of Equipment Assistance to the Head of Wanagiri Village and Wanagiri PKK Group (C), Presentation of Service Material (D)

The participants involved in this activity were 20 people from the Wanagiri PKK group in Wanagiri Village. The extension team donated tools and materials for the development of zero-waste-based taro processed product management. This community self-reliance activity has been published in the district newspaper and electronic media.

3.2. External

In detail, the output achieved from this KKM includes appropriate technology, mass media publications, activity videos, and processed taro products, namely taro bread, taro jam, taro nuggets, and taro chips.

3.3. Advantage

The Wanagiri PKK group acquired skills in developing innovative taro-based product management with the concept of zero-waste. Of the 20 people, 5 people have mastered the making of taro jam, 5 people have mastered the making of taro chips, 5 people have mastered the making of taro nuggets and 5 people have mastered the making of taro bread.

3.4. Partner Contribution to Implementation



Fig 2. Product Manufacturing Process (A, B), Taro Bread (C), Taro Jam (D), Taro Nuggets (E), Taro Chips (F)

All participants of the community self-reliance activity were very enthusiastic about participating in the training. All partners actively participate in direct practice in activities and expect continuous assistance in developing innovative taro-based product management with the concept of zero-waste.

3.5. Implementation of Community Service

The obstacle actor in the implementation of KKM is that it is difficult to find a schedule for the implementation of activities in the midst of community busyness because of the large number of customary activities in the village so that the implementation schedule is difficult to agree. The supporting factor for this activity is that PKK Wanagiri members are very enthusiastic, active and eager to know the development of innovative taro-based product management with the concept of zero-waste until the entire activity ends. The location prepared for the implementation of KKM activities is very supportive and representative. The obstacles faced in implementing KKM can be addressed by communicating with the group leader and village officials. Counseling and practical activities can take place smoothly. 20 group members attended counseling and hands-on practice activities. This activity was carried out in accordance with the covid-19 health protocols. Furthermore, the KKM team will continue to assist in taro-based innovative product development activities and product marketing. The next plan is for the implementation team to accompany the group to develop

bakery products, taro jams and chips, and nuggets until they get p-IRT.

4. CONCLUSION

Community Self-Reliance Activities (KKM) in Wanagiri Village have been running smoothly. The added value of the Wanagiri PKK group and their standard of living has increased. Taro-based innovative product development with a zero-waste concept can be applied. Knowledge of how to process taro into bread, nuggets, chips and jam, product packaging, and marketing can help people to increase self-sufficiency. Mentoring activities should be carried out on an ongoing basis so that groups can independently make products (chips, bread, nuggets and jam), more comprehensive marketing and ultimately increase welfare.

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