



# Improving the Skill of the Women Farmer Group "Widya Pertiwi" in Belantih Village, Bangli, to Enhance the Value-Added of Citrus Fruit Processing in Production Outcomes.

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## ABSTRACT

Belantih Village, located in the Kintamani District of the Bangli Regency, is recognized for its substantial citrus fruit potential. The majority of the local population in this region engage in citrus farming as their primary means of income. The lack of knowledge among citrus growers in Belantih Village about the processing of citrus fruits into long-lasting processed products is evident. The primary objective of the community service activities is to enhance knowledge and expertise in the processing of citrus fruits into value-added products, hence extending their shelf life and augmenting their economic worth. The implementation of counseling and mentorship programs, technological transfer initiatives, and training sessions focused on the processing of oranges into jam. The individuals included in this study were members of the women farmer group known as "Widya Pertiwi". The service activity consists of several steps, including the provision of materials and demonstrations on citrus processing, followed by a final evaluation in the form of a post-test administered through the distribution of questionnaires. The outcomes of counseling and training revealed that participants, utilizing the experiential learning approach and training, expressed their ability to comprehend and effectively execute the processing of citrus fruits into various culinary derivatives. This skill acquisition was particularly beneficial during periods of abundant fruit harvest, as it allowed for the generation of increased value and income. The findings of the study indicated a significant improvement in general knowledge. Specifically, 93.33% of participants reported a clear understanding, while the remaining 6.67% expressed comprehension regarding the processing of citrus fruits into value-added products following the completion of the service activities. Notably, no respondents reported a lack of understanding or confusion. The findings indicate that all participants belonging to the Women Farmers group have a keen interest in enhancing their competencies and implementing citrus fruit processing techniques to produce jam products. This approach aims to mitigate fruit rotting during periods of ample fruit availability.

## 1. INTRODUCTION

### 1.1. Research Background

Citrus is a fruit horticulture commodity that is widely cultivated in Indonesia. This commodity can grow in certain areas with suitable climatic conditions and is a product that is favored by the

community. Oranges have health benefits because they contain organic acids consisting of citric acid, tartaric acid and ascorbic acid. In addition to the acid content, oranges also contain bioflavonoids that function as antioxidants such as limonin and limonene [1]. Oranges have a variety of properties that have a good effect on the body, including a rich content of vitamin C with its benefits as an antioxidant that serves to form an immune system for the body so that it can help protect against various



diseases [2]. The other benefits of antioxidants are preventing free radicals to protect body cells from damage and containing folic acid which serves to help improve brain health and beta-carotene to maintain body tissues and metabolism [3].

Based on these benefits and opportunities, almost every region cultivates citrus fruits as one of the regional plantation products. Belantih Village, Kintamani Subdistrict, Bangli Regency is one of the villages of citrus production centers so it is not surprising that citrus plants or trees dominate the plantations or moor of local residents [4]. The main problem faced by citrus farmers in Belantih Village is that although the village is one of the centers of citrus production, the cultivation and agribusiness of citrus has not been able to alleviate poverty and provide good welfare. The strategic issue of citrus agribusiness in Belantih Village in the last decade has been declining. Based on data [5] citrus production in Bangli Regency in 2018 (168,476 tons); in 2019 (131,587 tons) and in 2020 (104,528 tons). The fruit produced is less competitive with imported fruits, the fruit harvest is seasonal. During the main harvest season, the fruit is abundant, and outside the main harvest season, there is little or no production, so the availability of fruit is not continuous, and the quality of the fruit produced is low so the selling price is also low. This condition causes many farmers in the peak harvest season to leave the fruit unharvested (rotten on the tree) because of the low selling price (1,000 - 1,500 per kg) [6].

Furthermore, it is stated that post-harvest handling is also not good and there is no skill in processing citrus fruits into various variants of citrus-based culinary products such as sponges or cakes, sweets, and tea from citrus fruit peels) which should be done when there is abundant fruit in the main harvest season to increase added value. This is due to the low capacity of farmers' human resources in responding to technological developments in the framework of good post-harvest handling of oranges by the principles of Good Handling Practices (GHP) so that the oranges have a longer shelf life and have added value in sales.

Generally, siamese oranges in Bangli Regency are sold fresh and consumed directly without further processing. People also recognize processed citrus fruit products themselves only to the extent that they are often found in the form of syrups, extracts, cake mixes, puddings, and others. As for the processing of the latest innovative products, it is still unfamiliar and not widely found [7].

Citrus fruits can be further processed into a processed product in order to increase its selling value and also become an alternative business product for farmers. Some processed citrus products that are easy to make include candy, jelly, jam and fruit leather. Jam is a paste-shaped food obtained from cooking fruit pulp, sugar and thickening agents can be added. The proportions are 45% by weight of fruit and 55% by weight of sugar. The resulting mixture is then thickened so that the final result contains a minimum total soluble solids of 65% [8]. Quality requirements are always applied so that the products produced have nutritional and safety values that can ensure safety in consuming them.

Jam is commonly used as a complement to bread, pastry filling, and additives in other food products. Jam derived from fruits is generally only rich in vitamins while mineral content such as calcium is present only in small amounts [9] and [10]. Jam includes preserved products from crushed fruit mixed with sugar and without the addition of water and has a soft texture [11]. In making jam, it is also necessary to consider the concentration of sugar, pectin and acid in order to obtain optimum conditions in

gel formation, namely sugar by 65-70%, pectin by 0.75-1.5% and acid with a pH of 3.2-3.4. Quality requirements are always applied so that the products produced have nutritional and safety values that can ensure safety in consuming them. The quality of good fruit jam can be known from the quality requirements of jam based on the Indonesian National Standard (SNI 01-3746-2008) [8].

## 1.2. Literature Review

Efforts to encourage and prepare Belantih Village as an object of citrus-based agro-tourism are needed so that when Bali tourism recovers after the Covid-19 pandemic, there is a symbiotic mutualistic integration between agriculture and tourism in Belantih Village, so that there is added value obtained by citrus farmers, not only from fruit production but also fruit processing when fruit is abundant. The goal is that in the future the primary sector (agriculture) is not increasingly marginalized and abandoned by the younger generation, but on the contrary it is growing because it gets added value from the touch of the tourism sector [12].

Although it has great agro-tourism potential, this potential has not been well cultivated so that the benefits have not been felt by the people of Belantih Village. This is due to the weak ability of village human resources (HR) in managing their potential, such as the lack of ability to package agritourism packages. In the on-farm aspect, farmers and the community have not been able to package the various potentials that are owned into something to see, something to do, something to buy, and something to learn by tourists [13]. The community needs to be given an understanding of the benefits and properties of citrus fruits in depth as well as business opportunities. In addition, it is also to put forward the mindset of the community regarding the potential of citrus fruit as an innovative product that can be competitive [14]. In addition, through the education provided, it aims to inspire the community to be creative and utilize citrus fruits intensively.

Based on the reality in Belantih Village, the paradigm needs to be changed by conducting systematic coaching and mentoring to increase the capacity of village human resources comprehensively from upstream to downstream so that they are able to develop competitiveness and create excellence in a coordinated manner starting from production, post-harvest, distribution, and marketing, while linking it to agritourism. Through cooperation with partners indicated by the willingness and seriousness of the Widya Pertiwi Women Farmers Group partners, in responding to the invitation to cooperation offered, it is hoped that through assistance for 3 (three) years through this proposed PPPUD activity, Belantih Village can build an efficient and effective citrus agribusiness and agritourism value chain system with improved quality of handling on-farm and off-farm aspects, so that Belantih Village becomes a Citrus-Based Agrotourism Center Village.

## 2. METHODS

The service activity of the Regional Superior Product Development Program (PPPUD) was carried out in Belantih Village, Kintamani District, Bangli Regency, on Sunday, June 11, 2023. The training was held at 09.00 WITA until completion by involving the Widya Pertiwi Women Farmers Group. KWT Widya Pertiwi was chosen as the service subject because it is

expected to receive the knowledge provided to further develop the diversity of Micro, Small and Medium Enterprises (MSMEs) in Belantih Village. The service program carried out is exploratory qualitative in nature by going through stages such as: observation, socialization, product introduction, training implementation, product evaluation. The method of approach and work procedures in this service activity are presented in Table 1.

Evaluation of activities is carried out by distributing questionnaires and the results are tabulated and used for follow-up improvements to the next service..

### 3. RESULT AND DISCUSSION

The implementation of the service is carried out in accordance with the predetermined activity method. The first phase of activities begins with observation and identification carried out in March 2023, at the beginning of the PPPUD service, namely observation and seeking information about the potential of the village and citrus groves. In addition, it also explores the problems and innovations needed to further develop the potential of the village. Based on the observation results, some information was obtained about the problems that are often found by the community. The information obtained is: 1) Citrus harvest is

seasonal, where during the harvest season the fruit is abundant and the price is cheap, so many farmers let the citrus fruit turn yellow on the tree not picked and many fruits are wasted due to decay; 2) Citrus crops are sold directly or in the form of fresh fruit with a benchmark price of IDR 5,000 - 10,000 per kg. 3) The harvested citrus fruits are prone to rot if the visitors are quiet; 4) The community recognizes processed citrus fruits as limited in general, such as orange ice and direct consumption of fresh fruit, 5) Low public knowledge about the benefits, properties and variety of processed fruits in depth. Based on the observation and identification of the problem, the preparation of the solution provided is in the form of: 1) Providing education on the processing and utilization of citrus fruits and explaining the benefits of citrus fruits as a whole; 2) Providing training on how to process diversified products made from citrus fruits into high-value innovative products such as marmalade; 3) Provide knowledge on how to label and package products.

**Table 1.** Stages of Orange Fruit Processing Service Activities for KWT Widya Pertiwi

No.	Activity	Output
1.	Observation	Knowing the condition and potential of the orange groves in Belantih Village, Kintamani, Bangli, and identifying existing problems.
2.	Socialization Regarding the Benefits and Processing Programs and Utilization of Citrus Fruits	Providing an understanding of the benefits and efficacy of citrus fruits and their skins as well as business opportunities for processing citrus fruit products; and The activities to be carried out include the types and objectives of the activities.
3.	Introduction to Processing Innovations Citrus Fruits and Explanation	Introduction of product innovations processed marmalade; materials used and needed; as well as production and packaging process procedures.
4.	Training on Making Processed Citrus Fruits	Training participants are able to carry out and make processed jam products according to established procedures.
5.	Evaluation	Tasting the results of preparations and preparations that have been made before to find the advantages and disadvantages of these processed products. Apart from that, it is also to find a solution to the shortage of these processed products so that they become ready-made products.



**Figure 2.** Observation of orange orchards in Belantih Village, Kintamani District, Bangli

The second stage was in the form of socialization of training on processing and utilization of citrus fruits as marmalade which was carried out on June 11, 2023. This socialization activity was attended by 15 participants of the Widya Pertiwi Women Farmers Group in Belantih Village. This stage is the first step of providing a good understanding of post-harvest processing and product innovation. The material presented discussed briefly citrus fruit, its benefits, and properties of the fruit, and explained the potential of Belantih village in the form of a citrus garden located in Banjar Luahan Belantih Village, an explanation of the product diversification system in citrus fruit. The material was delivered by the Service Team assisted by 2 students. Socialization

activities are carried out to provide education about understanding the benefits and properties of citrus fruit and its business opportunities, to put forward the community's mindset regarding the potential of citrus fruit as an innovative product that can be competitive and can inspire the community to be creative and utilize citrus fruit intensively. The socialization of citrus fruit processing and utilization as well as the donation of tools and materials are presented in Figure 3.

After the socialization is carried out, followed by the third stage, namely the introduction or introduction of materials and tools needed in the process of processing marmalade, citrus fruit processing innovations, processing procedures, and production processes to packaging with the aim of empowering the community by providing knowledge about processing materials into an innovative product that has economic selling value. The materials needed to make marmalade consist of several types of oranges, namely Kintamani siam oranges, selayar oranges, squeezed oranges and tangerines as the main raw material, sugar as a thickener, pandan leaves, and cinnamon sticks. The introduction of citrus fruit processing innovations and an explanation of the tools and materials needed as well as the processing procedures are presented in Figure 4.



**Figure 3.** Socialization regarding the processing and utilization of citrus fruits as jam products as well as donations of processing tools and materials



**Figure 4.** Introduction to citrus fruit processing innovations, explanation of processing procedures and the tools and materials needed

There are several steps taken which include: 1) Selection of citrus fruit with good condition; 2) Washing of citrus fruits is done in washing citrus fruits using clean water with a washing process of 2-3 times so that the citrus fruit is completely clean to avoid the remnants of dirt that sticks; 3) The process of cutting the fruit and separating with seeds on tangerine fruit is done to make it easier when squeezing or smoothing the orange pulp; 4) Then proceed with the process of smoothing the orange pulp with sugar; 5) Next is the process of dissolving cornstarch into the orange pulp liquid before the orange juice is heated which is then continued in the cooking process until it thickens; 6) After the cooking process is complete, proceed with the cooling stage before packaging and 7) The last step is the packaging process with jar and labeling.

The KWT Widya Pertiwi conducted the training in accordance with the procedures that had been previously exemplified. Although the implementation is quite good, the service team on duty always directs and fosters continuously. This is done so that the processing process is in accordance with product requirements so that the resulting product has good stability. Because this training aims to enable participants to process with a diversification system in accordance with predetermined stages or procedures. The training on making marmalade is presented in Figure 5 and the final product of marmalade is presented in Figure 6. After the training, the next stage in this community service activity is an evaluation carried out by tasting the final product that has been made. Tasting is done by the training group to feel the taste of the processed product. Through this stage, the shortcomings and advantages of the processed results in marmalade can be found. With the discovery of these factors, solutions and suggestions can also be found for the shortcomings and advantages of the products produced so that they can find the expected final product results. The evaluation of the final result of the marmalade product is presented in Figure 7.

**Table 1.** Level of Understanding of Counseling Participants on Utilization and Processing of fruit into processed jam products

No	Question	Understanding Level of Counseling Participants (%)		
		Very Understanding	Understand	Do not understand
1	What do you think about the counseling material provided?	93.33	6.67	0
2	What is your opinion about the counseling methods provided?	93.33	6.67	0
3	Regarding this counseling activity, are you satisfied participating in it?	Very satisfied	Satisfied	Not satisfied
		80.00	20.00	0
4	Are you willing or interested in practicing the application of citrus fruit processing technology into processed jam products to increase the added value of production when fruit is abundant?	Very interested	Interested	No interested
		86.67	13.33	0

Note: the number of respondents 25 people



Figure 5. Training in marmalade processing



(a) (b) (c) (d)

Figure 6. The final marmalade product. (a) Fresh Oranges, (b) Tangerines, (c) Kintamani Siamese Oranges and (d) Selayar Oranges



Figure 7. Evaluation of the final product of processed marmalade

#### 4. CONCLUSION

The implementation of the service was carried out well, which began with village observation activities to find the potential of the village that could be developed and the problems found. The

potential of the village that was observed was in the form of a Citrus Garden located in Banjar Luahan, Belantih Village. The stages of service activities are continued with socialization, introduction, training, and evaluation activities. In this series of programs, participants were given knowledge and training on citrus fruit processing and utilization procedures to strategies and business opportunities that can be created. This education, it can increase the added value and selling value of citrus fruits can provide innovation to the community to process the latest products so as to develop Belantih Village MSMEs. The results of this service activity showed an increase in overall knowledge where 93.33% of respondents stated that they really understood the remaining 6.67% stated that they understood the material and methods of counseling provided and 86.67% of respondents stated that they were very interested and the remaining 13.33% stated that they were interested in practicing in their own homes. This means that 100% of the participants from the Women Farmers group are interested in improving their skills and applying the technology of processing citrus fruits into processed jam products to reduce the occurrence of fruit spoilage when the fruit is abundant.

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