The empowerment of coconut farmers through the processing of Virgin Coconut Oil (VCO)

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Abstract. The community service program by the empowerment of coconut farmers model in Kabaena Island is motivated by a sense of concern that many coconut farmer who have difficulty in processing their coconut fruit because the price of copra is very cheap which causes losses to farmers. The aim of the program was to form a partnership of coconut farmers with the cooperative to process the coconut into Virgin Coconut Oil (VCO), so that the farmers get more favorable price from selling their coconut fruit. The program was held on January to April 2019 in Kabaena Island which is consisted of six sub-districts namely Kabaena, South Kabaena, West Kabaena, North Kabaena, Central Kabaena, and East Kabaena district. The method used consisted of several phases namely; (1) problem and potential identification; (2) program socialization; (3) Group Formation; (4) Workshop on VCO processing techniques; (5) result inspection; (6) Evaluation and Reflection. The outcome of this program was the formation of two coconut farmer group with 20 members. The VCO result obtained was based on the laboratory analysis of PT Saraswanti Indo Genetech which in accordance to the Indonesian National Standard (SNI).

1. Introduction

Coconut (Cocos nucifera) is one of the plantation commodities has high economic value because all parts of this fruit can be processed into various types of products with high economic value and each of these products has been widely known among the community. The coconut parts which have high economic value such as fruit flesh can produce the pure coconut oil or known as Virgin Coconut Oil (VCO), coir, shell, coconut water, and coconut pulp. According to Zulfadli [1] VCO is a modification of the manufacture of coconut oil so as to produce a product with lower moisture content and acidity, has a clear color and has a long shelf life of 12 months. Gumilang and Pratama [2] suggest that VCO is fatty acid that has medium chain that has been believed to have many functions for health. Although it has a high economic value, but the manufacturing process has not been known by many people.

Kabaena is one of the islands in Southeast Sulawesi province which consist of six sub-districts. The livelihoods of the majority of the island’s population are farmers, especially plantations,
including coconut processors. Coconut has been a mainstay commodity of Kabaena population for decades until now. Generally, the products/process products of coconut produced by the community are copra which is processed traditionally. However, since the few years ago the processed coconut product like copra experienced a substantial price decline which is very detrimental to the farmers. As the result of the price decline of copra year by year, many farmers are forced to no longer process their coconut fruit and are left to rot because the processing costs are higher than the selling price. As of June 2019, the price of copra at the farm level in Kabaena is around IDR 380,000 to IDR 400,000 per quintal or around 3,800 to IDR 4,000 per kg of dry copra. While the price of coconut at farm level is around IDR 600 to IDR 700 per fruit, depending on the location of the land with the processing site. The further the processing location from the coconut land, the cheaper the price of the coconut. The yield of coconut processing into copra ranges from 1:4 or 1:5, depending on the size of the coconut processed. Thus, with the prices mentioned above, for processing farmers it is very difficult to undergo the profession as a copra processor because the result will not be enough to cover the processing cost.

The problem of coconut farmers in Kabaena Island is of course the impact of price decline of copra commodities nationally. Therefore, a solution is needed so that the coconut commodity that has become the icon and mainstay of the farmers since decades ago does not just disappear. In addition, coconut plantation that is still quite large need attention because it is a source of income for thousands of people to save their prosperity. One solution to save the coconut commodities is by diversifying the product by processing coconut into VCO. This program is designed to empower the coconut farmers by involving local cooperatives to process coconuts into VCO so that the farmers get a more favorable price by selling their coconut fruit. Sardu et al. [3] argued that empowerment is a process of society having the ability to increase their assets and attributes and utilize them to improve their standard of living. According to Lyosn et al. the term community empowerment refers to the process by which communities have control and benefits over their activities, and enhance initiatives regarding their own destiny [4].

2. Methodology

The community service program was held on January to April 2019 in Kabaena Island which is consisted of six sub-districts namely Kabaena, South Kabaena, West Kabaena, North Kabaena, Central Kabaena, and East Kabaena district. The method was carried out in several phases namely; (1) problem and potential identification; (2) program socialization; (3) group formation; (4) workshop on VCO processing techniques; (5) result inspection; (6) evaluation and reflection.

The problem and potential identification was carried out by surveys and visits the coconut farmers in six sub districts in Kabaena Island to obtain an overview of coconut farmers, especially the obstacles faced in utilizing coconuts to have economic value. In addition, the identification of farmers who have the potential of coconut plantations and the willingness to join VCO processing business groups is also identified.

Program socialization was conducted after the coconut farmers were identified and joined the VCO processing group. The socialization activity was delivered by giving an explanation of the VCO processing mechanism and the role of sharing system for all group members in the business. The farmers who have the potential and willing to join the VCO processing business unit were then confirmed in groups and partnered with local cooperatives that provide VCO processing equipment.

The VCO processing workshop was carried out by direct practice and provides an explanation of the technicality of coconut processing into VCO. So that all farmers incorporated in the processing unit group understood the stages and techniques of coconut processing into VCO.

At the result check stage, the final result of coconut processing into VCO were examined and carried out laboratory tests to determine the extent to which the VCO produced reaches the quality standards set by the government or SNI. The laboratory tests were conducted in Bogor.

Finally, evaluation and reflection stage aimed to determine the problems and constraints faced by farmers and technical processing of VCO which includes the availability of raw materials, yields, marketing, and management of waste processing.
3. Results and discussion

3.1. The problem and potential identification phase
The potential of coconut commodities in the six sub-districts in Kabaena Island is quite high. Based on the data from BPS of Bombana Regency in 2018 [5], the coconut area in Kabaena Island is 2.595 ha with the production of 2.160 tons of dry copra. To boost the economic value of coconut product in Kabaena Island, the product diversification needs to be done by making the processed coconut products other than copra, such as VCO. The coconut farmers in Kabaena Island generally process the coconut into copra to get cash and have increased over the years. When the copra’s price has decreased in recent years, the coconut farmers have difficulty in getting income because the result of copra products cannot cover the operational cost. One solution to this problem is to process the coconut into another product that has high economic value. However, the main problem is minimal knowledge and skill, specifically related to coconut processing into VCO. In addition, another obstacle is business capital and marketing.

3.2. Program socialization phase
At this phase, the socialization is carried out to potential farmers regarding the work system of the empowerment program through processing coconut into VCO. The farmers are invited to listen to the exposure of group work system including the role of each group member. The working system of VCO processing group is in the form of partnership system with VCO processing cooperatives. The member of the group who are the coconut farmers act as suppliers of raw materials while the cooperatives as the partners act as operators of processing VCO to produce marketing. With the existence of farmers’ partner, the availability of raw materials is more assured, so that the product continuity is maintained. In addition, the socialization also emphasized the quality of raw materials. The supplier farmers have a responsibility for the quality of raw materials that have been established, while the cooperatives give the premium prices for raw materials provided by farmers’ partner. The price potential given for farmers’ coconut is IDR 700 per item, while the price of coconut at copra processing farmer is IDR 500 up to IDR 600 per item. So, at this price, the farmers can get a fairly good price increase. In addition, to act as a raw material supplier, the farmers are also given the opportunity to become employees who are employed in processing coconut into VCO. The target for processing coconut is 600 coconuts per day. By the work period of 25 days for one month, the coconut raw material needed to be processed in one month is 15,000 coconuts. While the target of the VCO results obtained is 1,250 liters per month with a target yield of 1:12.

Figure 1. The workshop and processing of VCO
3.3. Group formation phase
At this phase, 20 farmers were identified who were willing to join the group form and partner with VCO processing cooperatives. Based on the results of the agreement, two farmers group were formed. Each group consisted of 10 people. While there are 20 other farmers who intend to be partners, but have not decided to form a group. The cooperative that become the partner of farmer group is Koperasi Jaya Bersama which already has a legal entity and registered in the cooperative office of Bombana Regency. In addition, it is also registered at the ministry of Cooperatives and Small and Medium Enterprises of the Republic of Indonesia with a number of legal entities 015/BH/16.2/XI/2002 with the Cooperative Registration Number of 7405020010003.

3.4. The workshop on VCO processing
The workshop aims to provide understanding and introduce to the coconut farmers how the VCO processing equipment works. At this phase, the farmers are given a good understanding of the work process of processing equipment and the importance of maintaining the quality of raw materials so that the high quality of VCO oil yield is obtained based on the Indonesian National Standard (SNI). The steps of VCO Processing are explained in the figure 2.

![Figure 2: The flowchart of VCO processing](image)

3.5. The result of inspection phase
The final result of the coconut processing in form of VCO was examined in PT Saraswati Indo Genetech Laboratory addressed in Bogor by referring to the provisions of SNI in April to May 2019. The results of the examination are presented in Table 1. Based on the result of the laboratory test, the processed VCO has fulfill the Indonesian National Standard.

| No | Parameter                  | Unit | Result | Standard Limit of detection | Method                                      |
|----|----------------------------|------|--------|----------------------------|--------------------------------------------|
| 1  | Iod number                 | Wijs | 6.28   | 4.1 – 11.0                  | AOAC Official Method 993.20 (2005)         |
|    |                            |      |        |                            | AOCS Official Method Ca 2b-38              |
| 2  | Water and ingredients      | %    | 0.15   | Max. 0.2                   |                                            |
|    | yawning                    |      |        |                            |                                            |
| 3  | Smell                      | -    | Typical coconut fresh, no rancid | Typical fresh coconut, Not rancid | SNI 01-2891- 1992 point 1.2 |
|    |                            |      |        |                            |                                            |
| 4  | Color                      | -    | Pale yellow | Colorless until pale yellow | SNI 01-2891- 1992 point 1.2 |
|    |                            |      |        |                            |                                            |
| 5  | Taste                      | -    | Normal, typical coconut oil | Normal, typical coconut oil | SNI 01-2891- 1992 point 1.2 |
|    |                            |      |        |                            |                                            |
| 6  | ALT                        | colony/ml | <10  | Max. 10 | SNI 7381 : 2008 point B.8.2 |
|    |                            |      |        |                            |                                            |
| 7  | As                         | mg/kg | Not detected | Max. 0.1 | 18-13-1/MU/SMMSIG, |

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### Table 2. The evaluation results of the community service program

| No | Target of each phase                              | Results                                                                 | Gap   |
|----|--------------------------------------------------|-------------------------------------------------------------------------|-------|
| 1  | Problem and potential identification             | A survey was conducted in 6 sub-district                                | No    |
|    | Survey in six sub-district                       |                                                                         |       |
|    | Farmers’ problem identification                  | Farmers’ problem are identified                                         | No    |
|    | Farmers’ problem identification                  |                                                                         |       |
|    | The identification of potential and the availability of the coconut | The potential of farmers and the availability of the coconut are identified. | No    |
|    | Accessibilities identification                   | The accessibilities condition is identified                             | No    |
|    | Accessibilities identification                   |                                                                         |       |
| 2  | Program socialization                            | The socialization is conducted to the farmers                           | No    |
|    | Socialization to the potential farmers           |                                                                         |       |
|    | The farmers understand the scheme of the empowerment | Not all farmers understand the scheme of the empowerment                | Yes   |
|    | The farmers interest to be partners              |                                                                         |       |
|    | Group Forming                                    |                                                                         |       |
| 3  | At least 2 groups are formed and be partners     | 2 groups of coconut farmers are formed                                  | No    |
|    | At least 2 group who interested to               | 2 groups were identified as interested                                  | No    |
No  | Target of each phase  | Results  | Gap |
--- | --- | --- | --- |
4   | VCO processing technique workshop  | All group members are active in workshop  | No |
5   | Result inspection  | Rendemen 1:14  | Yes |

Table 1 above shows the identification several things that have not achieved the result based on the target that in point of the understanding of farmers about the empowerment schemes, the interest of the farmers to become partners, and the yield has not been as the target. Based on the evaluation result, the lesson obtained on the empowerment of the coconut farmers are; (1) additional time is needed to provide understanding to the coconut farmers about the empowerment scheme that will be implemented; (2) the process of processing coconut into VCO needs to pay attention to the better raw materials to fit the expected yield. According to Muis [6] the age of coconut harvest affects the yield of VCO. The higher the harvest age, the higher the yield obtained.

4. Conclusions
The community service program with a farmer empowerment model succeeded in creating two farmer groups with 20 members. The VCO results obtained based on the analysis of PT Saraswati Indo Genetech Laboratory are in accordance with the Indonesian National Standard (SNI)

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