



Analysis of Processing of Clove Essential Oil In Lawulo Village Samaturu Sub-District Kolaka District

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Abstract

The objectives of the study were to train clove farmers group about the post-harvest handling system in order to produce essential oils with export quality, to train clove farmers group in terms of essential oil processing system as well as to encourage clove farmers group to apply appropriate technology for processing of clove essential oil with export quality. In general, the main and most common problems faced by clove farmers are inadequate system of clove essential oil processing system, the handling system and equipment used are not up to standard, moreover, the technology used in handling, durability, and package of clove essential oils still very limited. The approaches offered and agreed by the clove farmer group are as follow: (1) General approach, (2) Determination of training participants, (3) Types and procedures of training (training strategy), and (4) Scale of the program. The expected targets and outcomes of this community service program are: Farmer groups are able to apply appropriate technology in the production of clove essential oil, both to post-harvest handling, processing and storage of clove essential oils to obtain added value. In fact, knowledge of farmers about post-harvest handling and processing technology of clove essential oil to increase farmer's income is still very poor. The results of analysis of essential oil clove processing showed that the clove leaves utilization as an effort to create an added value of farmer's income by Rp. 13,000,000 per production unit. The difference in selling price between the dried clove leaves and processed clove leaves into essential oil was Rp. 10,765,000. Comparative test (t-test) showed that t-count value for selling dried clove leaves was 16,068 while clove leaves processed into essential oil was 35,108. The t-table value of 1,675 indicated that $t \text{ count} > t \text{ table}$ where H_0 is rejected and H_1 is accepted. It concludes that there is a comparative income of farmer who sells dried clove leaves and farmers who sell clove leaves in the form of essential oils.

Keywords: Clove Farming, Essential Oil and Comparative

A. Background

Agribusiness is a comprehensive concept, that is the unity of business include the production chain, processing, and marketing of the product relate to agriculture in a broad sense. The economic crisis that has plagued Indonesia since July 1997 has made many non-agricultural industry businesses bankrupt, while agricultural products remain dependable as it contributes

substantially to the country's foreign exchange, thereby achieving an acceptable progress level, particularly in non-oil and gas commodity exports that are very important for industry sector processing. Agroindustry is an alternative to balance the economic growth as well as to create employment through an export-oriented economy which simultaneously providing millions of new jobs, particularly in rural areas (Soekartawi, 2013).

Agroindustry is an option because the agricultural sector is still the main source of livelihood of the population and the largest contributor in Gross Domestic Product (GDP). Agroindustry activities are an integral part of the agricultural development. The agroindustry effect is capable of transforming the primary product to the processed product as well as transforming the culture of low added value into a modern industrial work culture with a high added value (Mujrin, 2016). In Kolaka District, clove is a commodity of plantation crop that is able to contribute the largest in gross domestic product (GDP). From the data of Central Bureau of Statistics (BPS) of Kolaka District in 2015, it shows that the production of clove leaves is 159,225 quintal which is one of the districts with the largest production in Southeast Sulawesi province.

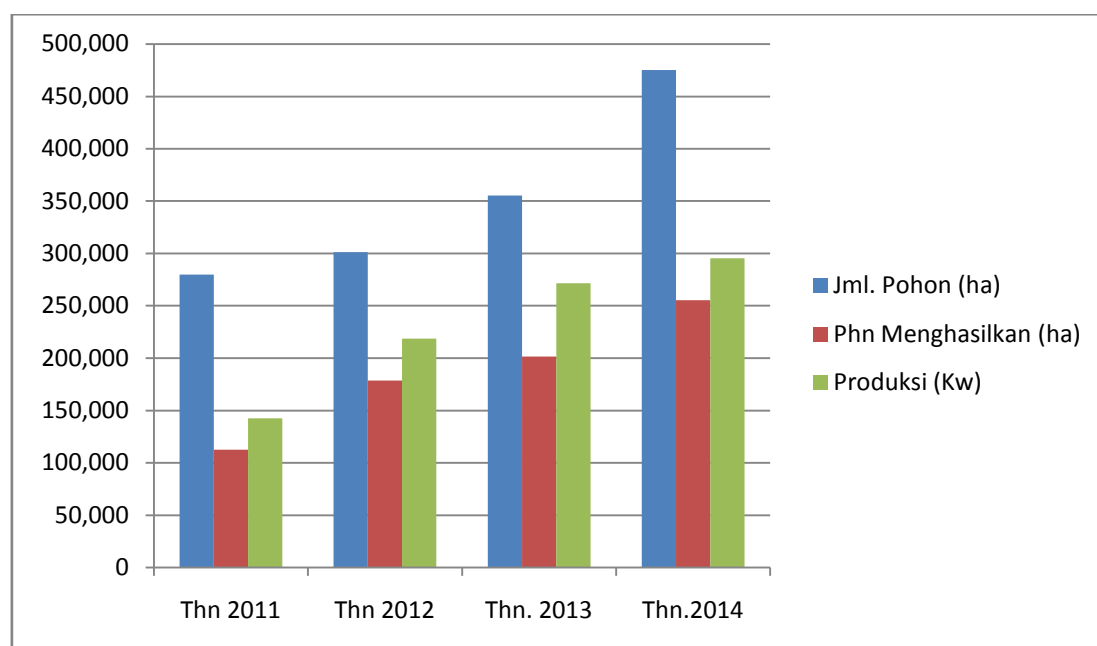


Figure 1.1 Clove leaves production in Bombana District

Source: BPS of Kolaka District, 2015.

The problems generally faced by clove farming group, are ; Inadequate system of clove essential oil processing, handling systems and tools used are not up to standard, limited technology of Clove essential oil handling, durability and packaging of cloves essential oils is still poor, and the abundance of clove leaves production which can have added value to the clove farmers.

B. Method

1. *Procedur of the Program*

Procedures for training and mentoring program to be provided to the partner groups of Lawulo Village Samaturu Sub-district Kolaka District includes four main activities, (1) General approach, (2) Determination of training participants, (3) Types and training procedures (training strategies) and (4) The scale of the program.

- General approach. This program is an activity of education and training, in addition to provide knowledge to trainees, it also trains with focus group discussion method as well as practice in class.
- Determination of training participants. Determination of training participants and assistance will be done by Purposive Sampling method by directly selecting the members of farmer group in Lawulo village who have clove land as well as clove leaf seller. The number of trainees planned is 15 people.,
- Data Collection. The data used is secondary data obtained from related institutions.
- The Scale of the program. This community service program will be carried out in Lawulo Village, Samaturu Sub-District, Kolaka District.

2. Training Method

The methods used in the training and mentoring include: (1) Practice and exercise in the class, (2) Description of constraints faced in business development, (3) Practice of Cost and Revenue Analysis of the processed resource of clove essential oil processing.

3. Scope and Design of The Program

The implementation of the training is divided into four steps: (1) Preparation of socialization to the partner group, (2) Determination of the participants based on business group, (3) Training and Mentoring, and (4) Partner group Participation.

- Preparation. At this step, the preparation starts from the socialization to the target group partners, Program introduction to community figures and government officials about the plan of community service program, determining the location of the implementation of community service program.
- Determination of the participant and group. The results of socialization obtained the data of the number of clove farmer group members. Participants are divided into 2 groups.
- Training/Mentoring. Training and mentoring are conducted in 3 (three) stages: (1) Lecture at the class, (2) Practice and exercise in class as well as discussion and simulation, (3) Practice in the business field of each participant (teorical study based on the facts in the field). Mentoring activities to the partners group, the production/processing of clove oil, even though this program has finish but still under supervision and coaching until the farmer are really considered professional and independent for managing the business. In addition, analysis of productivity and income is conducted to know how much production and income obtained by the clove oil processing group in a month production period.
- The responsibility for partner participations in this program are. To participate directly in program activities, to assist in determining which group members will be invited as participants, division of the group of clove essential oil processing, coaching/group mentoring.

The ingredients for clove essential oil can be made from dried clove leaves, the feasibility depends on market demand; the purpose and the next process. Some essential oils which are popular raw materials in the community are clove essential oil and patchouli essential oil. Production of clove essential oil is divided into two processes that are the process of clove leaves cooking and distillation of clove essential oil.

4. Tools and Materials

Tools in manufacturing of clove essential oil :

- Stove
- Mixer
- Distillers
- Container/Drum
- Bucket
- Pipe
- Jerrican
- Weightscale

Materials used are as follow :

- 500 Kg dry clove leaves
- 2 Cubic of firewood
- 5 Liter Fuel oil (BBM)
- ½ cubic of clean water
- Plastic drom
- Basin
- Matches

5. Tools and Materials

Clove essential oil processing begun by collecting firewood under the stove which is then watered with kerosene and burned with matches, dried clove leaves then put into the stove, after cooking process lasts about 1-2 hours cramping cheek from the stove is opened, then the distillation process began. The essential oil of the distillation process is added to the plastic

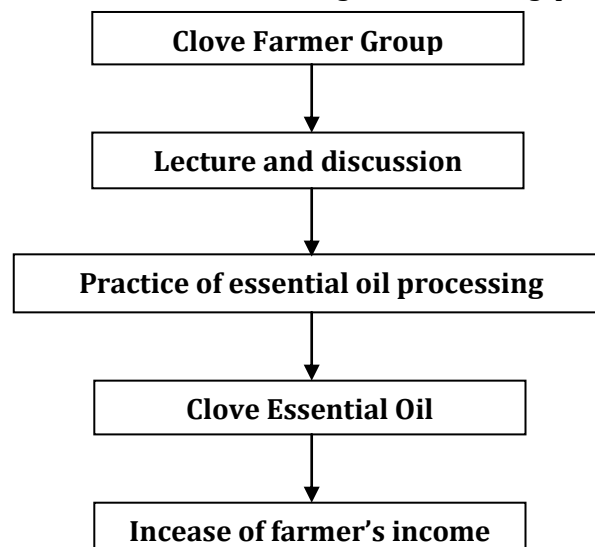
drum for the cooling process, subsequently, after cooling for less than 10 hours, the essential oil is spilled on the basin to separate the essential oils and water. Furthermore, essential oil is inserted at 20 liters of jerrican and then weighed and packaged for export purpose.



Figure 1.2 Tools and materials used for processing dried clove leaves into clove essential oil

Outlook of Study of Clove Essential Oil Processing Which Transfers to the Farmers Joining in the Farmers Group

- The training of essential oil has not been implemented maximally where clove farming groups have not utilized and doing the processing of essential oil of clove proportionally with post harvest handling still be traditional. It caused the quality of the resulting product is still low which then affects the pricing. Thus, farmer groups Mamminasae need to be trained and mentored as well as packaging methods training using approach technology.
- After receiving training and mentoring, it is expected that clove farmers group will conduct essential oil processing which can be a high selling product and create employment for farmers and their families. The flow of training and mentoring program are as follows:



C. Discussion

The results of the study of clove leaf processing to clove essential oil products during the held of community service. Based on the result of the survey in the field, it can be seen that the location of farmer group Mamminasae with clove plants that potentially get clove leaves as a raw material of essential oil processing. Prior to the training, the socialization is attended by community figures and government officials about community service with the theme of "clove leaf processing into essential oil with economic value". The results of socialization on the target group (partners), community figures and government officials concluded that most of the farmers in Lawulo Village, Samatuuru Sub-district of Kolaka District agreed to this program.

Clove plant on the farmer's land is intensively cultivated, during the harvest season leaves miscarriages along with the leaves falling from the clove fruit. Clove plants that produce clove leaves are marketed in large quantities but in very low price. The price of clove leaves is unstable, thus, dried clove leaves are sometimes left scattered under clove trees.

The problems faced by clove farming communities can be overcome by:

1. Conducting training on post-harvest handling system well, in order to get a high quality essential oil to gain added value.
2. Conducting practice and mentoring to the community about the processing of dried clove leaves into clove essential oil. Encourage clove farming groups to apply appropriate technology in processing and packaging essential oils to improve quality.

Implementation of community service program is held on October 7 to October 17, 2016, in Lawulo Village, Samaturu Sub-District, which is attended by 10 participants. Program include the delivery of materials by lecture method and discussion. The lecture method is conducted to convey a variety of general information about how to processing the clove leaves into essential oils, market opportunities by trying to diversify food, post-harvest handling of cloves. On this occasion, it is conveyed that the clove plant is a very useful plant for medicinal, cosmetic, and spices purposes.

The driving factors of this program are:

1. Technology of post-harvest handling of clove leaves to produce quality clove essential oil and in order to extend the durability of the storage.
2. The raw material of clove essential oil is abundant and easy to found.
3. The technique of processing and packaging of clove essential oil very easy to do.
4. Great curiosity of the trainees about how to extend the storage durability and to gain an added value from clove essential oil.

While the inhibiting factors in this program are:

1. Most of the farmers in this area are farmers who cultivate clove without using the technology of post-harvest handling.
2. Lack of farmers knowledge about essential oils.
3. Marketing scheme.
4. The technology of essential oil packaging is still very limited.

An effort of diversification of clove leaves products is one of the opportunities to increase the economic value of not utilized raw materials into a product with an economic value. Business profit/income are analyzed using Soekartawi's (2002) formula, as follow:

$$Pd = TR - TC$$

Whereas:

$$Pd = \text{Profit/income (Rp)}$$

$$TR = \text{Total Revenue (Rp)}$$

$$TC = \text{Total Cost (Rp)}$$

Result of Analysis of Clove Essential Oil Processing Per Production Unit:

1. The cost of clove essential oil processing

-	Clove leaves	500 Kg	Rp.	1,500,000
-	Firewood	1 cubic	Rp.	320,000
-	Food	3 people	Rp.	150,000
-	Fuel	2 ltrs	Rp.	20,000
-	Manpower	3 people	Rp.	225,000
-	Jerycan20 Liter	1	Rp.	20,000
	Total		Rp.	2,235,000 (TC)
2. Resulted Product

-	20 Kgs Clove Essential Oils	
-	Price/kg	Rp. 650,000
-	20 Kg X Rp. 650.000	= Rp. 13,000,000 (TR)
3. Profit/income per production unit (Pd)

Profit/income per production unit = production revenue - production cost
 Rp. 13,000,000 - Rp. 2,235,000 = Rp10,765,000,-
4. The difference profit/income of dried clove leaves and processed clove leaves into essential oil is Rp. 10,385,000,-

Comparison of farmers revenue of selling clove leaves in the form of dried clove leaves and clove essential oils

The result of mean different test analysis of farmer's income who sells clove leaves in the form of dried clove leaves and clove essential oil can be seen in the following table:

Tabel 1.1 Results of comparative analysis for revenue of clove farmers who sell dried love leaves and essential oil by using t-test

Detail	Selling of Dried Clove Leaves	Selling of Clove Essential Oil
Revenue	Rp.1,950,000	Rp.10,765,000,-
t _{count}	16.068	35.108
t _{table} ($\alpha = 0,05$)	1.675	1.675
Explanation	t _{count} > t _{table} H ₀ rejected H ₁ Accepted	

Source: primary data, analyzed in 2016.

The results show that the income of farmers selling dried clove leaves is Rp.1,950,000 / ha and that of the form of essential oils of Rp. 10,765,000/ha. The comparative test (t-test) suggests the t-count value for those farmers who sell dried clove leaves of 16.068 and 35,108 of essential oil. t_{table} of 1.675 means t_{count} > t_{table} then H₀ is rejected and H₁ is accepted, which concluded that the hypothesis of comparison of farmers income who sell dried clove leaves and farmers who sell essential oils is accepted.

D. Conclusion and Recommendation

Based on the study of clove essential oil processing, it can be concluded that:

1. Knowledge of farmers about post-harvest handling and clove essential oil processing technology in an effort to increase farmer's income is not adequate.
2. The analysis of clove essential processing suggests the earned income of Rp. 13,000,000
3. The difference of price of clove leaves in the form of dried clove leaves than clove leaves processed into essential oil is Rp. 10,765,000,-
4. Comparative test (t-test) suggests t_{count} for dried clove leaves selling of 16,068 and essential oil selling of 35,108, t_{table} of 1,675 indicates that t_{count} > t_{table} then H₀ is rejected and H₁ is accepted, so it concluded that the hypothesis of comparison of farmers income who sell dried clove leaves and farmers who sell essential oils is accepted.

Based on results of the study, it suggested that more intensive counseling is needed to increase the farmer knowledge on technology, marketing information, post-harvest handling. It is also necessary to motivate the farmers to increase their income.

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