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DEVELOPMENT OF COCOA SEED PROCESSING AS IMPROVEMENT FARMERS REVENUES IN TANAH DATAR DISTRICT WEST SUMATERA

Heru Pramudia, Mike Triani, Arief Maulana
Universitas Negeri Padang
E-Mail: pramudia.heru@ffp.unp.ac.id, miketriani@fe.unp.ac.id, arief@fe.unp.ac.id

ABSTRAK

Cocoa is one of West Sumatera's plantation commodities which also plays an important role as a producer of regional income, as well as providing employment and income sources for farmers. World demand for cocoa is still very high that every year has increased. Koperasi Kakao Mandiri Prima is one of the leading cooperatives in Jorong Cubadak District Five Kaum Tanah Datar regency. This cooperative is very close to the tourist destination of Istano Pagaruyung Batusangkar. With the tourism activities of course processed chocolate products can be souvenirs typical of this area.Koperasi Prima Mandiri Prima has a member of 46 people who are reliable in managing cocoa plantations, there are two obstacles in terms of planting. The first processing of cocoa beans has not experienced the fermentation stage so that the post-harvest quality is less. The two new cocoa beans processed in the form of cocoa powder and not yet produced as a processed chocolate products that can be souvenir for tourists. The method of implementation of this activity will be carried out with group discussion and material understanding for participants of Cocoa farmer members. Based on the results of the group discussion and the delivery of the material, the participants stated that they failed to implement the fermentation of cocoa beans into a quality chocolate. This is because they do not understand technically the process. This is certainly one of the problems for the government to increase cocoa production in the area. Furthermore, there has been no introduction and training in processing cocoa beans into processed food products that can increase the income of local communities. Therefore, it is necessary to review how the development of cocoa seed products in this flat land regency in order to increase the income of cocoa farmers and to increase the added value of production.

KEYWORDS: *Value added Production, Income and Welfare.*

1. Introduction

Indonesia's cocoa production has increased since 1980 and Indonesia is predicted by 2025 to become the world's main producer of cocoa, because in that year the total area of Indonesian cocoa plantation is estimated to reach 1.35 million ha with production of 1.3 million tons / year of cocoa beans (Ministry Agriculture, 2005). But in 2011 the government set a policy, namely raising export tax rates cocoa beans. In addition, the quality of cocoa beans in Indonesia is still at level 3 and 4 because most of the cocoa processing into cocoa beans do not go through the fermentation stage. Whereas the stage of fermentation is an important stage in shaping the taste of cocoa beans. So the price of Indonesian cocoa beans is cut by 10-15% in the international market, especially in the United States (Ministry of Agriculture, 2005). Responding to the problem of low quality of cocoa beans, the government must immediately undertake the downstream program of cocoa industry and attempt to reform the technology in cocoa seed processing.

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Most of Indonesia's cocoa beans are obtained from the processing bunch of people who are not oriented to quality. The low quality of the beans processed by cocoa farmers is caused by the lack of processing facilities, low quality control and the application of traditional technology. In each stage of the process occurs the formation of typical cacao flavors and the reduction of unwanted flavors, such as bitter taste and sepat. The quality of seeds and cocoa products is determined by the treatment at each stage of the process, such as place and operating conditions during processing. Thus knowledge of cocoa processing technology is needed to produce quality cocoa beans and products.

Other problems related to improving the welfare of cocoa farmers precisely in Kakao Mandiri Prima Cooperative is one of the mainstay cooperatives in Jorong Cubadak District Five Kaum Tanah Datardi regency, that is, there is no briefing and training for the surrounding community about processing cocoa beans into processed chocolate products that sell high. In some areas of Indonesia, chocolate and its products have become a favorite tourist destination that educates the public. One of them is located at Banteng Blorok Road 18 Plosorejo Village, Kademangan Sub-district, Blitar Regency, East Java, Kampung Cokelat become educational tourism destination. In Kampung Cokelat, visitors can follow the process of processing of cocoa from fruit to become various processed chocolate products ready to be served as the main menu of the tour. Not only see, visitors are also given the opportunity to take part in the process of chocolate production through cooking classes. Tanjung Subur Farmer Group, Kapalo Koto Village, South Payakumbuh West Sumatera, also offers an alternative tour in Payakumbuh City, as a brown village tour. Activities that can be obtained is to see directly the process of cultivation of cocoa trees, ranging from seeding, seeding, planting to see the fruit of cocoa that is ready to be processed into chocolate (bow: 2016). Meanwhile the Department of Investment of Integrated Services and Industry of Kab. Padang Pariaman is proud to introduce the Molibou Chocolate Culinary tourism destination located in Padang Pariaman District.

Processing of cocoa beans as peniongkatan earnings of farmer groups to review various aspects of cocoa processing, ranging from post-harvest process to get cocoa beans to the processing of seeds to get the main products of cocoa, namely cocoa liquor, cocoa butter, and cocoa powder. So that later this training knowledge training is expected to help the development of cocoa processing technology to be downstream products.

Figure 1: Kakao Mandiri Prima Farmer Group
Jorong Cubadak Kecamatan Lima Kaum Tanah Datar District
Source: Documentation of Service (2017)

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2. METHODS AND RESULTS

2 1 Post-Harvest Production Process

Fruit picking is done by cutting the fruit stalk using the help of a tool such as pruning shears, machetes, or sickles. Cutting the stalk is done as close as possible to the fruit that leaves a stalk with a length of about 1-1.5 cm. This fruit stalk is an investment because the new cocoa flowers will grow in this fruit stalk. Harvesting by twisting fruit, kicking, or pulling fruit is not recommended because it can damage the stalk and injure the plant. Broken fruit stalks can no longer be overgrown with cocoa flowers so that the fruits can not grow there again, whereas the wounded plant skin will be easily infected by pathogenic fungi. For fruits located on hard-to-reach parts, picking fruit is done with the help of a barrel pruning scissors. Harvesting using poles alone is at risk of damaging the fruit stalks and plant skins. At the cocoa fruit harvest stage to be considered is perfectly mature cacao fruit that has perfectly changed the color of the fruit, from which when raw green to yellow when ripe, or from which when raw red to old orange. The fruit stalks begin to dry. Cacao fruit sounds when shaken or shaken.

Figure 2: The Change of Cocoa Fruit Skin Color
Source: Bursatriannyo (2016)

After the cocoa fruits are harvested and the seeds are separated, the process stages to obtain ready-to-sell cocoa beans is called the post-harvest stage. This stage is so simple that it can be done by cocoa farmers around the plantation area. Although simple, in the post-harvest stage especially fermentation and drying is an important stage in shaping cocoa flavor.

a) Fruit Grinding

Fruit grooming aims to uniform fruit maturity, in addition to facilitate the expenditure of seeds from cocoa fruits. Cacao fruits are collected in baskets made of rattan or the like and are covered. Fruit storage is done in the shade for 5-7 days. After the cultivation is finished, the cocoa beans are removed from the cocoa fruit (solving process) and then fermentation process is done.

b) Fruit Skin Splitting

The breaking of the fruit is meant to remove and separate the cocoa beans from the skin of the fruit and its placenta. The breaking of the fruit should be done carefully so as not to injure or damage the cocoa beans. Besides, it should also be kept so that the cocoa beans remain clean not mixed with dirt or soil. Cracking cocoa fruit should

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use a wooden bat or hit one with other fruit. Care should be taken to avoid direct contact with cocoa beans with objects made of metal because it can cause the color of cocoa beans to gray. After the skin is split, cocoa beans are extracted from the fruit slices and pith bonds (placenta) by hand. Hand hygiene should be highly regarded because the contamination of chemical compounds from fertilizers, pesticides, oils and impurities, can disrupt the fermentation process or contaminate the end product. Healthy seeds should be separated from disruptive and diseased seeds, then put in plastic buckets or clean plastic bags to take to the fermentation site, while the pith attached to the seeds is removed. These healthy seeds should be immediately inserted into the fermentation container due to delays or processing delays can negatively affect quality due to uncontrolled pre-fermentation. In cocoa processing with large capacity, can be used cocoa fruit peeler.

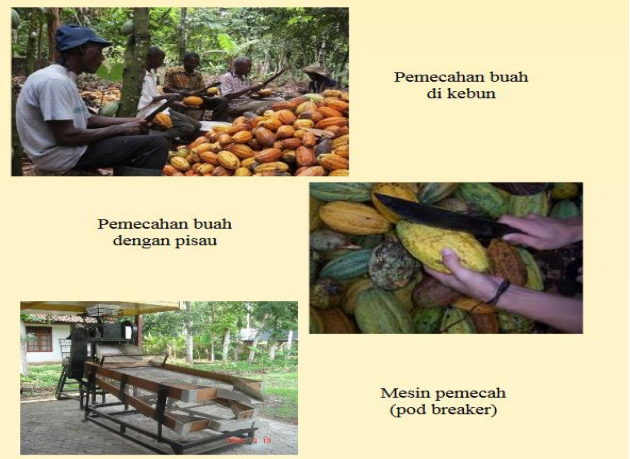

Figure 3: Breaking of Cocoa Fruit
Source: Training of Master Facilitator (2018)

c) Fermentation.

The process of fermentation aims to improve the taste of cocoa beans. The differences in microbial activity on fermentation affect the taste of the cocoa beans and the resulting chocolate products. Conventional fermentation process of cocoa beans or spontaneous fermentation generally takes about 5 days. Fermentation aims to release the pulp (a fluid in the form of mucus found on the surface of the cocoa bean's skin), stopping the growth of sprouts in the seeds, and forming distinctive colors and flavors. Another purpose of cocoa bean fermentation is to produce seeds that are resistant to pests and fungi during storage. Fermentation can be done in a box made of wood. Next the box is covered with burlap sacks / banana leaves for 36-48 hours. Most of the pulp attached to the cocoa beans will be converted to alcohol, acetic acid and lactic acid. On the 3rd day, stirring is done so that the fermented seeds are evenly distributed. Stirring is done every 48 hours once, then the cocoa beans are removed from the fermentation box after 8-10 days [Afoakwa, 2010].

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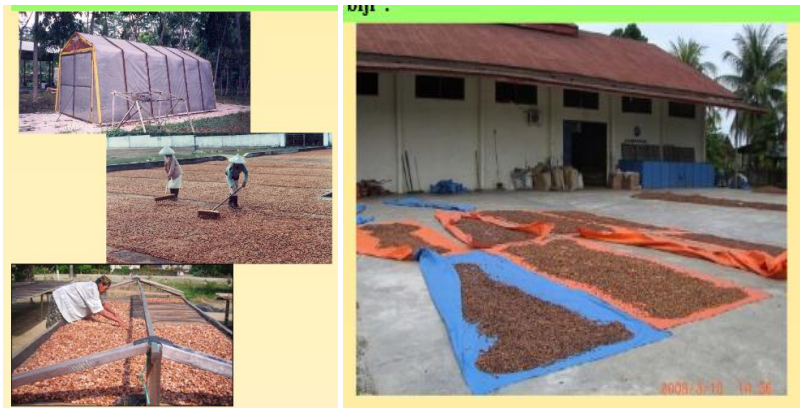
Figure 4: Fermented Cocoa Beans
Source: Training of Master Facilitator (2018)

d) Soaking, Washing, and Drying

The fermented beans are then immersed in water for 3 hours, then washed to remove residual pulp. Soaking and washing aims to stop the fermentation process and improve the appearance of seeds and eliminate the sour taste in cocoa beans. After the immersion and washing process is complete, then the drying stage is done. Drying of cocoa beans aims to reduce the water content up to 7-8% so that the cocoa beans can be stored for a long time and not overgrown with mushrooms (Afoakwa, 2010). Natural drying, the seeds are spread on the cement floor or given a clean sheeting sheet. Given a protective fence to avoid cattle or animals. Drying away from smell and smoke. Drying can be equipped with plastic cover. Drying can also be done above para-para. Drying in sunlight requires 3-7 days. Seeds are flipped every 2-3 hours for uniform drying (Training of Master Facilitator, 2018).



Figures 5: Fermented Cocoa Beans and Fermented Products
Source: Training of Master Facilitator (2018)

e) Sorting; Packaging and Seed Storage

The dried cocoa beans are then cleansed of impurities and sorted to separate the seeds according to their quality. The discharged cocoa beans are then packaged in sacks of 60 kg and then stored in a clean and dry place but have adequate air circulation (Ministry of Agriculture, 2005).

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2.2 Cocoa Bean Processing

The main products of cocoa processing, namely brown liquid (cocoa mass or cocoa liquor), cocoa butter (cocoa butter) and cocoa powder (cocoa powder). Liquid liquid and slippery liquid is produced from grinding cocoa core core. Cocoa fat is an oil contained in cocoa beans, generally ranging from 50-60%. Meanwhile, cocoa powder obtained by separating cocoa oil or fat from brown liquid then grinding process until obtained brown powder.


Cocoa Mass (Liquor)


Cocoa Butter


Cocoa Powder

Figures 6: Cocoa Processed Products
Source: Allbiz (2018)

There are two processes commonly used in processing cocoa beans into products, namely conventional and solvent process. Conventional process consists of several processes, namely seed cleaning, breaking and winnowing, sterilization, alkalization, drying and roasting, grinding, pressing, crushing, pulverizing and stabilizing. The process of extraction of cocoa fat in the conventional process is done mechanically so that the fat content of cocoa powder is still around 10-20%.

a) Cleaning, Breaking and Winnowing

Cocoa beans to be processed first cleaned from foreign objects that can reduce product quality. The impurity can be a piece of wood and soil, as a cleaning agent used in the form of air blowing (winnoing). The clean cocoa beans are then separated from their shells at the breaking and winnowing stage. Shells and partially separated kernels (nibs) can be used as organic fertilizer for cocoa plantations.

b) Roasting

Cocoa beans are roasted to evoke the distinctive flavor of chocolate that has been formed during the fermentation and drying process. During the roasting process, there are some changes in the physical and chemical properties of the seeds, which reduces the shell that is still carried, removes the seed water content up to 2%, and eliminate substances that cause acid taste. Roasting temperatures vary between 90-170 0C depending on the roasting method used (Afoakwa, 2010). There are three methods commonly used in the cocoa industry: whole bean roasting, roasting nibs and liquor roasting. Whole bean roasting is a traditional roasting method commonly used to produce chocolate liquids. In this process, the seeds are roasted before being separated from the shell and the heat generated in this process helps the removal of the shell from the kernel. Nibs roasting is done after the cocoa core separation from the shell, The process of nibs roasting allows nib to improve the taste of cocoa products. Some shortcomings of the process of nib roasting and liqour roasting ie shell should be

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separated before baking, the shell does not separate well in this process especially for some types of cocoa.

c) Grinding

Grinding process serves to change the core of cocoa into a brown liquid or also called cocoa mass (cocoa liquer). The main purpose of this process is to form a brown liquid so that in the next process will get a smooth brown texture and has a distinctive chocolate flavor. There are several types of grinding that are used to reduce the size of the core into liqour, such as stone mills, disc mills, hammer mills and ball mills. The choice of grinding type depends on the core characteristics of processed cocoa and the desired product quality. The core of cocoa has a fat content of 55% which is mostly found in cocoa bean cells. The brown liquid is solid at room temperature. The grinding process takes place in several stages of the process and requires heat to melt the brown fat to form a brown liquid. Chocolate liquids are stored in storage tanks at 90-100 ° C to prevent growth

d) Pressing

Half of the core weight of cocoa is oil or fat and about 78-90% cocoa fat is obtained from the process of mechanical extraction (forging) of cocoa mass (Afoakwa, 2010). Cocoa fat, extracted using the forging method at a pressure of 520 kg / em '. The result of forging is a cake that still has cocoa butter. Cakes that have 22-24% fat content are called high-fat cakes and cakes with 10-12% fat content called low-fat cake. The fat content in the cake can still be reduced to 5-9% by conventional forging method. However, it requires the same energy with energy for the initial pressing process.

e) Stabilizing

Chocolate powder is formed from cocoa cake. The finely chocolate powder is then cooled (Stabilizing) so that the cocoa fat found on the brown powder crystallizes and becomes a more stable form. Temperatures above 27 ° C may result in cocoa fat found on the brown chocolate powder and form a solid clot.

2.3 Processing Chocolate Home to Candy

Making chocolate from cocoa beans is not a simple process. Implementation at the factory requires a sophisticated and costly set of equipment. But that does not mean you do not make chocolate with simple equipment at home. The seeds used are fermented. Roasting, roasting at the plant requires sophisticated and expensive equipment that can cultivate cocoa beans in considerable volume. But for home processing, you can use the toaster. You can put the cocoa beans in the toaster tray and then put into the oven for 5 to 30 minutes, depending on the number and type of seeds and aroma you want to achieve. Or you can "menggongseng" on top of a cauldron with a heat source of fire coming from the stove. Breaking Winnowing, an agian that is processed to obtain chocolate is part of the cotyledon or inside which is covered by the outer shell. Where the outer shell or shell should be removed and discarded. Can use ballast to destroy the outer shell (crushed crushed), then separate using hair dryer to get rid of the outer skin. Grinding and Refining, after the inside you have obtained then you grind it (grinding) by using a blender. Once the result is shaped like a

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paste you can then mix it with milk, sugar, butter and other additives. Warm up, after heating and then chocolate heated. Actually this is a complicated process but you can put your processed chocolate into the microwave after that in the blender again to make it smoother and the brown particles smaller, after it is printed.Membuat coklat dari biji kakao bukanlah proses yang sederhana.

3. CONCLUSION

Processing cocoa fruits into downstream products include post-harvest processing and cocoa bean processing. Post-harvest processing products in the form of cocoa beans are further processed into cocoa liquor, cocoa butter and cocoa powder. The most influential factor on the quality of cocoa beans in post-harvest processing is the fermentation process. Conventional fermentation method can be done by using box and basket as a place of fermentation. The length of fermentation time and the amount of pulp used in fermentation have an effect on the quality of fermented cocoa beans. Drying of cocoa beans is done by drying the fermented cocoa beans in the sun. Processing cocoa beans into cocoa main products involves the process of heating, milling, and extraction of cocoa butter.

Figure 7: Giving Counseling Processing Cocoa Beans Post Harvest
Source: Documentation of Service (2017

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