Continuous Improvement of Total Quality Management in Arabica Coffee Quality Improvement and Control in Brebes Regency

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ABSTRACT

The efforts of the Brebes Regency Government to provide added value to the coffee business have shown very significant progress. This is evidenced by the community's ability to convert cherry coffee, which costs IDR. 5,000/kg, into downstream green bean products, which have a very high price, which is around IDR. 190,000/kg. Although it has been able to carry out downstream processes, these activities still leave problems in quality control and standardization. Therefore, it is necessary to conduct more comprehensive research on the standardization and quality control of this Brebes Arabica coffee. This research was conducted with an action research approach in the form of applying the use of sorting process tools, using water content measuring devices, counseling on good harvesting methods, using simple greenhouse technology, and drying with a heating oven. The object of this research is the "Tani Subur" group in Gucci Dawuhan Village, Sirampog District, Brebes Regency. Data collection using techniques: semi-structured interviews, observations, and questionnaires. Based on research, the combination of technology improvement and quality control of the drying process with a greenhouse and oven produces high quality and standardized raw materials with moisture content below 12%. Standardized raw material control produces green bean products that are intact and not broken and have standard sizes. The results also show that standardized and high-quality green bean products are attractive to consumers.

Keywords: Total Quality Management; Continuous Improvement; Quality Control; Quality standardization

1. Introduction

In recent years, the coffee agribusiness in Brebes Regency has begun to appear. In Brebes Regency, coffee producing locations are in Sirampog District, Paguyangan District, Bantarkawung District and Salem District. Sirampog Subdistrict with an altitude of more than 1,000 meters above sea level, the type of coffee grown is Arabica, as well as in Paguyangan Subdistrict which is located at an altitude of more than 1,000 meters above sea level, growing Arabica coffee. Bantarkawung

and Salem sub-districts with an altitude of less than 1,000 plants mostly grow robusta coffee, but there is one village located at an altitude of more than 1,000 meters above sea level, namely Capar Village with Arabica coffee.

From the condition of plant area and crop production in Brebes Regency which tends to increase, the impact of increasing coffee farmers' income is still very small. Because the knowledge of farmers about how to maintain coffee plants is still very low. In 2015 coffee farmers in Capar Village only learned that coffee plants must be pruned in order to produce well. Knowledge of superior clones and methods of controlling pests and diseases is still very limited.

Coffee is marketed still in the form of dry rice coffee (green been, wose). Marketing is still done traditionally, there has been no touch from the Brebes Regency government program. The buyers who play the most role are middlemen who provide loans before the coffee is harvested. The prices received by farmers ranged from Rp. 16,000 to Rp. 35,000 per kilo gram of wose coffee, coffee that has been collected from middlemen from the Districts of Salem, Paguyangan, Bantarkawung, Sirampog and surrounding areas is then sold in the commodity markets of Ajibarang, Temanggung or Wonosobo.

In Dukuh Gucci Dawuhan, Dawuhan Village, in 2010 the “Farmers Subur” group was established with the chairman, Mr. Nasam and 13 members. At that time, the farmer group received assistance of 7,000 Arabica coffee seeds. In 2014 “Tani Makmur” started its first harvest and in 2016 it began to expand its activities by buying ripe coffee cherries (cherry coffee), processing by peeling the skin and selling in the form of green beans. In this condition there is added value that is enjoyed by farmers, from selling coffee cherry for 5,000 rupiah to green been in 3 grades.).

Currently, the processing of coffee cherry to green beans is still focused on the quantity aspect. For other aspects such as hygiene, GMP, quality of raw materials, quality of processes, product quality, and many other aspects, there are still many unexplored and unattended. There is no standardization of raw materials, processes and products, so the quality changes all the time. Raw materials and production processes are carried out without standard procedure guidelines, so the quality of the coffee products produced is still heterogeneous. In addition, there are no documents or quality records for each production batch, so if you change the person who processes it, a different product will be produced.

Taking into account the above description, it is necessary to conduct research on controlling and improving the quality of raw materials and processes, in order to obtain standardized and high-quality coffee products. Quality products are expected to provide higher competitiveness, so as to increase the income and welfare of coffee business people in Guci Dawuhan or Brebes Regency in general.

2. Literature Review

2.1 Coffee Type

According to Aak (1980), there are four types of coffee that have been cultivated, namely: Arabica coffee, liberi coffee, robusta coffee and hybrid coffee. Arabica coffee is the most widely developed coffee in the world and in Indonesia. This coffee is grown in the highlands which have a dry

climate around 1350-1850 masl. While in Indonesia alone this coffee can grow and produce at an altitude of 1,000-1,750 meters above sea level. This type of coffee tends not to stand Hemilia Vastatrix, but this coffee has a strong aroma and taste.

Liberica Coffee, This type of coffee comes from the lowlands of Monrovia in the Liberica area. Liberica coffee trees thrive in areas that have high humidity and heat. Liberica coffee spread very quickly. This coffee has poorer quality than Arabica coffee both in terms of fruit and low yield. Canephora coffee (Robusta), Canephora coffee is also called Robusta coffee. The name Robusta is used for commercial purposes, while Canephora is a botanical name. This type of coffee comes from Africa, from the west coast to Uganda. Robusta coffee has advantages in terms of higher production compared to Arabica and Liberica coffee types.

Hybrid Coffee, Hybrid coffee is the first derivative of the result of marriage between two species or varieties so that it inherits superior properties from both parents. However, the offspring of this hybrid group no longer have the same characteristics as the hybrid parent. Therefore, it is propagated only by vegetative means such as cuttings or connections. Of the many types of coffee beans sold in the market, there are only 2 main varieties, namely kopiarabika (Coffea arabica) and robusta (Coffea robusta). Each type of coffee has its own uniqueness and its own market.

Arabica coffee is a traditional type of coffee with the best taste and most of the coffee made using this type of coffee beans, this coffee comes from Ethiopia and is now cultivated in various parts of the world, ranging from Latin America, Central Africa, East Africa, India and Indonesia. This coffee is grown in countries with tropical or subtropical climates. Arabica coffee grows at an altitude of 600-2000 masl. This plant can grow up to 3 meters if the environmental conditions are good. The optimal growing temperature is 18-26oC. The resulting coffee beans are quite small and are green to dark red in color.

Other types of coffee are derivatives or sub varieties of Arabica and Robusta coffee. Usually, each coffee-producing area has its own uniqueness and makes it a sub-variety. One other well-known type of coffee is the original Indonesian civet coffee. Kopi Luwak is the coffee with the highest selling price in the world. (https://id.wikipedia.org/wiki/Kopi - cite_note-arro2-17). The process of formation and its very unique taste are the main reasons for the high selling price of this type of coffee. Basically, this coffee is arabica coffee. These coffee beans are then eaten by a civet or a type of weasel. However, not all parts of the coffee bean can be digested by these animals. The inside of this seed will then come out with the feces. Because it has been around for a long time in the civet's digestive tract, these coffee beans have undergone a brief fermentation by natural bacteria in their stomachs which gives them a unique added flavour.

2.1 Harvest and Post Harvest

Intensively cultivated plants can bear fruit at the age of 2.5-3 years for robusta and 3-4 years for arabica. The first harvest is usually not too much, the productivity of the coffee plant will reach its peak at the age of 7-9 years. Harvesting and post-harvest processing will determine the quality of the final product.

Some methods of post-harvest processing of coffee are:

2.1.1. Natural Process

This natural process is also known as the dry process. This process is one of the oldest techniques in the history of coffee processing. After harvesting, the coffee cherries are spread out on plastic mats and dried in the sun. Some coffee producers sometimes dry it on brick terraces or on special drying tables that have an airflow at the bottom. When dried in the sun, these coffee beans must be turned periodically so that the coffee beans dry evenly, and to avoid mold/rotting. In the natural process, the dried coffee cherries are still in the form of fruit/cherries, complete with all layers. - the layers. This natural and natural process will make the cherries ferment naturally because the outer skin of the cherry will peel off by itself.

This natural process is considered capable of giving fruity notes to coffee such as blueberries, strawberries or tropical fruits. Coffee also tends to have low acidity, exotic flavors and more body.

2.1.2 Full Washed

Generally, this process aims to remove all the skins of the flesh that are attached to the coffee beans before drying. After harvesting, coffee cherries are usually selected by soaking them in water. Cherries that float will be discarded, while those that sink will be left for further processing because such cherries are considered ripe. Furthermore, the outer skin and skin of the coffee cherry will be removed using a special machine called a pulper. The coffee beans that have been separated from the skin are then cleaned again by putting them in a special vessel filled with water so that the remnants of the skin that are still attached can be completely removed due to the fermentation process.

The duration, or length of time this coffee is fermented, varies by manufacturer. However, it generally takes between 24-36 hours depending on the temperature, the thickness of the sap layer on the coffee cherry, and the concentration of the enzyme. The warmer the surrounding temperature, the faster the process will be. The coffees from the washed process generally have a cleaner, light, slightly fruity taste, the body tends to be light and soft with more acidity.

2.1.3 Semi Washed

This process is very common in Indonesia and is often known as wet milling. The semi-washed process involves two drying processes. After picking, the outer skin of the coffee cherry is peeled off using a depulper and dried briefly. In general, the humidity of the coffee is left up to 11-12% during the drying process, then in the semi-washed process, the humidity of the coffee is left up to 30-35% before being peeled again until it turns into green beans. from this green bean which is then dried again until it is really dry enough to be stored.

Semi-washed coffees tend to have an intense sweetness, fuller body, and lower acidity than washed-processed coffees. Then coffee with this process also has more diverse flavors

2.1.4 Honey

This process is somewhat similar to pulped natural and is commonly used in many Central American countries such as Costa Rica and El Salvador. Lately this process is also increasingly popular in Indonesia. In the honey process, the coffee cherries are mechanically peeled, but this method uses less water than the pulped natural process. The depulper machine will be controlled to determine how much flesh will remain attached to the seeds before drying. This remaining flesh skin in Spanish is termed miel which means honey (honey). Simply put, in the honey process there is a little mucus that looks sticky on the coffee beans.

3. Research Methodology

This research was conducted in Brebes Regency. Especially in the "Farmers Subur" business group. The data collection methods in this study consisted of: (a) Interviews, the data taken by interviews were data about coffee raw materials and coffee processes; (b) Observation, namely data taken by direct observation in the field. Data taken by observation are coffee harvesting method, age and color of coffee, coffee processing process, coffee moisture content and others; (c) Literature study and extracting written information from relevant official sources. Data taken by literature study is the production of coffee plantations; (d) Focus Group Discussion (FGD), namely data taken from a group of people led by a moderator who encourages discussion participants to speak openly and spontaneously about matters that are considered important related to the research title.

4. Results and Discussion

4.1 Coffee Processing

The coffee processing process in Guci Village, which was driven by Mas Yanto's son, Mr. Nasam, was carried out using several methods, namely:

- Full wash / Semi full wash. That is the washing process by soaking in water, peeled until the mucus is gone and immediately dried in the sun. The drying process is about 3 weeks. The price of coffee with this processing, around Rp. 65.000/kg in the form of green beans.
- Natural Process. The coffee cherries are directly dried in the form of cherries with the layers still intact. This natural and natural process, will make the cherry ferment naturally and the coffee skin will peel off by itself. This process usually takes about three months. The price of coffee with this processing reaches Rp. 100,000/kg in the form of green beans.
- Honey Process. That is the process of drying coffee using a little water, usually the coffee mucus is still attached to the coffee cherries so that it looks sticky on the coffee beans. This process takes about a month. The price of coffee with this processing reaches Rp. 90.000/kg in the form of green beans. Packaged Java Gucci Dawuhan

4.2 Improved Quality Control of Raw Materials and Processes

- Improved quality control of raw materials and processes

Quality control of raw materials through:

- harvest is done by picking red
- sorting in the garden
- weighing and delivery to factory
- store coffee in the receiving tub and the coffee is ready for processing

In general, the post-harvest process of coffee is divided into 2, namely the wet method and the dry method. The wet method includes the fully washed and semi washed methods. Meanwhile, the dry method of post-harvest coffee includes honey and natural processes.

Value added is the difference between the cost of the output and the value of the input (Feifi, et al., 2010). The value added analysis stage has variables in the form of production results (output), raw materials (input), labor, raw material prices and product prices, labor wages, and the number of other inputs used. Value added analysis using the Hayami method, produces added value received for each element. The advantages of this method are the ease of understanding and use, as well as providing fairly complete information for actors as well as investors and workers.

- Product quality improvement (finish good green coffee and ground coffee)

Coffee is a type of beverage that comes from processing coffee beans that have been roasted and ground into coffee grounds. This drink is famous for its properties in holding back drowsiness, especially for those of us who like to stay up late, besides that coffee also has other effects, both good and bad for health. The most widely used types of coffee are Arabica and Robusta, each coffee bean has its own taste from its respective region of origin.

When coffee beans are ground into coffee grounds, the coffee beans are converted into tiny particles, and drastically the release of aroma and other compounds is released. Initially the flavor and aroma-forming compounds are bound in the form of the beans, and when ground into coffee grounds, these good compounds are exposed to the air.

- Increased coffee drying capacity and efficiency

The coffee drying area is a special area for drying or drying coffee beans so that they receive heat from the sun evenly to the surface of the coffee beans. Previously at Dk. Gucci Dawuhan Village, Sirampog District, Brebes Regency only has one coffee drying area so that the drying process is still inefficient and the increasing coffee capacity requires a more effective drying area.

In making this coffee drying area, care must be taken when determining the land, namely land that is exposed to direct sunlight well and there are no shadowing trees, air circulation on the land must be good, for hilly areas it is ideal with sloping land, easy access for paths. collection of coffee beans, the land is not flooded by water, and the land is far from annoying odors (better away from the coffee storage room).

The making of this drying area has been carried out on July 3, 2020 in Dk. Gucci Dawuhan Village, Sirampog District, Brebes Regency. There are 2 coffee drying areas that have been completed. The benefits of this additional coffee drying area can increase the capacity and efficiency of coffee, rainwater does not penetrate the coffee drying house so that it can protect the coffee that has dried, and is able to dry coffee with more capacity.

- Standardization of Green Bean Product Quality

The material presented included the quality standard of green beans, after the implementation of the training activities continued with assistance on how to determine the quality standard of green beans in Brebes with several stages of physical testing carried out on coffee beans.

Physical testing is a system used to assess the quality of coffee beans based on their physical appearance, either using assistive devices or using the human senses in accordance with applicable standards. The standards that guide the physical test are the Indonesian National Standard (SNI)

and the Specialty Coffee Association America (SCAA). Stages of physical tests carried out on coffee beans are:

- Water Content Test. The water content in coffee beans can be measured by using a water level measuring device known as a tester of various brands, so that it can be seen what percentage of water is contained in the coffee beans. In addition to the water content tester, it can also be done using a drying oven with the Weigh method. The water content of coffee beans recommended by SNI and SCAA is 12-13%. The criteria are if high > water content = poor quality, if low < water content = good quality.
- Test Triage. Trace is the percentage of defective beans in 100 grams of coffee beans. Trace testing is carried out by weighing which will separate the defective beans from normal beans, the result of weighing the defective beans is referred to as the percentage of the trace. Trase test is carried out on random coffee beans. the quality of the coffee beans. The criteria are if High > Trase = Poor quality, if Low < Trase = Good quality.
- Test Defects. Defect is the sum of the coffee bean defect value, Defect Test is carried out on Ready or Export ready coffee beans to determine the quality or grade of the coffee.
- Color and Odor Test. This test is carried out using the senses in the form of foresight in seeing and smelling, good coffee beans have a fresh smell and bright color and are not contaminated with foreign materials that cause discoloration or odor. Color is not uniform / odor is not fresh = poor quality whereas if color is uniform and bright / smell is fresh = good quality.
- Seed Size Test. This test is carried out to determine the size of the coffee beans, namely the size of large beans (L) Size, medium beans (M) Size, small beans S) Size and very small beans / do not pass the screen (shells). This test is carried out using a screen consisting of some minimum levels of 4 levels of Gayo Cuppers Team with each hole size 1/64 inch, namely: 18, 16, 14 and <14. Good coffee beans have uniformity in size depending on their respective sizes. The criteria is that if the size of the seeds varies = poor quality, if the size of the seeds is uniform = good quality

6. Conclusion

Although it has been able to carry out downstream processes, these activities still leave problems in quality control and standardization. Therefore, it is necessary to conduct a more comprehensive research on the standardization and quality control of this Brebes Arabica coffee.
Based on research, the combination of technology improvement and quality control of the drying process with a greenhouse and oven produces high quality and standardized raw materials with moisture content below 12%. Standardized control of raw materials produces green bean products that are intact and not broken and have standard sizes. The results also show that standardized and high-quality green bean products are attractive to consumers. and m process control and final product control. quality green bean coffee.

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