

DEVELOPMENT OF APPROPRIATE TECHNOLOGY ADOPTION FOR COFFEE FARMERS IN SUKAWANGI VILLAGE, SUMEDANG

Bentang Arief Budiman¹⁾, Hari Purnama²⁾, Husna Nugrahapraja³⁾, Muhammad Abdur Rasyid⁴⁾, Natas Setiabudhi Daryono Putra⁵⁾, Sri Suryani⁶⁾, Annisa Ratna Nurillah⁷⁾, Ima Mulyama Zainuddin⁸⁾, Rindia Maharani Putri⁹⁾, Wervyan Shalannanda¹⁰⁾, Raden Aswin Rahadi¹¹⁾

¹ Kelompok Keahlian Perancangan Mesin, Fakultas Teknik Mesin dan Dirgantara, Institut Teknologi Bandung

² Sekolah Teknik Elektro dan Informatika, Institut Teknologi Bandung

³ Kelompok Keahlian Genetika dan Bioteknologi Molekular, Sekolah Ilmu dan Teknologi Hayati, Institut Teknologi Bandung

⁴ Fakultas Teknik Pertambangan dan Perminyakan, Institut Teknologi Bandung

⁵ Kelompok Keahlian Kria dan Tradisi, Fakultas Seni Rupa dan Desain, Institut Teknologi Bandung

⁶ Sekolah Arsitektur, Perencanaan dan Pengembangan Kebijakan, Institut Teknologi Bandung

⁷ Kelompok Keahlian Agroteknologi dan Teknologi Bioproduk, Sekolah Ilmu dan Teknologi Hayati, Institut Teknologi Bandung

⁸ Kelompok Keahlian Genetika dan Bioteknologi Molekular, Sekolah Ilmu dan Teknologi Hayati, Institut Teknologi Bandung

⁹ Kelompok Keahlian Biokimia, Fakultas Matematika dan Ilmu Pengetahuan Alam, Institut Teknologi Bandung

¹⁰ Kelompok Keahlian Biokimia, Fakultas Matematika dan Ilmu Pengetahuan Alam, Institut Teknologi Bandung

¹¹ Kelompok Keahlian Risiko Business dan Keuangan, Sekolah Bisnis dan Manajemen, Institut Teknologi Bandung

* Corresponding Author: aswin.rahadi@sbm-itb.ac.id

Abstract

In this paper, the authors propose solutions to increase the added value of coffee in the form of the process of making the process of making coffee using appropriate technology adoption. This paper uses qualitative methods of locational survey and literature study. Survey activities are conducted in the form of interviews and observations. The team conducted interviews with coffee farming communities in the area and observed the conditions of coffee farming. The literature study was conducted by synthesizing literature reviews and continued by formulating the theory and principles of appropriate technology in the context of local agriculture in Sukawangi Village, Sumedang Regency, West Java. In this paper, the authors describe the solution proposals related to the problems of coffee farmers in Sukawangi, Sumedang. Two suggestions for increasing the value added of coffee beans are by using appropriate technology adoption. With both of these solutions, it is expected that the quality of coffee plantation in Sumedang can be increased and can be marketed in both domestic and international markets. As a result, the welfare of farmers in Sumedang will increase.

Keywords: Agriculture, Appropriate Technology Adoption, Coffee Farm, Coffee Plantation, Sumedang.

1. INTRODUCTION

Coffee is one of Indonesia's leading export commodities. Based on a report released by the International Coffee Organization (ICO), Indonesia is ranked fourth in the world as the coffee producer nation under Brazil, Vietnam, and Columbia (International Coffee Organization, 2018). One of the coffees producing regions in Indonesia is Sukawangi Village, Sumedang Regency, West Java Province. Coffee is one of the few commodities produced in these plantations. Total production of Desa Sukawangi for the coffee product in 2017 has reached 200 kilograms (kg). The coffee is produced on a farmer's land with the area sized approximately 3000 square meters which consist of a mixture of land ownership: private owned land, Perhutani land, and also unused land. The types of coffee grown in Sukawangi Village are the type of Liberica (*Coffea Liberica*) and Excelsa (*Coffea Liberica* var. *Dewevrei*).

Both types of coffee have its distinctive character that is potential to be managed as raw materials of various primary and secondary processed products. Although it can grow in Indonesia, actually these two types of coffee are not originally from Indonesia, but from the African continent. Liberica coffee (*C. Liberica*) comes from the wild country of Liberia which is found also growing in the other parts of Africa. Liberica coffee was first brought by the Dutch to Indonesia in the 19th century. Initially, Liberica coffee was grown as substitutes for Arabica coffee plants that were exposed to leaf rape disease outbreaks.

However, the business is considered less successful because the liberal coffee crops suffered the same outbreak of the disease. Currently, Liberica coffee is grown on a limited basis in African and Asian countries. On a global scale, production is still far below Arabica coffee or Robusta coffee. In Indonesia, Liberica coffee can be found in Jambi and Bengkulu areas. Most of the liberal production from the region is exported to Malaysia. Excelsa coffee was discovered in the early 20th century in the West African region. At first, this plant is referred to as the species of Coffee Excelsa or sometimes called the species *Coffea Dewevrei*, later corrected as *Coffea Liberica* var. *Dewevrei*.

This coffee is not regarded as a separate species but as one of the varieties of coffee Liberica. The classification is still a debate up to now, so Excelsa coffee has many names. Coffee Excelsa not much cultivated other types of commercial coffee. Over 90% of the world coffee trade is dominated by Arabica and Robusta coffee; the rest is Liberica and Excelsa. In Indonesia, Excelsa coffee can be found in Jambi or other lowland peatland areas.

2. PROBLEM STATEMENT

With this favorable geographical condition, ideally, Indonesia can produce independent and large-scale coffee industry climate that can help improve the welfare of the community, especially farmers and coffee entrepreneurs. Unfortunately, the amount of coffee production in Indonesia is not in line with the development of the coffee industry and its processing.

From the chain of the coffee production process from a hatchery to become a ready-to-drink product, which generally occurs in Indonesia, only to the extent of hatchery until the coffee fruit harvest only. More than half of Indonesia's coffee exports are raw coffee, especially high-quality coffee such as Arabica. Therefore, it is understandable that the coffee beverage market is mostly dominated by foreign companies. Most domestic companies are only involved in the instant coffee market, where processed coffee is relatively low-quality coffee beans.

When viewed concerning value added, then the added value of raw materials in the form of coffee to coffee drinks ready for consumption is immense. For example, the price of the best raw coffee ingredients is usually around Rp4.000, - / kilogram whereas when it has become a coffee drink in a famous cafe, the price goes up to Rp50.000, - per glass (about 50 grams). Potential benefits that can be obtained from the coffee industry from the increase in the added value of coffee is also more interesting because the technology needed to process coffee into ready-to-drink coffee is relatively cheap and straightforward.

There are two types of coffee production processes that are commonly known: wet process and dry process. The wet process is done for Arabica coffee that has high quality, while the dry process is done for low quality coffee, such as Robusta, Liberica, and others. The difference of the process is in the stages of washing and fermentation processes. Both stages are essential stages that can produce a distinctive aroma of coffee. Although the coffee-making process is quite common, coffee producers in Indonesia are still less interested in managing their crops further.

To date, there have been a lot of government involvement as well as research and education institutions to improve the quantity of coffee production with better quality. However, the type of assistance in the form of the effort to increase the value added of coffee in the country with the process of production of quality coffee is still not significant. In fact, the intervention of industrial management of coffee processing process is one of the main things needed if it wants to increase the added value of coffee so that it will contribute to increasing national income.

In this paper, the authors propose solutions to increase the added value of coffee in the form of the process of making the process of making coffee using appropriate technology. The study objects that the author used is a coffee plantation in Sukawangi village, Sumedang regency, West Java. The output of this paper is the design and blueprint industry of coffee making process that can be applied in the village. The output generated also considers the economic aspects of low investment costs and social aspects of ease of use of process machines. The impact that will occur if this proposal is applied is also explained in detail, primarily related to the increase in value added coffee.

3. RESEARCH PURPOSE

Some critical issues for unearthing the potential of Sukawangi Village's coffee production supported by the uniqueness of its variety. However, the existing coffee production activities are still limited to planting and harvesting. Although it has become a prominent location for West Java coffee production, farmers' welfare levels still need to be improved (Koran Sindo, 2018). Increasing the welfare of farmers can be approached with the introduction of Appropriate Technology Adoption. After analyzing the potentials and problems, this paper aims to identify potential market expansion of coffee production with technology development that raises the value of Sukawangi Village's coffee production.

4. RESEARCH METHODS AND WRITING SYSTEMATICS

This paper uses qualitative methods of locational survey and literature study. Survey activities are conducted in the form of interviews and observations. The team conducted interviews with coffee farming communities in the area and observed the conditions of coffee farming. The results of the survey are arranged in the 'Current Conditions' section. The literature study was conducted by synthesizing literature reviews and continued by formulating the theory and principles of appropriate technology in the context of local agriculture in Sukawangi Village, Sumedang Regency, West Java.

Then, the team analyzed identifying the concept of technology that can respond to potential and answer needs. The concept is further elaborated in a solution offered, in the form of Sukawangi Coffee Rebranding. This solution is offered to add the value of the product with marketing. The paper concludes with the conclusion that the farming community can increase their sales rate by expanding the market through the rebranding of the coffee product.

5. RESEARCH METHODS AND WRITING SYSTEMATICS

Sukawangi Village is part of Pamulihan Subdistrict, Sumedang District, West Java, and is bordered by Cijambu, Pasirbiru and Sukasirnarasa villages in the north, Pamulihan village in the East, Citali and Gudang village in the South, and is bordered by Pasigaran and Kadakajaya villages in the West (Pemerintah Kabupaten Sumedang, 2018).

In 2013, the total population in Sukawangi village was around 5,100 people, consisting of 2,450 men and 2,650 women, and 1699 people recorded as the head of household (BPS, 2013). Most Sukawangi villagers work as farmers, farm laborers, traders, laborers, soldiers, police, and civil servants. Especially small-scale farmers, the average monthly income is still below the minimum wage of employees (around Rp 2.6 million per month), reflected in the level of welfare of those who are still the average population of Sumedang Regency.

To improve the welfare of farmers, there are initiatives to make Sukawangi Village as Coffee Village. Coffee plantations have been in the village of Sukawangi for a long time because, in the Dutch colonial era, this area is the center of a coffee plantation. At that time, the types of coffee grown were Liberica, Excelsa, and Robusta coffee. However, since the last few years, people in Sukawangi Village have started to plant Arabica type coffee. To realize the initiative of Sukawangi Village as Coffee Village, Karya Mandiri Prima Coffee Group to received assistance from the Agricultural Service of 12,000 stems of coffee tree seedlings in 2017.

The author interviewed several farmers with an age range of 30-53 years. They have diverse educational backgrounds, ranging from elementary, junior and senior high school. However, most

farmers only become cultivators because they only rent land. Some of them not only have one kind of business.

The first farmer whom the author interviewed was named Yoyo from Sukawangi village. He recounted that there had been a center of coffee plantations from the Dutch era. There are several types of coffee grown, including coffee Excelsa and Liberica. Starting in 2017 they will begin to plant the Arabica type of coffee. They plant coffee in the yard and behind their homes. In one village 12,000 trees were once assisted by the government.

The distance of planting yard there is one line or two lines with distance per line of about one meter. This year the farmers bought another 5,000 seeds by purchasing to the breeder for Rp3.000, - and already labeled blue. In Sukawangi village there is also a tea farming of Makarsina. They are also nurtured by the Bandung Institute of Technology (ITB) to process Mocaf flour and its derivatives.

The second farmer whom the author interviewed named Ada from Rancakalong Village. He mentioned that in addition to coffee, they also process Mocaf flour and derivatives, and Kasreng Tea. He explained that the processing of Kasreng Tea from the beginning was picked, after the new bending was done, the abrasive, was auctioned, freshly roasted again, auctioned, after which it was then dried in the sun. He told the authors about his business trips ranging from sewing themselves, joining convection, factory work to open their own business. In 2008 moved to tobacco, 2010 began to build on black tobacco until 2014. His organization takes care of the sub-district of mangrove farmers association. Sub-district Pamulihan oversees ten groups in eleven villages. His group, in addition to tobacco, is also growing horticultural and now goes to Arabica coffee. Livestock business already has implementation guidance, while tobacco still not yet exist. To date, the assets, and capital managed by this farmer group:

1. Farms manage Rp70,000,000.00;
2. The horticulture sector manages the funds of Rp18.000.000,00 and leases the land on the village land;
3. The tobacco field manages a fund of Rp72,000,000.00 and some untested assets (data is not updated regularly); and
4. Coffee and tea have owned land (people buy land).

However, the horticultural soil is still rented to the village land while in the plantation is already a property right. For the product, still only Liberica coffee. So, the goods there directly sold, for example to Sumatra. Tobacco production sometimes does not exist because it is very weather dependent and cannot be estimated how many each year. For rice, there are seven quintals per year, but the seedlings are small. This group has many shortcomings even though it has lasted for twenty years. There are self-contained works that can accommodate and can be bought by members or non-members. The coffee is bought by youth and religious leaders from their neighborhood. Due to avoid picking from young fruit, it is advisable to buy spindles. There is a case, about tobacco, already contract with the dealer, but the results are not as expected so fined. Once here the center of pepper but now it is no longer. They want besides coffees also to cultivate chili as the market is accessible. Moreover, there are limits to the rules of the tobacco-specific government; tobacco is restricted whereas tobacco farmers donate to a vast country so on the move to the plantation. Cassava cultivation in Pamulihan becomes a struggle, let alone tape center is also here.

The third farmer interviewed was a farmer from the Rancakalong area. He gardened in Perhutani land using a sharing system. They are gardening coffee with the type of Arabica. Sometimes if they need coffee, they make their own, bring the raw materials and milled themselves.

Special processing is in the processing center. Quantities of harvest are sometimes high sometimes low. Even once up to three tons, the quantity depends on the weather because for coffee there are special conditions that need to be performed. Early seeds obtained from the government and developers. So, there is business and assistance also due to limited capital. In one hectare can harvest 1,800 pounds of coffee, although weather support, not all will bear fruit. The authors can conclude that the difficulties they have among them are capital that is exhausted due to unfavorable results are expected. Capital is determined from whether the previous season's harvest was successful or not. When the harvest is abundant, there are times when prices are low due to the number of fixed requests. They have no knowledge, excellent skills, and excellent marketing skills. Even they cannot make family financial arrangements, never counting profit and loss, recap jobs that are not recorded well; even capital is not taken into account. They assume that it is useless to calculate capital because it is a waste

of energy. For those who matter most is being able to eat every day. They still do not have the knowledge and skills of farming correctly. In their village facilities and infrastructure for the processing of land was lacking. They are reluctant to access formal financial institutions to borrow, instead, go to the middleman. Sometimes the cost of a piece is more expensive than the price of production.

6. PROPOSED SOLUTION

INCLUSIVE AND SUSTAINABLE AGRICULTURAL AND RURAL DEVELOPMENT (ISARD) FRAMEWORK

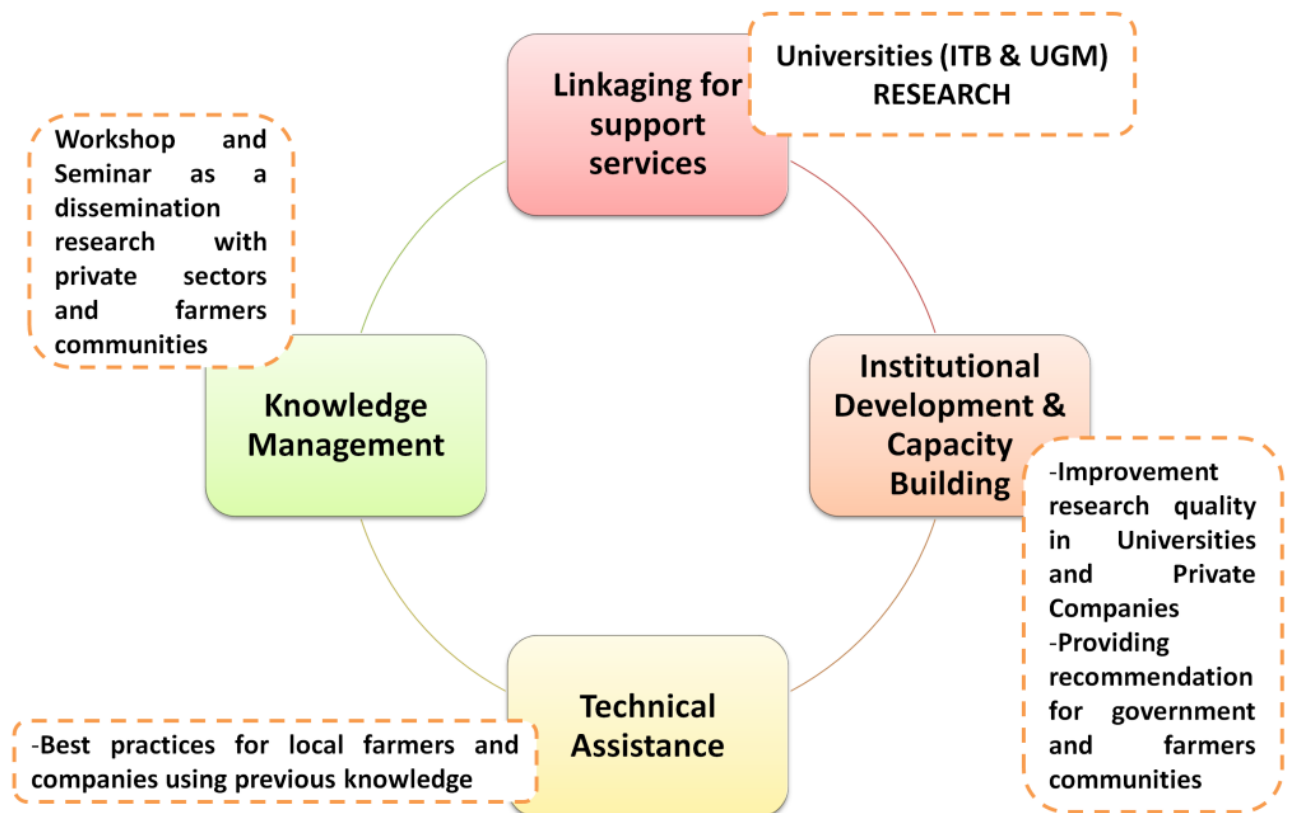


Figure 1. ISARD (Inclusive and Sustainable Agricultural and Rural Development) Concept for Sukawang Village Coffee Farmer Group in Sumedang (Nugrahapraja, Unpublished Data).

The authors propose based on preliminary evaluation results conducted through surveys, interviews, and discussions, the solutions that will be offered that include research, teaching, and community service. Therefore, it takes not only ground-breaking research but integration with existing research roadmap in each Scientific Group / Expertise in ITB. The concept offered is Quadruple Helix involving initiation and strengthening collaboration and collaboration between universities, research institutions, practitioners, industry collaborators, and farmers (see Figure 1 and Figure 2). The expected result is the integration between fundamental researches starting from upstream to downstream so that it is directly used by the people of Sukawang Village, Sumedang Regency.

APPLICATION OF INCLUSIVE AND SUSTAINABLE AGRICULTURAL AND RURAL DEVELOPMENT (ISARD) FRAMEWORK

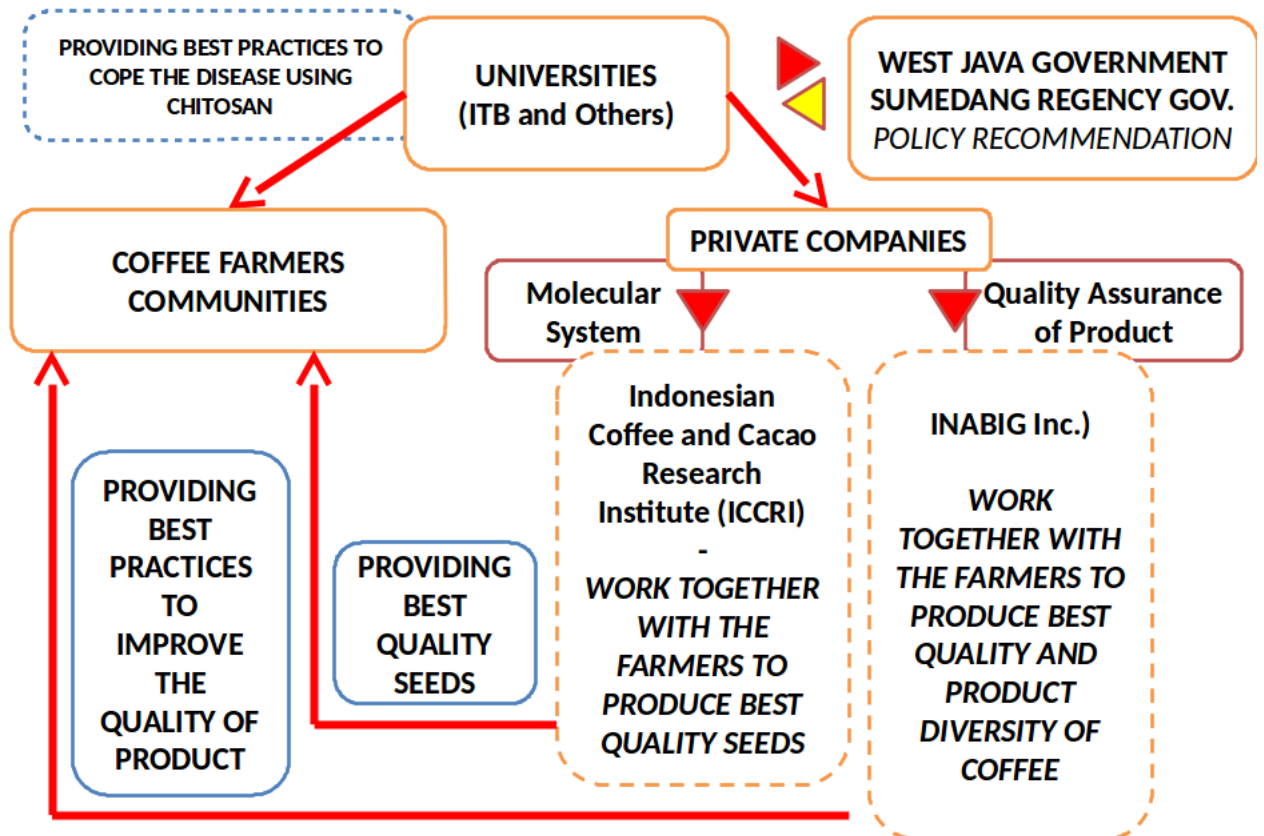


Figure 2. ISARD (Inclusive and Sustainable Agricultural and Rural Development) Concept Application for Sukawangi Village Coffee Farmer Group in Sumedang (Nugrahapraja, Unpublished Data).

The concept of technology transfer used is to increase mutual interaction between ABGC (Academia-Business-Government-Communities). The results of the research can produce technologies that can be applied to local farming systems. However, researchers still need to test their products and practices to farmers as users. A series of training, discussions and coaching with industry practitioners or collaborators can bridge the gap between research and farmer activity. The author hopes that between the circles ABGC in the concept of ISARD gets benefits, including:

1. Farmers can manage their coffee grounds from pests of disease using the results of research or practical science of the industry;
2. Farmers can manage the coffee harvest to increase the selling price;
3. The authors get input from farmers, practitioners, and industry collaborators to improve the technology or research methodology;
4. Establish collaboration and collaboration between institutions, industries, and farmers to improve synergy so that technology development and implementation can be more focused to reduce the risk of repetition of work.

At this stage, observations, surveys, and interviews with farmers, practitioners, industry collaborators, and people about coffee knowledge from upstream to downstream can be communicated. Practically, the authors propose to divide the activity into three parts: Seminar, Focus Group Discussion, and Coaching.

7. APPROPRIATE TECHNOLOGY ADOPTION

To be able to increase the added value of coffee products required a quality production process. Based on the survey results, farmers in Sumedang do not have machine tool equipment that can produce quality ore of coffee. The two main issues proposed for completion in this paper are:

1. The separation/sorting process between good and bad quality coffee and
2. The process of roasted to uniform the aroma and taste of coffee beans. The process of sorting the coffee is vital to maintaining the quality of the coffee.

Quality coffee is usually red and plentiful. Ideally, a red coffee fruit that can be harvested while the green or orange ones are left to become red. Figure 13 shows the color of coffee that has been ripe and immature. Although the sorting based on the color of the fruit looks simple, when applied in the field, many obstacles have occurred. In one coffee plantation area, the harvesting process is usually done simultaneously in one area.

Although the timber planting schedule is done simultaneously, the process of maturing the coffee takes a time that tends to be uniform so that the quality of the fruit in one stalk will be different. In the process of harvesting, picking ripe fruit on a single coffee tree is not a good solution. Uniformity of maturity level of coffee fruit will be higher. Usually, coffee farmers will pick all the fruit on the stalk of the coffee either that has been cooked or immature. The timing of the harvest becomes essential to reduce the number of undercooked coffee fruit plucked.



Figure 3. The Color of Coffee Fruit Ready for Harvesting (Red) (Necap Coffee Capsules, 2018)

The process of sorting between ripe and immature fruit can be done after picking the whole fruit. To get good quality coffee and uniforms, farmers can sort them manually. However, manual sorting process requires high working hours, especially if the harvest up to tens or hundreds of tons of coffee fruit. In the case of farmers in Sumedang, most coffee fruit is not sorted to save production costs. Although production costs will be cut a lot, the quality of coffee is sacrificed. In fact, the coffee fruit produced in Sumedang Arabica coffee type that has a high quality.

The process of sorting using a process machine using the color difference of fruit can be a solution. However, creating a machine that can distinguish the color of coffee is not straightforward. Even if the machine can be well designed, it indeed requires a high purchase and maintenance costs. To solve the problem, the authors propose sorting machines based on the volume of coffee fruit. As is known, during

the maturation process, in addition to changing color, the coffee fruit will also be enlarged to maximum volume. By using a fruit size sorting machine, the selection of ripe fruit can be made quickly. The sorting machine can be a filter with many predetermined diameter holes. The filter is vibrated with an electric motor to pass an immature coffee fruit. Determination of the diameter of the hole requires a survey and statistical analysis to determine the average diameter of mature coffee fruit.

Fruits that have a diameter smaller than the diameter of ripe fruit will pass from the filter and can still be processed as low-quality fruit. With the results of such sort, will get a quality coffee fruit. It should be noted that the sorting process can also be combined with manual sorting by farmers based on the color of the fruit. The second problem proposed for completion in this paper is the process of roasting coffee beans. Like traditional farmers in general, coffee farmers in Sumedang usually perform the process of roasted manually using a wok and spatula.

This irradiation process will cause the water content in coffee to decrease. This irrigation process is vital and needs to be well controlled to produce the best quality and regular coffee beans. When the process of roasting happened, aroma and taste of coffee will appear. The smell and taste of coffee vary depending on the water content. Good quality coffee beans should have a uniform aroma and taste. Figure 4a shows an example of coffee beans produced by coffee producers in Sumedang. As seen, the color of coffee beans is not uniform. This is caused by the process of roasted is not well controlled. The level of water content in the coffee seeds can be seen from the change of seed color as in Figure 4b.



Figure 4(a). The Sample of Coffee Fruit After Drying Process (Grand Coffee Rapids Roaster, 2018). (b). The Change of Coffee Fruit Color After Roasting Process (Peritus Coffee Roaster, 2018)

The machine tool of the process of roasting proposed in this paper. To obtain a uniform level of the water content of the coffee beans, the surface of the hot coffee bean should be evenly distributed. To be able to make quality coffee beans, the authors propose the making of engine roasted process as in the picture. The roasted engine design has a regular frying pan, with a small hole underneath. This

hole is used to flatten the heat in the frying pan, also to sort the small coffee beans so that not only the level of average water content, the size of the coffee beans can also be uniform. A spatula with a large surface is also designed to distribute the heat that is hostile. To maintain the uniformity of heat received by coffee beans, the spatula must be rotated at a fixed rotational speed.

Investment to design and make the equipment is relatively cheap. The author estimates it only takes Rp50.000.000, - to make both devices with a capacity of ten kilograms per hour. Considering the results of the process of making quality coffee ore, the investment is quite cheap. Impact, coffee farmers in Sumedang will benefit better from the sale of coffee beans that have a significant added value.

8. SUKAWANGI VILLAGE COFFEE REBRANDING

Branding or better known as a trademark has an essential role in introducing or promoting the company/product to the broader community (Rita, 2016). Especially for newly form companies or for companies that are already running (known as rebranding). The behavior in the market is very dynamic, so in trading, producers should always try to adjust. An excellent product if not accompanied by a good marketing strategy will be impossible to be sold. Sometimes medium quality products, using the right marketing strategy can get a positive response from the public; otherwise premium products whose marketing strategies are not suitable to give a minor effect from the community. No doubt, social media on the internet is a marketing alternative that cannot be denied. Many success stories of businesspeople who use online social media services such as Facebook, Instagram, marketplaces (Tokopedia.com, Bukalapak.com, Blibli.com, and so on) in offering their products to the netizen. Promotions made in online and conventional media (print media, TV, pamphlets, or catalogs) if not accompanied by attractive designs or packaging, will not affect people psychologically to buy them. However, the scientific principle that a product with a prestige advertisement must match the quality of the product offered.

Associated with coffee farmers in Sukawangi, Sumedang, actually branding is good enough, need to be rebranding to improve the welfare of local communities. In addition to packaging design issues, collaboration with other products can be an option to consider. Sumedang is known as the icon of traditional crisp and delicious tofu producers. Collaboration can be a simple shop offering regular Sukawangi coffee with typical Sumedang snacks.

9. DEFINITION OF THE TERMS

Rebranding is an effort done by a company or institution to completely change or renew an existing brand to be better by not ignoring the company's initial goal, which is profit-oriented. Rebranding itself comes from the word Re which means "back" and Branding which means "the creation of brand image" in a fundamental way to a better condition. According to Muzellec and Lambkin (2005), the precise definition of rebranding is to create a new name, term, symbol, design, or a combination of all for a brand that cannot be denied with the aim of developing a new (different) position in the mind of stakeholders and competitors.

10. CURRENT CONDITION

1. Design of less attractive coffee packaging - Material packaging: sack material, plastic, paper, or cardboard - Design (shape, color, text, and image)
2. The absence of company logo/ cluster/cooperative - Letterhead - Name card - Website - Portal coffee of West Java
3. The absence of collaboration with products other than coffee - Know the Sumedang - Beautiful mugs

11. Proposed Condition

1. Design of less attractive coffee packaging - Packaging made using natural materials Sumedang nature, for example, using dried leaves placed on a carton box. - For the design is a blend of classical and modern, both color, text, and picture.
2. The absence of company logo/ cluster/cooperative - Created a logo that symbolizes Sumedang in general and coffee.

3. The absence of collaboration with products other than coffee - Farmers can sell coffee packets with other products, such as tofu or other typical Sumedang snacks. - In addition to snacks can also include a mug that is characterized by the city of Sumedang.

12. LOGO DESIGN

The logo design is a classic and modern blend (see Figure 5). The perfect impression is seen in the main image outline (Art Nouveau style). To visualize, the artistic impression is reinforced with a hoeing silhouette of farmers and manual style fonts (such as handwriting). This reflects that the people of Sumedang and Sunda, in general, do not forget the traditions of ancestors containing great values. The color on the logo is a typical color of West Java. West Java is so rich in natural resources, and rice fields, mountains, valleys, rivers, trees so spoil the eye. Nature West Java is so colorful, and this is represented by colors: blue (sky), green (mountain), and yellow (rice).



Figure 5. 250 Gram Coffee Powder Packages (up) and 20-50 kg Coffee Fruit Container (down).
Source: Author's Design

13. CONCLUSIONS

- 1) In this paper, the authors describe the solution proposals related to the problems of coffee farmers in Sukawangi, Sumedang. The problem of coffee farmers in Sumedang is the small value added from the coffee plantation because the processing of coffee beans into coffee beans is not appropriately managed. The current condition, the result of the process of making coffee beans is not qualified and cannot compete in the global market. In fact, the coffee fruit produced from coffee plantations in Sumedang including the type of Arabica is excellent quality. This is supported by the geographical condition of Sumedang Regency which is in the highlands with fertile land. Two suggestions for increasing the value added of coffee beans are by using appropriate technology. Based on survey results and interviews from farmers, the process of sorting the coffee fruit and the process of roasting the beans is a process that needs to be solved. The sorting process can separate the quality and specific pieces of coffee characterized by the color of the fruit and the diameter of the fruit. The roasted process that can reduce the level of water content can determine the uniformity of aroma and taste of coffee beans. Quality coffee beans have a uniform aroma and taste. The authors propose the use of machine sorting and roasted process to improve the quality and added value of coffee beans. After the quality of the coffee beans is improved, the rebranding process is also needed to increase the selling power of Sukawangi farmers. The author proposes rebranding by designing the packaging of coffee beans for a capacity of 250 grams and packaging for storage with a capacity of 25 and 50 Kg. The author also proposed the logo to attract consumers to buy regular local coffee Sumedang. With both of these solutions, it is expected that the quality of coffee plantation in Sumedang can be

increased and can be marketed in both domestic and international markets. As a result, the welfare of farmers in Sumedang will increase.

References

- International Coffee Organization. (2018). Historical Data on the Global Coffee Trade. Retrieved from http://www.ico.org/new_historical.asp?section=Statistics at July 23, 2018.
- Koran Sindo. (2018). BUSINESS HITS: Kopi Sumedang Potensi Tingkatkan Kesejahteraan Petani. Retrieved from <https://economy.okezone.com/read/2017/06/23/320/1723687/business-hits-kopi-sumedang-potensi-tingkatkan-kesejahteraan-petani> at July 23, 2018.
- Pemerintah Kabupaten Sumedang. (2018). Profil Pemerintah Kabupaten Sumedang. Retrieved from <http://www.sumedangkab.go.id/> at July 23, 2018.
- Necap Coffee Capsules. (2018). Photo of Coffee Roasting Stages. Retrieved from <https://www.pinterest.jp/pin/305681893427613321/?autologin=true> at July 23, 2018.
- Grand Coffee Rapids Roaster. (2018). Roasting Coffee. Retrieved from <https://www.jambean.com/wp-content/uploads/2016/12/Roasting-coffee-HR.jpg> at July 23, 2018.
- Peritus Coffee Roaster. (2018). Roasting Coffee. Retrieved from <https://www.perituscoffee.com> at July 23, 2018.
- Rita (2016). Rebranding. Retrieved from <https://sbm.binus.ac.id/2016/10/31/rebranding/> at July 23, 2018.

