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PRODUCT SPECIFICATION

FLORES BAJAWA

Geographical Indication Protection Society of *Kopi Arabika Flores Bajawa*

Masyarakat Perlindungan Indikasi Geografis (MPIG) Kopi Arabika Flores Bajawa

‘FLORES BAJAWA’

ABSTRACT

On the Ngada Regency, coffee is grown at elevations between 1,000 – 1,550 m above sea level on fertile Andosol volcanic soil. The average air temperature is 15 – 25 °C and at certain times the air temperature is very cold (< 10 °C) due to the influence of the southeast monsoon blowing from Australia. This area has a dry climate type with an average rainfall of about 2,500 mm per year and there are 3-5 clear dry months in June – October. These geographical conditions are very suitable for Arabica coffee cultivation.

The Ngada people, often called the Bajawa, have been cultivating Arabica coffee for generations. They grow Arabica coffee under shade trees, using organic fertilizers, and without using any synthetic pesticides, as well as selective picking (only ripe fruit). Arabica coffee processed by farmer groups is classified as specialty coffee because of its delicious, distinctive, and unique taste. In general, most of Arabica coffee from this area if subject to medium roasting has the main taste components as follows: dry powder coffee fragrance and strong floral brewed coffee aroma, tasty and strong taste, moderate to thick body, moderate acidity, as well as strong sweetness.

Geographical Indication Protection Society of Kopi Arabika Flores Bajawa *(Masyarakat Perlindungan Indikasi Geografis (MPIG) Kopi Arabika Flores Bajawa) (Hereinafter referred to as “MPIG”)* is applying for Protected Geographical Indications (PGI) under the name ***‘Flores Bajawa’***. The types of goods applied for this PGI is green coffee beans. Given good reputation of ‘Flores Bajawa’ in the domestic and international markets, MPIG intends to maintain the prime quality of ‘Flores Bajawa’ in accordance with the one set out in the product specification included at the time of this application.

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List of Acronyms

Disbun	: Plantation Service Office
gr	: Gram
ha	: Hectare
IPR	: Intellectual Property Rights
GI	: Geographical Indication
HS Coffee	: Hard shell coffee
MPIG	: Geographical Indication Protection Society
NTT	: East Nusa Tenggara
GR	: Government Regulation
PPKKI	: Indonesian Coffee and Cocoa Research Institute
SCAA	: Specialty Coffee Association of America
SOP	: Standard Operating Procedure
SNI	: National Industry Standards
PPU	: Product Processing Unit

INTRODUCTION

In 2010 Indonesia was the 3rd coffee producing country after Brazil and Vietnam, with export volumes reaching more than 500 thousand tons per year. Coffee commodity is the flagship plantation commodity that has a significant contribution to the Indonesian economy, namely as the producer of export foreign exchange, source of farmers' income and well-being, producer of industrial raw materials, creating jobs, and for regional development.

Coffee plantations developed in Indonesia mostly cultivate Robusta coffee with an area of 1,191,557 ha (91.5%) and Arabica coffee with an area of 110,486 ha (8.95%) spread over almost the entire Indonesian archipelago with Sumatra island as the island having the largest coffee plantations reaching 671,400 hectares (60%), Java (14 %), Sulawesi (12 %), Nusa Tenggara (10 %), and Kalimantan (3 %). Most of the area (95.96 %) is developed in the form of people's plantations (PR) while the rest (4.04 %) is developed in the form of large private plantations (PBS) and large state plantations (PBN).

Coffee is an important export commodity for East Nusa Tenggara (NTT) Province, both Robusta and Arabica coffee. Until now, most of coffee exports from NTT Province are still carried out through the Tanjung Perak port in Surabaya (East Java) and partly through the Makassar port (South Sulawesi) after the interinsular trade process took place.

Ngada Regency is one of the main coffee producing areas in NTT Province with an area of 6,147 ha. 5,351 ha of the area are Arabica coffee plantations, and the remaining 796 ha are Robusta coffee plantations with a productivity level of 500 - 750 kg/ha. Development of Arabica coffee agrobusiness in Ngada Regency is still quite open, either through expansion programs, intensification to increase productivity, or quality improvement and downstream industrial development. Arabica coffee originating from this area has the potential to become a specialty product because it has a distinctive taste character, while the planting areas are administratively scattered in Golewa District and Bajawa District.

In the era of global market and increasingly fierce competition, as is the case now and in the years to come, product differentiation is an important means to attract consumers' attention. Geographical Indications (GI) play an important role in attracting consumer interest by providing added value to this product, namely certainty for consumers to consume local products, originating from special areas, with their own production methods. The characteristics of product quality (especially taste, for food products) that are typical,

unique and appear different, which are indicated due to the influence of geographical factors, can be utilized to increase the competitiveness of these products. Therefore, many governments in various countries around the world encourage legal protection for a product that has good quality from a certain area and has a good reputation by using Intellectual Property Rights (IPR) in the form of Geographical Indications.

Taking into account the considerations above, the Arabica coffee farming community of Ngada district intends to increase the competitiveness and added value of their cultivation products, to gain recognition for the quality and uniqueness of this product, as well as a way to preserve their coffee production traditions. To that end, the farming community intends to obtain legal protection in the name of its products and submits an application for registration of Geographical Indication protection for *arabica coffee 'Flores Bajawa'*.

The proposed application for Geographical Indication protection for *'Flores Bajawa'* can be considered for the following reasons:

a) *'Flores Bajawa'* comes from a specific area at an elevation above 1,000 m asl. The agroecosystem in is suitable for growing Arabica coffee and the agricultural system is relatively homogeneous, which administratively belongs to Ngada Regency. This area has a specific climate, namely the air is cold and dry with quite high temperature fluctuations. The rainy season usually lasts for 5-6 months, and the dry season lasts for 5-6 months, during which there are 4 months of clear dry season. This area has volcanic soil groups with Entisol and Inceptisol soil types which are relatively fertile. Therefore, Arabica coffee produced in this area has high quality potential, especially the distinctive taste.

b) In addition to the natural factors above, *'Flores Bajawa'* has the advantage of human factors. *'Flores Bajawa'* is a product that has a high quality and reputation because it is grown by people who have a concern for quality. This community is incorporated in farmer institutions referred to as farmer groups. These people want to maintain the quality and reputation of the coffee they produce.

c) Flores coffee, both Robusta and Arabica, has a long history and a reputation for relatively good quality in the market. However, considering the agroecosystem conditions in the Ngada Regency and the culture of the local community, 'Flores Bajawa' has developed into origin coffee (coffee from certain areas) in Indonesia. The quality of distinctive taste of 'Flores Bajawa' has been known in the domestic

and foreign markets (especially the United States).

d) Farmers already have a fairly strong institution (farmer groups). Because of these groups, agricultural management is distinctive and relatively homogeneous based on traditional knowledge. Thus, the Arabica coffee farming community in Ngada Regency in carrying out their farming business can share knowledge and skills with each other.

Based on the considerations above, the Arabica coffee farming community in Ngada Regency views that *'Flores Bajawa'* must obtain legal protection in the form of Protected Geographical Indications (PGI). In an attempt to get this protection, the Arabica coffee farming community of Ngada Regency has joined an organization called the Geographical Indication Protection Society of Kopi Arabika Flores Bajawa *(Masyarakat Perlindungan Indikasi Geografis (MPIG) Kopi Arabika Flores Bajawa)*. This MPIG represents the people who inhabit the Bajawa highlands to file an application to the European Commission.

This application document describes the applicant and the product specification for *'Flores Bajawa'*.

APPLICANT

The applicant is the "*Masyarakat Perlindungan Indikasi Geografis (MPIG) Kopi Arabika Flores Bajawa*" (Geographical Indication Protection Society of Kopi Arabika Flores Bajawa). The Geographical Indication Protection Society, abbreviated to MPIG, is an institution that represents the Bajawa people inhabiting an area on Flores island that grew on the basis of a shared vision and mission to carry out and maintain the production as well as quality of *'Flores Bajawa'* products as well as to propose the protection of Intellectual Property Rights (IPR) on products produced by the community in this area as products that obtain geographical indication protection so that it is expected to increase competitiveness in the global market.

Since 2004, farmers who are members of Arabica coffee farmer groups in Ngada Regency have begun to work together in an effort to improve quality and think about ways to protect their coffee products. On 26 May 2009 in Bajawa, the "Geographical Indication Protection Society of *Kopi Arabika Flores Bajawa*" was officially agreed to be established. The establishment of the institution was subsequently registered with the Notary Office of Albertho Herman Johanes Dopo, S.H., M.Kn., Notary in Ngada Regency, No. 4 Dated 15-08-2011.

In 2009, private processors joined MPIG to form a group called the real GI Management Group. The membership of this group can only be filled by farmer groups and private companies, meaning that the members are not individuals, but organizations. It is recommended that each organization clearly states its members. As will be explained later, *'Flores Bajawa'* production is the result of organizational dynamics. Thus, the decision to have memberships consisting of organizations is not meant to exclude individual producers, but to reflect the local reality. Individual producers can be registered after joining an organization that is a member of the group.

MPIG in Ngada Regency remains inclusive, namely local organizations based in this area can join this organization as long as the members are Arabica coffee producers or processors and that they have complied with all the rules listed in in the Product specifications of *'Flores Bajawa'*.

The components comprising MPIG of *'Flores Bajawa'* are:

1. One component of the red cherry producer, consisting of farmer groups,
2. One component of the coffee processor, consisting of farmer groups, processors and roasters.

3. One component of the advisory board consisting of representatives of regional government, supporting organizations and important buyers who have become partners of farmer groups.

The “Farmer Group” organization consists of farmers, who are red cherry producers. Some farmer groups also have product processing units (PPU) and produce HS coffee and/or coffee beans. Farmer groups that are coffee processors can sit as members of each component (“red cherry producers” and “coffee processors”).

The right to vote is divided equally (50 % : 50 %) between the two components above (the advisory body does not have any right to vote). Within the “red cherry producers” and “coffee processors” components, a larger stakeholder has two votes, while a smaller stakeholder has only one vote.

In August 2011, this group consisted of:

a. 25 Red coffee producing farmer groups (representing 600 farming families

b. 14 Processing farmer groups

c. 1 roaster in Bajawa, which sells *‘Flores Bajawa’*.

‘Flores Bajawa’ production is the result of organizational dynamics so the decision to have memberships consisting of organizations is not meant to exclude individual producers, but to reflect local reality. Individual producers can be registered after joining one of the organizations that are members of the group.

MPIG of Arabica coffee in Ngada district is inclusive, where local organizations based in this area can join this organization as long as the members are coffee producers, companies or processors that have complied with the rules in the Product specifications of Geographical Indications.

The “Farmer Group” organization consists of farmers who are red cherry producers. Some of these Farmer Groups have processing facilities and produce hard shell coffee (HS) or Green coffee. Farmer groups that are coffee processors can sit as members of each component (“red cherry producers” and “coffee processors”).

Verification of Compliance

The body verifying compliance with the provisions of the product specification:
Name: CSQA Certificazioni Srl
Address: Via S. Gaetano, 74, 36016 Thiene (VI)

PRODUCT SPECIFICATION

A. Name of Geographical Indication

The name of the proposed Geographical Indication to be registered is 'Flores Bajawa'.

B. Name of Product

'Flores Bajawa' is coffee product in the form of green coffee beans. The coffee product is produced according to certain standard operating procedures (SOP) that have been democratically agreed upon by the community in a meeting and determined by the MPIG.

The name Flores coffee, both Arabica and Robusta, has generally been known for quite a long time in the domestic and international markets. While the name *'Flores Bajawa'* as a specialty product began to be known in the domestic and international markets starting from mid-2000s, especially in the United States and Australia markets.

C. Characteristics and Quality

'Flores Bajawa' is produced from Arabica coffee plants grown in the Ngada Regency at an elevation above 1,000 m.a.s.l. This area has cold and dry air, especially in July – August (dry season) and the air is often very cold due to the influence of cold dry wind from Australia. The amount of rainfall is relatively high for 5-6 dry months.

Arabica coffee plants in the Ngada Regency come from selected coffee varieties. These coffee trees are planted under shade trees in combination with other crops and managed and fertilized organically. The red coffee cherry is picked manually and carefully selected with a minimum proportion of 95% of red coffee cherry. The red coffee cherry is then processed wet by fermentation for 18 hours or up to 36 hours and dried naturally by sun drying. The wet processing technique developed by Arabica farmers in Ngada district, which is described in Sub-Chapter G (Goods production process), can realize the potential of quality Arabica coffee in the region.

Regional characteristics, cultivation techniques, and post-harvest processing methods have been proven to produce high quality coffee beans with distinctive taste. The characteristics of Arabica coffee of Ngada regency have been studied in an in-depth manner since 2006. From 2006 to 2009, hundreds of samples were taken which were analyzed by coffee experts from the Indonesian Coffee and Cocoa Research Institute in

Jember. This research produces fairly consistent data regarding the physical quality of coffee beans and their taste.

C.1.Green Coffee Beans

Regarding its chemical composition, the ‘Flores Bajawa’ contains approximately 13.33% protein, 16.32% fat, and 0.41% caffeine (UV–Vis spectrophotometry). The carbohydrate content is approximately 59.31%, forming the main nutritional components of the product. These values represent the core chemical profile of ‘Flores Bajawa’ beans. The beans have an average width of around 6.5 mm, and the product is known for its distinctive floral aroma.

a) Resulting from wet process, dry hulling

Physical Quality:

a maximum moisture content of 12% (weight/weight), free from mold odor, light green and greyish color, and a maximum number of physical defect value of 11 beans per 300 grams coffee beans.

Taste Profile using SCAA cupping method:

Through medium roast method, ‘Flores Bajawa’ with wet process and dry hulling, has a floral aroma, and shows the highest values for sensory scores (0-10 score scale), including Flavour (7.7), Aftertaste (7.6), Acidity (7.4), Balance (7.5), and Overall (7.6), with Fragrance & Aroma scoring (7.4) and Body (7.2). These relates to strong sweetness, bright acidity, and medium to high body (thickness) revealed a floral aroma, with strong sweetness and acidity, as well as medium to strong body..

b) Resulting from “wet processing, wet hulling” or commonly referred to as “semi-washed coffee”.

Physical quality:

A maximum moisture content of 12% (weight/weight), free from mold odor, greenish-blue color, and a maximum number of physical defect value of 11 beans per 300 grams coffee beans

Taste profile using SCAA cupping method:

Characterised by its strongest Body score (7.5), Fragrance & Aroma (7.2), Flavour (7.3), Aftertaste (7.2), Acidity (7.0), Balance (7.2), and Overall (7.2). These results reflect the cup profile — medium to high body (thickness), moderate acidity, and balanced sweetness, along with floral aroma.

Through medium roast method, Flores Bajawa' with wet process and wet hulling, revealed a floral aroma, with medium sweetness and acidity, as well as medium to strong body.

c) Resulting from "wet process honey coffee" (pulped natural or decascado)

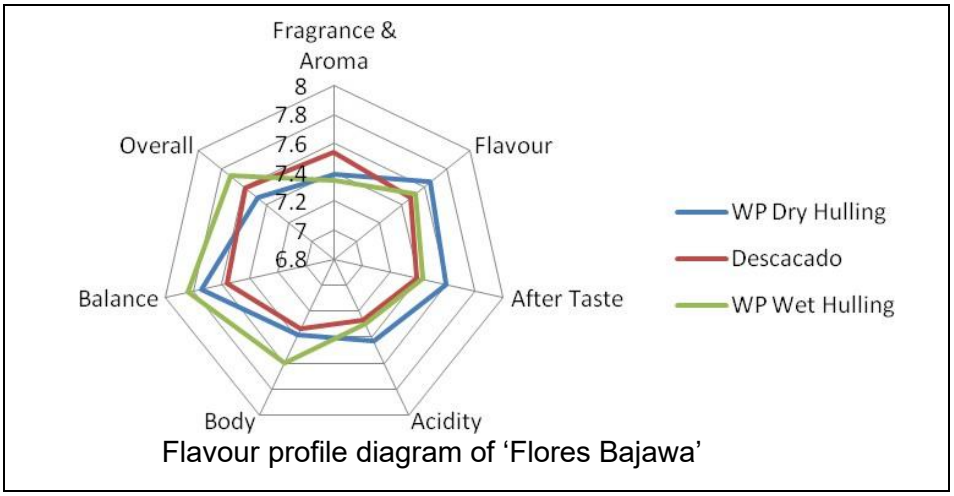
Physical quality:

A maximum moisture content of 12% (weight/weight), free from mold odor, light green color, and a maximum number of physical defect value of 11 beans per 300 grams coffee beans.

Taste profile using SCAA cupping method:

Exhibits the most intense aromatic expression, with Fragrance & Aroma scoring (7.8), followed by Flavour (7.5), Aftertaste (7.4), Acidity (7.2), Body (7.0), Balance (7.3), and Overall (7.4). This corresponds with the presence of dried-fruit notes, medium body (thickness), moderate acidity, and lower sweetness.

Through medium roast method, Flores Bajawa' with wet process honey coffee or pulped natural/decascado, revealed a dried fruit aroma, with less sweetness and medium acidity, as well as medium body.



Flavour profile diagram of 'Flores Bajawa'

D. Description of Geographical Environment (Natural Factor and Human Factor)

D.1. Natural Factors

The geographical position of Arabica coffee plantation area in Ngada Regency is in the middle of Flores island, East Nusa Tenggara Province with tropical conditions, located at latitudes between 120° 05‟E and 121°03‟E, as well as arc lines between 8 °45‟S and 8°52‟S. This area has a cool mountainous nature that includes slopes and undulating plains. The vegetation includes forest plants, horticulture, and food crops as well as plants of Arabica coffee plantations.

Some elements of the physical environment in Ngada regency are as shown in Table 1. located at an elevation between 1,200 – 1,550 meters asl, coffee plantations are ideal for Arabica coffee cultivation. The average rainfall of 2,597 mm per year with an average rainy day of 115 days per year is relatively good for Arabica coffee cultivation. In the dry months the soil moisture conditions are still sufficient to support the growth of coffee plants.

The majority soil type is Andisol which has high chemical fertility and good physical soil conditions; thus, it is also very supportive for the growth of Arabica coffee. The high level of soil fertility will affect the taste and physical quality of the produced coffee beans.

Table 1. Elements of the Physical Environment of the Ngada Regency

Relief	Elevation	1,200 – 1,550 m dpl
	Slope	0 – 60 %
Weather	Rainfall	- 2,597 mm/year, - 4 – 5 dry months/year, - dry period of June – September, - type of rainfall according to Schmidt Ferguson C – D (dry)
	Temperature	15 – 25 °C
	Relative humidity	80 – 99 %
Soil	Geological formation	Mountain rocks consist of lava, breccia, agglomerates, tuff, interspersed with tuff and pumice
	Soil Type	Andisol with high physical and chemical fertility

Texture	Clay loam, loam
Solum	100 – 160 cm
C-organic	High
Cation exchange capacity	High
Water shortage period	July to August

Source: Plantation Service Office of Ngada Regency, 2007

Topography

Ngada Regency with Bajawa as the capital has a mountainous area in the middle and lowlands in the south. Coffee plantations are located in the middle of the mountainous area because it is ecologically suitable, namely higher rainfall, the position relative to sea level is much higher than in other areas. Arabica coffee centers are scattered in Bajawa and Golewa districts at an elevation of more than 1,000 m asl. The Arabica coffee plantation area in Ngada district is an elevation area with topographic conditions that vary from flat, undulating to mountainous. In this area there are *lungur-lungur* that stretches in a north-south direction and coffee plantations are found on the hillsides. The variation in elevation between villages is very diverse, even in certain villages the difference in elevation between farmers' plantations is quite striking. The elevations of villages where *'Flores Bajawa'* production can be carried out are listed in Appendix 1. Dadawea Village (PPU Bowoso) in Golewa district is the lowest village at around 1,162 meters asl. While the highest village is Ngoronale village (PPU Bowoso) in Bajawa district at an elevation of more than 1,333 meters asl. The coffee PPU belonging to the farmer groups are located in the vicinity of the farmers' Arabica coffee plantations which are located in the range between 1,100 - 1,400 meters asl.

Climatic Conditions and Rainfall

Ngada Regency is located in the middle of Flores island, where the climate is generally influenced by the surrounding environment and the dynamics of sea temperature as well as wind blowing from Australia. In general, the climate in eastern Indonesia, which includes daily air temperature, rainfall and other environmental factors, has little rainfall, and a long dry season. However, in Ngada regency, particularly in Bajawa and Golewa district area, the conditions are unique. The rainfall is relatively higher than in the eastern region.

The analysis of rainfall data for 17 years, namely from 1990 to 2006 from the rainfall measuring station in Bajawa shows that the average rainfall in Bajawa district is 2,597.23 mm/year and 115 rainy days per year. Meanwhile, the measuring station in

Golewa district states that the average rainfall is 2,561.35 mm/year with 119 rainy days/year. The results are presented more clearly in Table 2

Table 2. Rainfall and rainy days in Ngada Regency

No	Description	District	
		Bajawa	Golewa
1	Average rainfall (mm/yr)	2597.23	2561.35
2	Average rainy days (days/yr)	115	119
3	Number of Dry Months (month/year)	5.2	4
4	Number of wet months (month/year)	5.8	7
5	Rainfall type (Schmidt & Ferguson)	D	C

Source: Plantation Service Office of Ngada Regency, 2007

The climatic characteristics of the Bajawa area show that there are 4 or 5 dry months. This period usually lasts from June to October. In the Bajawa area from June to November there is a routine water deficit for the purpose of coffee plants. Soil moisture during dry months is usually sufficient to support the coffee's need for water.

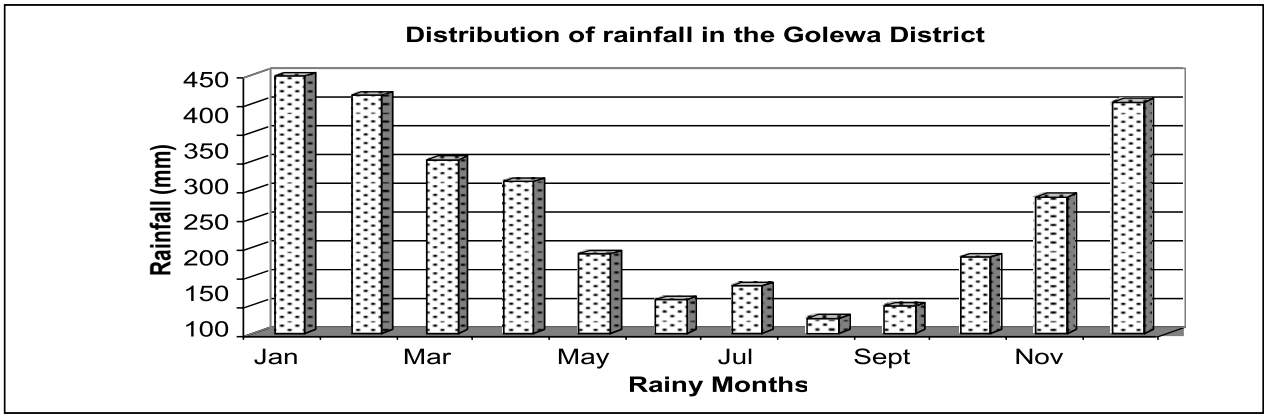


Figure 1. Rainfall in Golewa District, Ngada Regency (1990 – 2006)

The dry period in Bajawa has a positive impact on coffee production, because water stress causes flower buds to experience dormancy for a sufficient time. Physiologically, flower bud dormancy is very necessary so that flowers can bloom properly after rain. Their soil management practice by adding organic matter by farmers is one of the effective methods for storing soil moisture. In addition, sufficient shade, thanks to the trees in the coffee plantations, is able to reduce the air temperature around the canopy during the dry season so that the process of draining soil moisture can be reduced.

As mentioned above, the region receives approximately 2,500 mm of rainfall annually, distributed seasonally and followed by a defined dry period. This rainfall pattern supports consistent cherry development and contributes to bean density, sweetness, and overall clarity of flavour in the final cup.

Temperature and Moisture

Based on observations during the previous years the humidity is relatively high (> 80 %), while the daily air temperature ranges from 15°C (at night), 22 – 25°C (in the morning) and 23 – 26°C (at noon). At certain times the air temperature at night can reach 5 °C, namely when a cold wind blows from Australia.

Geology

Based on the geological report of the Ruteng Valley, East Nusa Tenggara, Ngada district consists of areas of (1) quaternary age, Qct (coastal steps), Qtva (inerie volcano), Ohva (young volcano Abulobo), Qtvw (old volcano) and (2) tertiary age, Tmk (Kiro formation), Tmb (Bari formation), Tmn (Nangapanda Formation and Tmt (Tanahau Formation).

The geomorphological processes that occur in Ngada and Nagekeo regencies are the lifting and folding (structural) processes that occurred during the Middle Miocene era and the volcanism process that lasted from the late Miocene to Pliocene. The process of volcanism produced the old and young volcanoes of Inerie and Abulobo (Qtvl). Old volcanic rocks consist of lava, breccia, agglomerate, tuff, interspersed with pumice tuff. The youngest geology in this area is the coastal step (Qct) resulting from the Fluvial-Marin process, consisting of alternating conglomerates, sandstone and a little limestone.

The process of lifting and folding forms the physiography of hills and mountains is found in the northern part. The northern hill areas include the Bari formation (Tmb), Kiro formation (Tmk), Nangapanda formation (Tmns) and Tanahau formation (Tmt). The oldest estimated rocks in the Ruteng sheet are andesite, dacite, basalt rocks which belong to the Kiro formation. This formation is the oldest formation, cross-overlapping with the Nangapanda formation and the Bari formation, overlapping in line with the Tanahau formation. The rocks of the Nangapanda and Bari formations are andesite, while the Tanahau formation consists of sandstone and limestone.

According to the results of measurements by the BPTP of East Nusa Tenggara, in 2003, Ngada Regency is dominated by mountainous and hilly areas. The results are

listed in Table 3.

Table 3. Topographic Distribution of Ngada Area (Ngada and Nagekeo)

No	Description	Area (ha)
1	Mountainous	168,878.2
2	Hilly	78,346.6
3	Low hilly	7,187.2
4	Relatively sloping	15,600
5	Relatively flat	14,382.4
6	Wavy	2,372.2
7	Steep	1835.2

Source: Basuki et al., 2006, modified.

As mentioned, 'Flores Bajawa' is cultivated at elevations of 1,000–1,550 m a.s.l., with most plantations located between 1,100–1,400 m, a range recognised as optimal for Arabica coffee. This high-altitude environment provides cool temperatures of 15–25°C, relative humidity above 80%, and a pronounced diurnal temperature variation. These conditions slow the maturation of coffee cherries, allowing the development of higher acidity, greater aromatic, and the distinctive floral notes characteristic of 'Flores Bajawa'.

Soil Properties in the Ngada Regency

The locations for taking soil samples in 2008 were coffee plantations constituting the work area of Product Processing Units (PPU). Soil samples were taken from 9 locations which were evenly distributed in Arabica coffee plantation centers (Table 4).

Table 4. Soil Sampling Locations in Ngada Regency

No	Location	PPU	Elevation (m a.s.l.)	South Latitude	East longitude
1	Were I	Ate Riji	1,162	08^0 52" 28.3"	121^0 03" 48"
2	Dadawea	Bowoso	1,143	08^0 50" 50.9"	121^0 03" 05.2"
3	Mangulewa	Papa Wiu	1,296	08^0 49" 46"	121^0 00" 55.5"
4	Beiwali	Fa Massa	1,258	08^0 47" 10.4"	120^0 57" 4.6"
5	Ngoranale	Peupalo	1,333	08^0 45" 39.9"	120^0 57" 19.5"
6	Bomari	Papa Taki	1,223	08^0 49" 06.4"	120^0 58" 07"
7	Turenaru	Suka Maju	1,284	08^0 48" 33.6"	120^0 59" 28.4"

8	Rakateda II	Mezamogo	1,194	08^0 50" 42.9"	120^0 00" 36.9"
9	Tiba Ribo	Wongawali	1,295	08^0 46" 54.6"	120^0 57" 17.3"

Notes: - The sampling location is at the village or hamlet level.

- PPU – Product Processing Unit.

The topography of sampling locations is generally flat to wavy, while the physiography is mountainous with a macro slope between 8 – 25%. The soil belongs to the Andisol order with quite a lot of allophane content. Allophane minerals are the result of the eruption of Mount Abulobo in the east of the location. There are no rocks that interfere with plant roots to a depth of 100 cm.

Table 5. Soil Texture of Several Locations in Ngada Regency

No	Sampling Location	PPU	Soil Texture
1	Were I	Ate Riji	Clay loam
2	Dadawea	Bowoso	Clay loam
3	Mangulewa	Papa Wiu	Clay loam
4	Beiwali	Fa Massa	Clay loam
5	Ngoranale	Peupalo	Loam
6	Bomari	Papa Taki	Loam
7	Turenaru	Suka Maju	Loam
8	Rakateda II	Mezamogo	Loam
9	Tiba Ribo	Wongawali	Sandy clay loam

The results of soil texture analysis show that the soil in the Arabica coffee area in Bajawa and Golewa districts are suitable for the purpose of Arabica coffee cultivation, namely loam to clay loam. The soil structure in moist conditions is friable, while it is loose in dry conditions, with black soil color. For areas with a fairly high slope (> 30%) it is relatively prone to erosion.

Observations on the nutrient content in the soil show that in general the soil in the Arabica coffee centers in Beiwali, Ubedolomulo, Bomari, Were I and Mangulewa villages could be said to be quite good. The carbon content in the soil is very high, however, additional organic matter in the form of compost must still be given. Soil has a high content of macro nutrients such as K, Ca, and Mg, soil acidity or soil pH with H2O solvent at a depth of up to 40 cm on average 6.0 or almost neutral. With such a soil pH, the availability of nutrients in the soil is relatively good, and when observed, the

ability of the soil to store and provide nutrients is even quite good. These nutrients can play a role in shaping characteristics such as Potassium (K) to supports the development of sweetness and enhances acidity balance, Calcium (Ca) and magnesium (Mg) contribute to bean hardness, structural integrity, and the observed bean width of around 6.5 mm. These properties support bean development and density, sweetness and acidity balance, bean size and hardness, and the formation of aromatic precursors responsible for the distinctive floral aroma.The nutrient content of phosphorus, which is greatly needed by plants to grow and a source of metabolic energy, varies from very low to high, but is generally low. In volcanic soils such as in the Bajawa Arabica coffee center, the P (phosphorus) level is naturally low, because these nutrients are absorbed by allophane minerals. Therefore, fertilization SP 36/18 or Rock Phosphate needs to be done.

These soil conditions support the formation of chemical and sensory profile, including its floral aroma, sweetness, balanced acidity, and medium to high body (thickness), and form an essential part of the ‘Flores Bajawa’.

Therefore, the characteristics of ‘Flores Bajawa’ come from several factors. These characteristics are also supported by human intervention which is the human factors of ‘Flores Bajawa’.

D.2. Human Factors

The raw material for red coffee cherry of ‘Flores Bajawa’ is produced by farmer organizations that are farming on dry land (agriculture that does not use technical irrigation) in the Arabica coffee area of the Ngada district called the "Farmer Group". Farmer groups are essentially farm organizations that have a long history and tradition, formed in areas that share the same agricultural orientation.

Coffee farmers who are members of farmer groups have high enthusiasm and expectations and consciously unite to be able to improve the quality of coffee products, so that their hope of obtaining high incomes will be realized.

In each village, one farmer group has usually been formed with between 50 and 100 farming family members. Farmer groups play a role in managing social and religious affairs, particularly in organizing community activities. Farmer groups are also responsible for organizing agricultural activities and for obtaining agricultural data. They manage collective projects that benefit the community. Sometimes these farmer groups receive funds from the government to carry out certain activities. To run this Farmer Group, its members democratically elect a board of executives consisting of Chairman, Secretary and Treasurer.

Since the 2004s, these Farmer Groups have been officially recognized and have

developed themselves on dry land (without irrigation) in the Arabica coffee area of the Ngada district. The growth and development of these Farmer Groups are encouraged and facilitated by the Government and other institutions.

Some of the farmer groups, namely around 14 farmer groups in the Arabica coffee area of Ngada district, received facilities for implementing a wet process of coffee from the regional government and the private sector to produce coffee in the form of HS coffee and Green coffee produced by the Processing unit in the farmer group.

Thanks to the development of farmer groups and the existence of local regulations, farmers are able to rationalize the sale of red cherries to develop wet processed coffee. Without farmer groups, farmers who only have limited land will find it difficult to get sufficient income from this coffee business. Production of high-quality coffee for farmer groups can increase income significantly.

Limited land will force farmers to intensify agricultural production. However, they also have the will to diversify their agricultural activities and combine coffee plants with other types of crops (cloves, bananas, etc.) and livestock. This combination produces an interesting and unique planting system, where coffee can get shade from other plants, and livestock can get their feed. Livestock waste becomes manure (organic) that can be used for coffee trees. Since *'Flores Bajawa'* is grown without using other fertilizers or chemical pesticides, this *'Flores Bajawa'* is grown organically.

Farmers in the Arabica coffee area of the Ngada district always use shade trees, for example *dadap (Erythrina orientalis)* which is the most abundant crop, beneficial for coffee trees, and livestock fed from the leaves of the shade.

To obtain the characteristics of 'Flores Bajawa', people of Ngada Regency have been practicing certain ways to cultivate the coffee that has been inherited for generations. Apart from the way people of Ngada Regency found a method to plant coffee under shade trees, using organic fertilizers, and without using any synthetic pesticides, as well as selective picking (only ripe fruit).

The human factors that influence 'Flores Bajawa' can be separated into 3 (three) processes, as shown below.

1. <u>Wet process, dry hulling.</u>

   This method is associated with floral aroma, strong sweetness, bright acidity, and medium to strong body when roasted to medium level. Fermentation lasts 18–36 hours, allowing full mucilage breakdown, followed by thorough washing that produces a clean cup. Drying takes approximately 15 days, with seed-thickness adjustment on the second day before hulling. This extended and controlled drying

supports the development of clarity, sweetness, and acidity.

2. Wet process, wet hulling.

The semi-washed method yields a floral aroma with balanced sweetness and acidity and medium to strong body. Fermentation is shorter (12–18 hours) and does not fully remove the mucilage. Beans are hulled at a higher moisture content (~30%), followed by sun-drying until they reach 12%.

This shorter fermentation and two-stage drying process results in a slightly mellower cup, with moderate acidity and balanced sweetness.

3. Wet process honey coffee (pulped natural or decascado)

The pulped natural method omits fermentation, leaving the mucilage intact during drying. This process produces a cup with dried-fruit aromatic notes, medium acidity, medium body, and lower sweetness. The presence of mucilage during drying enhances fruity complexity but reduces perceived sweetness.

E. Regional Boundary Map

E.1. Area of Red coffee cherry and Wet hard shell (HS) Coffee

'Flores Bajawa' can only be obtained from red coffee cherries and hard shell (HS) coffee produced in the suitable area of Bajawa and Golewa districts.

Other criteria used as requirements are soil and climatic characteristics, Arabica coffee production system and collective management of coffee production within farmer groups. All of these factors are homogeneous in a limited area. The impact on coffee quality has been described above. Sensory analysis has been carried out in this area and has proven the existence of high-quality coffee throughout the restricted area. The area and production of Arabica coffee in this area is expected to increase in the future due to new plantings by farmers.

Administratively, this area includes Bajawa district and Golewa district. There are 24 villages in the two districts that are included in the area that needs to get GIP.

The soil in this area is classified as volcanic (Andisol type) which is quite fertile and suitable for many plants, so this area is basically an agricultural area with intensive and environmentally friendly agricultural cultivation with good, diversified cropping patterns. The climatic conditions are relatively homogeneous and suitable for Arabica coffee plants, because:

1. Rainfall is quite important (2,597 mm/year), for 6-7 months of the rainy season. The dry season lasts 4-5 months, with 3 months of clear dry season. Bajawa farmers have adapted to this unique northern climate, The weather is generally cool (between 15 °C and 25 °C),
2. The difference in air temperature between day and night is usually sufficient,
3. This restricted area produces Arabica coffee about 50% of the total Arabica coffee production in East Nusa Tenggara Province. The production process in this area is relatively homogeneous, due to the existence of the same production model (small plantations are managed through farmer groups throughout the area) and the same natural factors.

Area of HS Coffee Drying, Green Coffee ProductionThere is a requirement that the red cherries come from the area as described above, and are processed in the same area into wet HS coffee. Sun drying is done in every PPU. However, after this sun drying, the storage of HS coffee must be carried out at the processing site (at the location where the red cherries are processed).

Final hulling and sorting (with the aim of obtaining coffee beans with a physical defect value of less than 5 per 300 grams, and with a size greater than or equal to the value of 16), as well as labeling of coffee packaging (see Part I for details) can be carried out throughout Flores. For the purpose of controlling the hulling place and preparation of lots for export (sorting and labeling) must be communicated with MPIG.

Table 6. Production process stages and areal limitations for *'Flores Bajawa'*.

Production Process Stages	**Places**
Red coffee cherry production (Harvesting and Fruit sorting)	Geographical Area
Processing up to wet hard shell (HS) coffee (Depulping, fermentation & washing, sun drying)	Geographical Area
Sun drying	Flores Island, including Geographical Area
Storage (2 months)	Geographical Area (processing place)
Hulling	

Sorting	
Packaging of Green coffee	Flores Island, including Geographical Area

F. History and Tradition

F.1. History of Coffee in Bajawa

Based on information from David Lado Baraus, an observer of the history of Flores, the first trial of coffee cultivation was carried out in Larantuka and East Flores in 1871. The coffee was the result of an introduction from one of the regencies in eastern Java, namely Pasuruan. Knowledge of cultivation techniques was still very low, causing the first coffee introduced by the Portuguese with the help of Catholic missionaries to wither in the field. In 1874, for the second time, coffee was introduced from Timor Leste which was planted in Larantuka. The introduction of coffee from Timor Leste was also continued in 1894. However, many of the coffee plants grown in Larantuka withered in the field, until it was concluded that the entire Flores land was not recommended for large-scale coffee development because there was no hope of growing well.

Traces of the introduction of coffee in Flores in the past are strongly suspected to have also reached Bajawa. The indicator is the use of the word "*sombar*" in the Bajawa language which means coffee shade tree. The word "*sombar*" is allegedly derived from the Portuguese language "*sombra*" which means shade or in full "*arvore de sombra*" which means a shade tree. The word *sombar* became popular in the community, allegedly because of the initial failure of coffee development on Flores Island was caused by the lack of or not using shade plants for coffee cultivation. The use of shade trees is crucial in coffee cultivation in Flores, considering that Flores is an island with a dry climate.

In 1926-1929, many Seminaries which were a means of uniting Catholic Christians were established in Flores. The world recession in 1930 required the Seminaries to have plantations and livestock to strengthen the people's economy. In the same year, 1930, the first coffee plantation under the supervision of Seminary in the Mataloko area (near Bajawa) was developed resulting from introduction from Timor Leste, coffee cultivated under *sombar*. The coffee grew well and produced, eventually leading to many people around the Seminary to grow coffee outside the plantation area.

In 1947 a public school teacher named Joseph Ratu Depu formed the Catholic Cattle Farmers Union Organization (STATERK) which provides a forum for farmers to share their experience. However, at that time STATERK still had a vision only of

strengthening food crops, with the hope that the Ngada community should not have any shortages of food. Until 1950, Herman Deru formed the Association of Agricultural Harmony Brotherhood (PPKT) which not only pay attention to food crops but have a policy that hot areas are planted with coconuts while cold areas are planted with coffee. Even for the first time the PPKT building located in Mataloko was made to grow coffee in large quantities.

In 1958, Law 69/1958 regarding the formation of level two (II) regions in the level one (I) regions for Bali, West Nusa Tenggara and East Nusa Tenggara regions became the basis for the formation of the Agriculture and Plantation Service Office.

The PRPTE project which was started in the 1978/1979 budget year through the Agriculture and Plantation Service Office of East Nusa Tenggara Province endeavored to revive the cultivation of Arabica coffee in Flores through the Export Crop Rehabilitation and Development Project (PRPTE). The consideration for Arabica coffee development in Flores is not only based on export interest, but Coffee plantations in the Ngada Regency are also considered to have a strategic role in preserving the hydrological function. PRPTE in Flores has been able to restore and increase the area of plantations in Flores so coffee production from Flores started to increase. In the late 1980s, the area of coffee plantations in Flores reached approximately 8,000 ha. The Special Area Development Program (P2WK) launched in 1993/1994 became the beginning of wider coffee development in the Ngada area. However, the increase in production apparently has not been followed by the acquisition of good quality.

To overcome this, in 2004 the Plantation Service Office of NTT Province in collaboration with the Indonesian Coffee and Cocoa Research Institute (PPKKI) conducted a study to develop an Arabica coffee agribusiness system in Ngada and Manggarai Regencies with an institutional empowerment approach at the farmer level. The results of the study, among others, show the low quality of coffee produced by farmers and cheap prices. The price of Arabica coffee beans in the Bajawa market is only about 40% of the price of the New York terminal, while in the Ruteng market the price is about 70% of the price of the New York terminal. The price of coffee in Bajawa is cheaper because at that time the red coffee cherry picked by farmers are mostly bought by traders from Ruteng and processed in Ruteng.

In this collaboration, the function of the Plantation Service Office was more emphasized on cultivation in the farmer sector, while the function of the PPKKI was more emphasized on solving market issues, technology assistance, quality improvement, and building business networks.

The machines that are facilitated for PPU are in the form of pulpers and washers.

In 2005 PPKKI started exploring the market by bringing in an exporter (PT Indokom Citra Persada) based in Sidoarjo as a potential buyer. This agribusiness development uses a partnership pattern called the "Mediated Partnership Model" or abbreviated as MOTRAMED. In this model the Coffee Farmer Association (APEKI) partners directly with exporters, while PPKKI acts as a mediator.

At the beginning of 2005, there was a socialization of the importance of quality to the selling price of Arabica coffee to farmers. In addition, training which was packaged in the form of a field school on wet processing procedures for Arabica coffee to obtain a good taste quality using the available machines was also started. The training was guided directly by senior researchers from PPKKI. The quality improvement program and marketing system were initiated in two farmer groups, namely Sukamaju (Ubedolumolo Village) and Fa Masa (Beiwali Village). Each farmer group has a product processing unit (PPU), each equipped with tools and machines as well as drying racks to carry out a good and clean wet processing process. The quality of Arabica coffee processed by farmers in the two PPU is very good and can be exported to the specialty coffee segment in the United States under the name "Flores Bajawa".

In 2006 the Plantation Service Office facilitated tools, machines, and drying racks in three other farmer groups. After the training, farmers have started to process coffee with the wet process, and it turns out that they are also able to produce good quality coffee. The government always adds PPU every year according to budget availability, so that in 2011 14 PPU which are able to produce prime quality "Flores Bajawa" have been built.

The success of farmer groups in improving coffee quality and marketing *'Flores Bajawa'* to the specialty segment was able to increase the selling price at the farmer level to 95-100% of the New York terminal price.

The hope of an improvement in prices seems to have encouraged farmers to care for and grow Arabica coffee again. This can be seen from the interest of farmers to ask the Government for assistance with coffee seedlings, and some are even self-sufficient in procuring seeds. In 2007 the Government assisted seedlings for planting in an area of approximately 70 hectares. This seedling assistance continues to be carried out every year in varying quantities.

Since 2008 the situation has continued to improve. More and more consumers want to buy wet-processed Arabica coffee, and this demand can be fulfilled by PPU developed by the Plantation Service Office. In addition, the government which continues to provide tools and machines to farmer groups, also help with some equipment. Some farmer groups also buy their own equipment. This new business

situation further encourages farmers to always pick red fruit, increase productivity, and increase the area of coffee plantation.

The description of the history of Arabica coffee from Ngada above shows that for more than a century, coffee has become a primordial farming community culture. Even if there are high fluctuations in cultivated land, coffee remains an important crop and a driving force for regional development. Currently, 'Flores Bajawa' has a good reputation in the domestic market as well as in foreign markets.

F.2. Customs

The Bajawa society is of matriarchal type and still holds firmly to the beliefs of their customs. In carrying out the duties and functions of farmer groups, they are guided by togetherness and mutual aid. The manifestation of togetherness in producing, processing and marketing Arabica coffee products are as follows:

a) Strengthening religious feelings in getting closer to the God Almighty in Churches where they carry out worship activities,
b) Carrying out social and religious activities as a form of gratitude and thanks to the God Almighty, while also asking for blessings so that the coffee produced is of high production, quality and good price,
c) Carrying out certain traditional ritual activities when plants are attacked by pests and disease,
d) Making internal rules that must be obeyed by members, as well as sanctions that will be imposed by customary groups democratically through traditional meetings,
e) Conducting customary meetings and farmer groups on a regular basis to determine several matters like:
   - Time for doing activities in mutual aid, both coffee cultivation, harvesting, processing and marketing,
   - Update of internal rules to adjust with developments,
   - Determining incidental meetings related to development, counseling and so on.

So, it is evident that *'Flores Bajawa'* is produced by institutions that are very important for religious and social life. As described above, people in the Ngada district think that it is very important for them to carry out social and religious activities when they produce Arabica coffee (usually held before and at the end of harvest, and when plants are attacked by pests and diseases). This further strengthens the link between production and local customs and beliefs.

Despite the fact that *'Flores Bajawa'* is produced by local social organizations/institutions, it can be emphasized here that there is a link between coffee and the local Ngada culture, and that coffee is a product that has traditionally been used by local people, among others:

a) Coffee is used as a gift or donation in certain social events such as weddings, child recognition, and death. Neighbors, relatives and relatives often donate coffee to be consumed during the activity.
b) Coffee is also used as a healing medicine, for example if someone feels dizzy, they usually drink coffee immediately. If there is a small bleeding wound then coffee can also be used as a wound cover, etc. For women who have difficulty in giving birth, family members usually give sweet coffee drinks to help the birth process.
c) Coffee becomes the main traditional drink after *moke* (alcoholic drink distilled from palm sap) which is consumed at important traditional ceremonies for the local community.

Therefore, coffee has become an important part of the local Bajawa culture. After decades of development, being known both in NTT Province and outside NTT, and being integrated into the local culture as part of the culture, *'Flores Bajawa'* production shows a strong and sustainable link with the region.

G. Goods Production Process

The production process of *'Flores Bajawa'* includes the following activities:

1) Arabica coffee cultivation to produce red fruit;
2) Harvest;
3) Upstream post-harvest processing; and
4) Downstream post-harvest processing.

G.1.Arabica Coffee Cultivation

Cultivation techniques used by farmers to produce *'Flores Bajawa'* are basically done organically.

G.1.1. Planting and Seeding Materials

- The currently used varieties are S-795 (dominant), Arabusta Timtim, and Typica (Juria). The program to increase productivity and expand coffee in the future will use Arabica S-795 variety, whether propagated generatively or vegetatively.
- The use of a new variety recommended by the Government that is more productive and

has a distinctive taste of “Flores Bajawa” coffee will be carefully considered by MPIG.

- The seeds used by farmers must come from seed plantations that have been certified by the Government.

G.1.2. Seeding

- In principle, MPIG together with farmer groups will carry out their own Arabica coffee seeding. Coffee seedlings from suppliers must be certified and with the knowledge of the Service Office in charge of the plantation sector.
- Seeding by MPIG will be carried out by applying the principles of good agricultural practices which will be consulted with the Service Office and/or competent research institutions.
- The coffee seeds to be planted must be of the correct variety and planted in plastic bags (polybags).
- Ready-to-plant seedlings must be healthy and have a minimum of a pair of primary branches and a maximum of 3 pairs of primary branches. In the first pair of primary branches, each has a minimum of two internodes or two pairs of leaves.

G.1.3. Land for planting coffee

- Coffee is planted on land owned by farmers or legal customary land.
- There are 3 (three) status of land that are legally permitted for planting coffee in Ngada Regency. The first land status is the status of Other Use Area (APL). APL is an area outside the state forest area designated for development other than the forestry sector (such as settlements). APL usually is also the property of the community.

  The next land status is Social Forestry, social forestry is a sustainable forest management system implemented in state forest areas or customary forests implemented by local communities to improve their well-being. Social forestry can be divided into 5 (five) schemes, namely Village forest, community forest, community plantation forest, Customary forest and Forestry partnership. Social forestry has strict regulations, among others must not use chemicals, only certain commodities are allowed (including coffee), must apply Good Agroforestry Practices, must be local communities and obtain approval from the relevant authorities.

  The next land status is Land for Agrarian Reform Objects or TORA. TORA is land controlled by the state and/or land already owned by the community for legalization. Generally, TORA is sourced from derelict state land. So that this land is delegated to the surrounding community to be able to resolve land dispute conflicts and overlapping land status.

The division of areas based on this status refers to the official map of the Ministry of Environment of the Republic of Indonesia, while the opening of plantations by illegal logging is prohibited. The planting process must refer to the Conservation principles.

- Coffee is grown by taking into account the aspects of environmental sustainability (conservation of soil, water, and biodiversity).
- Land planted with coffee has a maximum slope of 45°. On land with a slope of 15° – 30° a bench terrace is made with a transverse direction slope (mountain belt), while on land with a slope of 30° –45° an individual terrace (per plant) is made. Land on a slope of 0° – 15° if deemed necessary a terrace according to the slope conditions is made.
- The lips of the terrace are planted with useful terrace-strengthening plants (grass, fodder, calliandra, etc.)

G.1.4. Preparation of shade plants (sombar)

- Coffee planting must use shades, both temporary shades as well as permanent shades. Shade plants are prepared one year before the time for planting coffee seedlings. The intensity of sunlight received by the coffee plant canopy is set at about 60%.
- Temporary shades need to be well prepared on new (open) land, while the distance is adjusted to the shade plants and coffee spacing planned. Plant species that can be used as temporary shade are for example Tephrosia candida (for green manure), Moghania macrophylla (for animal feed and green manure), Cajanus cajan (pigeon pea, for vegetables), Musa sp. (bananas, for fruit), etc. Temporary shelter is only maintained for 2 years after planting.
- Permanent shades can be in the form of one canopy layer (using one plant species) or with more than one canopy layer (using more than one plant species).
- The one-layer canopy permanent shade plant species that can be used are *dadap* (Erythrina sp.) and river tamarind (Leucaena sp.). The distance of shade planting is adjusted to the coffee planting distance plan.
- In order to maintain biodiversity, in the future, shades will still be directed to use more than one canopy layer (multi-strata), in particular using local tree species that are suitable for use as coffee shelters. The arrangement and number of multi-strata shade trees are adjusted to the canopy property, land slope, and coffee planting distance.
- For terraced land, shade trees are planted on the lip of the terrace.

G.1.5. Preparation of coffee planting holes

- On flat land and sloping slopes, coffee is planted at a distance of 2.5 m x 2.5 m or 3 m

x 2 m (north-south line), so that the coffee plant population is around 1,600 trees/ha. On land with terraces, the coffee planting distance in the terraces is between 2 m – 3 m, taking into account the distance between the terraces, so that the plant population is highly dependent on the degree of slope of the land.

- Coffee planting holes are made with a size of 40 cm x 40 cm x 40 cm. When digging the top and bottom layers of soil are separated, and the hole is left open for approximately one month.
- Before closing, hole are filled with manure and/or compost at a dose of 10 – 20 kg per hole mixed with soil. Closing of planting holes is done at least two weeks before planting coffee seedlings.

G.1.6. Planting coffee seedlings

- Prior to planting, weeds around the planting hole are cleaned, the shade plants deemed necessary are cut (too dark, untidy, dry branches, etc.), and re-adjustment is made so that the rows of coffee plants can be straight.
- Planting of coffee seedlings is carried out at the beginning of the rainy season, when the rainfall has reached a minimum of 200 mm.
- To avoid the occurrence of crooked roots, before planting, cut the base of the polybag with a thickness of 1.0 – 1.5 cm using a sharp knife or sickle.
- One month after planting an evaluation is carried out. Dead plants are immediately replaced with new seedlings.

G.1.7. Coffee plant care

a. Unproductive Plants (*TBM*)

- The conservation of water, soil and soil fertility is prioritized. For each coffee plant, a trench (vent) is made with a distance of 20-30 cm from the coffee stem, with a size of 120 cm x 40 cm x 40 cm. The trench is filled with organic matters (waste, weed cuttings, manure, compost, etc.). When the trench is full (usually for a year) a new trench is made on the other side of the plant in turn, so that after four years it will back to the trench that is first made. On sloping land, terrace maintenance is carried out regularly so that it can function properly in preventing erosion.
- At this time, farmers in Bajawa have not carried out coffee plant pruning well, so most farmers' plantations have multiple stems and irregular and less productive branches. In the future pruning will be directed to well-patterned single stem and multiple stem systems.
- For single stem pruning, two stages are made, starting with shape pruning. Shape

pruning is made by cutting the main stem (orthotrope) at a height of between 120 cm - 140 cm (usually in the fifth year) 2 or 3 years after planting), and cutting the top 2 – 3 side branches (plagiotrope) on the 3rd or 4th internodes. Then the plant is left for 1-2 years so that productive branches grow on the cut side branches and the plant grows firmly. On the cut stem, new shoots will grow upward which are called "water shoots" or "orthotrope shoots" or "wiwilan" (Javanese language). These water shoots must be removed until the primary branches are cut relatively strong (woody).

- For multiple stem pruning, 2 – 3 planting stems are made with the pruning cycle of 5 years. To grow a new stem, a coffee plant which has grown firmly is cut at the height of 40 cm (usually about one year after planting) or the plant is bent. New water shoots growing from the result of stem cutting or bending is selected and only 2 – 3 best shoots are maintained as new stems.
- Fertilization only uses organic fertilizers (manure, compost, bokashi, etc.) with a dose of 5 – 10 kg/tree/year, applied 2 times (beginning and end of the rainy season) by inserting them into the prepared trench. Natural inorganic fertilizers can be used as long as they do not conflict with the principles of organic farming.
- OPT control is carried out with integrated principles (PHT), which prioritize preventive measures and use environmentally friendly methods. The use of OPT poisons (synthetic pesticides) that are not in accordance with the principles of organic farming are prohibited. Weed control is carried out manually and weed cuttings are put into the trench as an organic matter. PHT measures for each disease, pest, and weed will be consulted in details with the relevant Technical Service Office and other competent parties.

b. Productive plants (*TM*)

- As in TBM, the maintenance of TM must also prioritize the conservation of water, soil and soil fertility. A trench (vent) with a distance of 30-40 cm from the coffee stem, with a size of 120 cm x 40 cm x 40 cm is made for each coffee plant. The trench is filled with organic matters (waste, weed cuttings, manure, compost, etc.). When the trench is full (usually for a year) a new trench is made on the other side of the plant in turn, so that after four years it will return to the trench that is first made. On sloping land, terrace maintenance is carried out regularly so that it can function properly in preventing erosion. For TM, it is necessary to pay more attention to the maintenance of drainage channels to prevent inundation and potential landslides.
- In a single stem pruning system, routine activities that need to be carried out include:
  - Pruning water shoots (*wiwilan*) that are not needed (this activity is often called

wiwil kasar),

- Pruning unwanted plagiotroph shoots and branches (worm branches (weak growing), protected branches, dry branches, and ill branches),
- Post-harvest pruning (pruning of branches that have produced 3 times, pruning of dominant growing branches, and shortening of plants).

- In a multiple stem pruning system, routine activities that need to be carried out include:
  - Cutting water shoots (*wiwil kasar*),
  - Cutting primary branches that are dried, attacked by pests, and have produced 3 times,
  - Cutting stems for rejuvenation every five years.
  - Branches and twigs resulting from pruning activities are collected and put into a trench to become compost.
  - Fertilization only uses organic fertilizers (manure, compost, bokashi, etc.) with a dose of 10 – 20 kg/tree/year, applied 2 times (beginning and end of the rainy season) by inserting it into the prepared trench. Natural inorganic fertilizers can be used as long as they do not conflict with organic farming principles (for example dolomite, rock phosphate, etc.).
- OPT control is carried out with integrated principles (IPM), namely prioritizing preventive measures and using environmentally friendly methods. The use of synthetic poisons for OPT (synthetic pesticides) which are not in accordance with the principles of organic farming is not allowed. Weed control is carried out manually and weed cuttings are put into the trench as an organic matter. IPM measures for each disease, pest, and weed will be consulted in details with the relevant Technical Service Office and other competent parties.

G.1.8. Shade plant management

- Temporary shade care is done by cutting the parts that are deemed necessary (too thick canopy, ill branches, etc.), and the results of cuts are used for animal feed or put into a trench as an organic matter.
- After the coffee plants reach two years, the temporary plants are dismantled so that the plantation condition is not too humid.
- Shade pruning is still done so that the sunlight received by the coffee plant canopy is of sufficient intensity (about 60%), not dark and not bright.
- In December/January shades continue to be pruned until the level of sunlight received by the coffee plants is relatively bright (about 30%) to stimulate the formation of flower primordia.

- At the end of the rainy season (April/May) there is no shade canopy pruning in order to provide sufficient shade to the coffee canopy during the dry season.
- Shade canopy cuttings are used for animal feed or put into a trench for organic matters.

G.1.9. Plant diversification

- The land ownership of coffee plantations by farmers is not very wide and coffee farmers in the Ngada plains are accustomed to make plant diversification efforts in order to minimize business risks and increase income, both with seasonal crops (food crops) and annual crops.
- Diversification with seasonal crops (corn, red beans, chilies, soybeans, peanuts, etc.) is carried out during land preparation and TBM. The planting distance of seasonal plants with coffee stems is at least 40 cm. It is recommended to plant annual crops that do not require synthetic pesticides for pest control.
- Diversification with seasonal crops can also be carried out in TM by taking into account the available space and lighting (for example: ginger, taro, etc.).
- Diversification with annual crops is carried out in order to form a multi-strata shade system and can provide additional income for farmers. The trees used can be in the form of timber producers (sengon/Albizia chinensis, toona, eucalyptus, etc.) or trees producing horticultural products (bitter bean, avocado, banana, etc.)

G.1.10. Integration with livestock

- MPIG will continue to encourage its members to implement a more intensive integration system of coffee plants and livestock, especially cattle and pigs. Livestock rearing will greatly assist farmers in providing organic fertilizers for coffee plants, as well as to increase farmers' income.
- As a source of cattle feed, forage is made from pruning of the canopy of shade plants (*dadap*, river tamarind, and fodder grass that are intentionally planted on the lips of terrace and/or plantation boundaries. The source of feed for pigs is stem/and or taro tubers which are intentionally planted in the context of diversification.
- In order for the integration between coffee plantations and livestock to be successful, MPIG will always consult with the relevant Technical Service Office and competent institutions.

G.2.Harvest

- To get maximum taste quality in wet coffee processing, raw materials in the form of "a

minimum of 95% of healthy and fresh ripe (red) fruit" (BMSS) are required.

- Harvest is done in the morning until noon manually, namely hand, and selective picking, namely only perfectly ripe fruit are picked.
- Coffee pickers carry two coffee containers, one for BMSS and the other for other fruit (dried fruit on the tree, semi-dried fruit, naturally fallen fruit, etc.).
- For coffee plants with a high canopy, it is necessary to prepare a ladder so that all the fruit can be picked.
- Before picking, a plastic or sack is laid under the coffee canopy so that the fallen fruit during picking are held on it and at the end of picking it is easy to collect them.
- After harvest, sorting (separation) is carried out for fruit that are not classified as BMSS and are also picked. These fruit include unripe (green) fruit, yellow fruit, semi-dried fruit, and dried fruit on the tree. These fruit may be included in wet processing, but the maximum amount is 5%.
- BMSS that has been picked must be processed immediately and must not store or ripen the fruit, because ripening the fruit can cause a taste defect called fermented (stinging stench).
- Internal Control Unit (SPI) officers in each PPU must check carefully the quality of BMSS before it is wet processed.
- Sorted fruit are dry processed by direct sun drying and after being dried they are ground to produce coffee beans (market coffee). This dry processed coffee is not classified as ‘Flores Bajawa’.



Figure 2. Picking and sorting coffee fruit.

G.3.Post-harvest Processing

The processing process of coffee fruit (coffee cherries) into green beans can generally be divided into 2 (two) methods, namely Dry Processing (DP) and Wet Processing (WP). *'Flores Bajawa'* is only produced by wet processing (WP) with steps already determined in the Standard Operating Procedures (SOP) by MPIG.

The wet processing method used for the production of *'Flores Bajawa'* consists of three types, namely:

1. Wet process, dry hulling,
2. Wet process, wet hulling,
3. Wet process, honey coffee (Pulped Natural or Decascado).

The SOP for each processing method is listed in Appendix 2.

In order to optimize added value, various types of processing will be applied according to market demands. Each type of processing will provide coffee products with different flavor characteristics but still belong to the specialty coffee group.

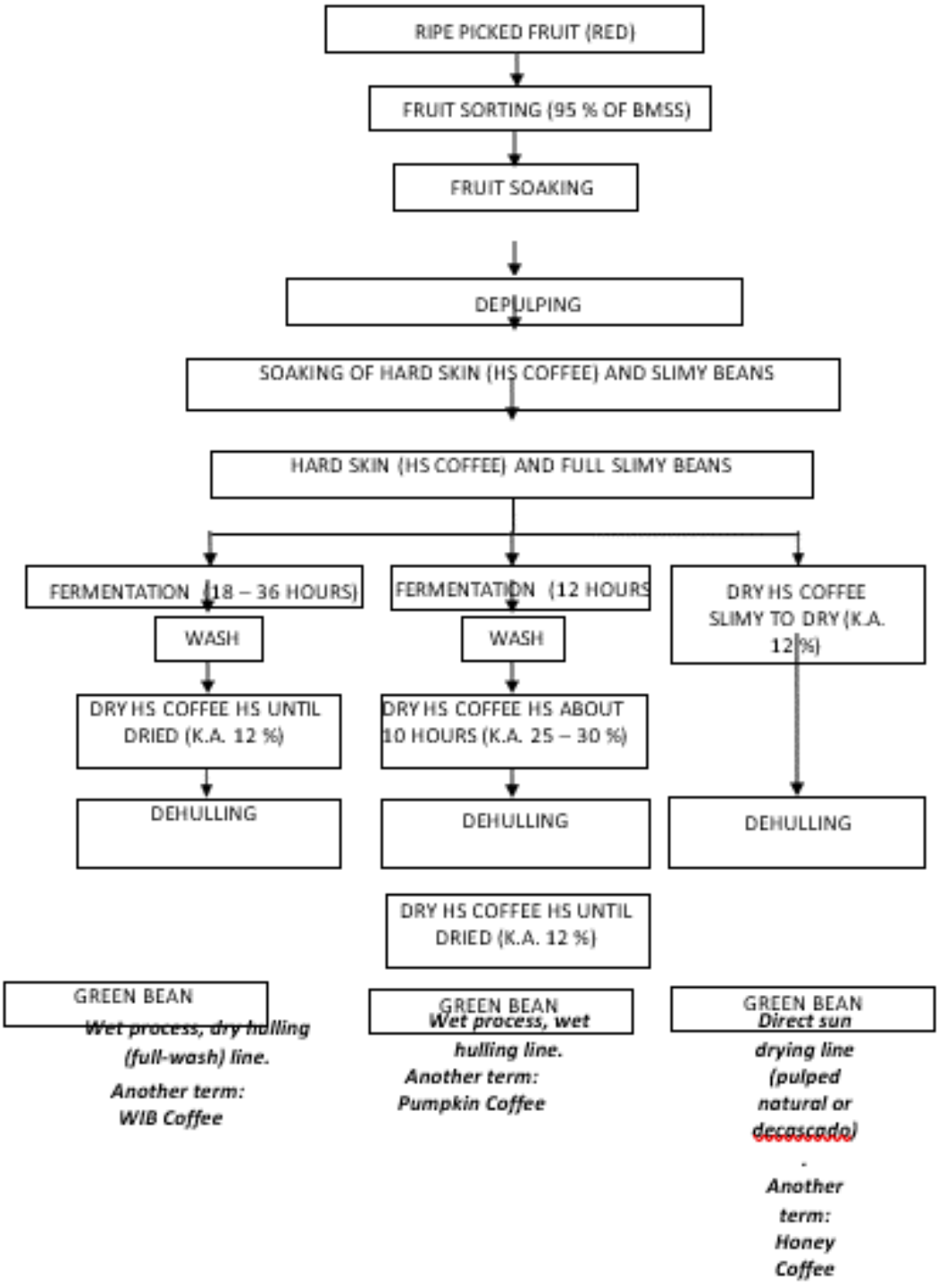


Figure 6. Flow chart of processing red fruit into "Flores Bajawa" coffee beans.

H. Control Method and Traceability

To ensure the credibility of Flores Bajawa Arabica GI coffee, a control and traceability plan has been made. This plan aims to:

1. Fulfill the rules of the Product Specification
2. Product origin (traceability)
3. Product Description:
    - Physical quality of product (no defect)
    - Taste quality of product (no defect)
    - Product uniqueness.

1. Control of compliance with the rules in the Product Specification

Control is carried out starting from cultivation to processing, which consists of:

1. Control by farmer groups
2. Control by MPIG.

Crop Control (Cultivation)

Control by farmer groups

Every year, the chairperson of farmer groups (or management of farmer groups) must ensure that the Product specifications is complied with by their member plantations, and must report to the Geographical Indication Protection Society.

Each farmer group can choose the methods to achieve this control. The management of farmer groups can do this themselves, or appoint someone to be assigned. In such cases, a regular meeting may be held, or a special plantation inspection may be necessary.

Control by MPIG

Every year, in April (before the processing season), MPIG randomly selects 5 farmer groups, and then checks the fulfillment of the Product specifications in the farmers' plantations for 2 days for each sampling farmer group (so it takes 10 days for this control activity).

2. Processing Control

Control by farmer groups / Processing Units

For each Processing Unit (farmer group or PPU), there is one person in charge of the control of processing process (checking that the process is in accordance with the Product specifications).

The officer controls the processing process every day, among others:

1. The Red Cherries to be processed come from registered producers,
2. The percentage of red cherries is sufficient (>95 %),
3. The dehulling process is carried out on the same day as picking until 24.00,
4. Fermentation is carried out for 18 to 36 hours (depending on when fermentation begins),
5. Drying is done on a drying rack, drying floor or tarpaulin, and may not be in direct contact with the ground. The moisture content of the dry coffee should not be more than 12%, which is checked using a calibrated water content controller.
6. Cleaning of Processing Units (including machines, fermentation facilities, processing room floors, drying, and so on).

After processing, the officer assigned to control at the Processing Unit also checks the conditions and storage duration of HS coffee (minimum 2 months).

Control by MPIG

Every year, during harvest and processing (June, July, or August), MPIG randomly selects 5 farmer groups or private Processing Units, and checks the process is in compliance with the Product specifications, for 1 day/PPU (so it takes 5 days for this control).

MPIG also inspects hulling, preparation for exporting lots and labeling of Green coffee packs. To ensure ease of control, the places where the operation of this process is carried out must be communicated by those who will carry out the above activities (Processing Units or buyers) to MPIG.

If it is found that the Product specifications is not fully adhered to, then MPIG decides on appropriate actions to be taken, which can range from giving a recommendation to temporary decommissioning. In all of the above cases, this action is then examined after the farmer groups or Processing units have made the necessary adjustments to meet the requirements of the Book of Descriptions.

3. Traceability

a. Member Registration

Member farmer groups of MPIG have been asked to make a list of members of their coffee producers. This list has been entered into a computer. In this list, producers get a GI card with a membership number from MPIG.

An updated list of manufacturers will be issued annually. MPIG will send a list of producers to each farmer group and will ask them if they have any changes in their membership. For example, there may be a new producer (who will receive a new card) or one that has stopped producing coffee (who must return their card). If any producer makes changes to their plants and no longer meets the rules in the Product specifications, their membership may be canceled, and they will also be asked to return their card.

Each Processing Unit must be registered as a "GI Processor". To facilitate control at each stage of GI coffee processing, each Processing Unit must list the places where they process coffee (also where the coffee will be stored).

b. During harvest and processing : Control of cherry origin

Every time a producer deposits or sells red coffee cherry to a Processing Unit (PU), the PU must check the card and record the producer's name, producer number, quantity of coffee bought and transaction date.

If there is a problem, PU can check the registration of the producer. MPIG sends a list of all registered farmers to all PU every year before the harvest period.

Individual farmers (who are not members of a farmer group) also have the discretion to sell red cherries (if their plants are located in an area marked for GI and meet the requirements) to PU after they are registered by the farmer group as a GI producer.

PU must send a list of red cherry suppliers to MPIG twice a year: mid-July (mid-harvest), and end of September (end of harvest). MPIG checks whether the quantity of red cherries sold by one producer matches the area and number of trees owned.

c. Tracing the Coffee Lot Order

Immediately after processing, PU must identify each sack with a lot code. This code includes: Processing Unit code (XX), year of production (YYYY) and lot number (XX). This code consists of 8 numbers: XX-YYYY-ZZ.

Each processing unit should form 10 to 15 lots of their annual production (these lots can be formed depending on the weeks of production or by forming sub-groups of producers within the farm group. See information below on lot formation).

These lot codes are stored up to the point of sale of GI coffee (when certificates have been obtained, see below), and allow for complete traceability.

d. <u>Sales and Purchase of GI Coffee</u>

After processing and storage and obtaining a GI certificate (see information below), PU can sell their GI coffee. Every transaction must be recorded. Once a year (in April), the data must be sent to MPIG. MPIG then checks the transactions and matches the quantity of Green coffee or HS coffee sold with the quantity of red cherries purchased from GI producers.

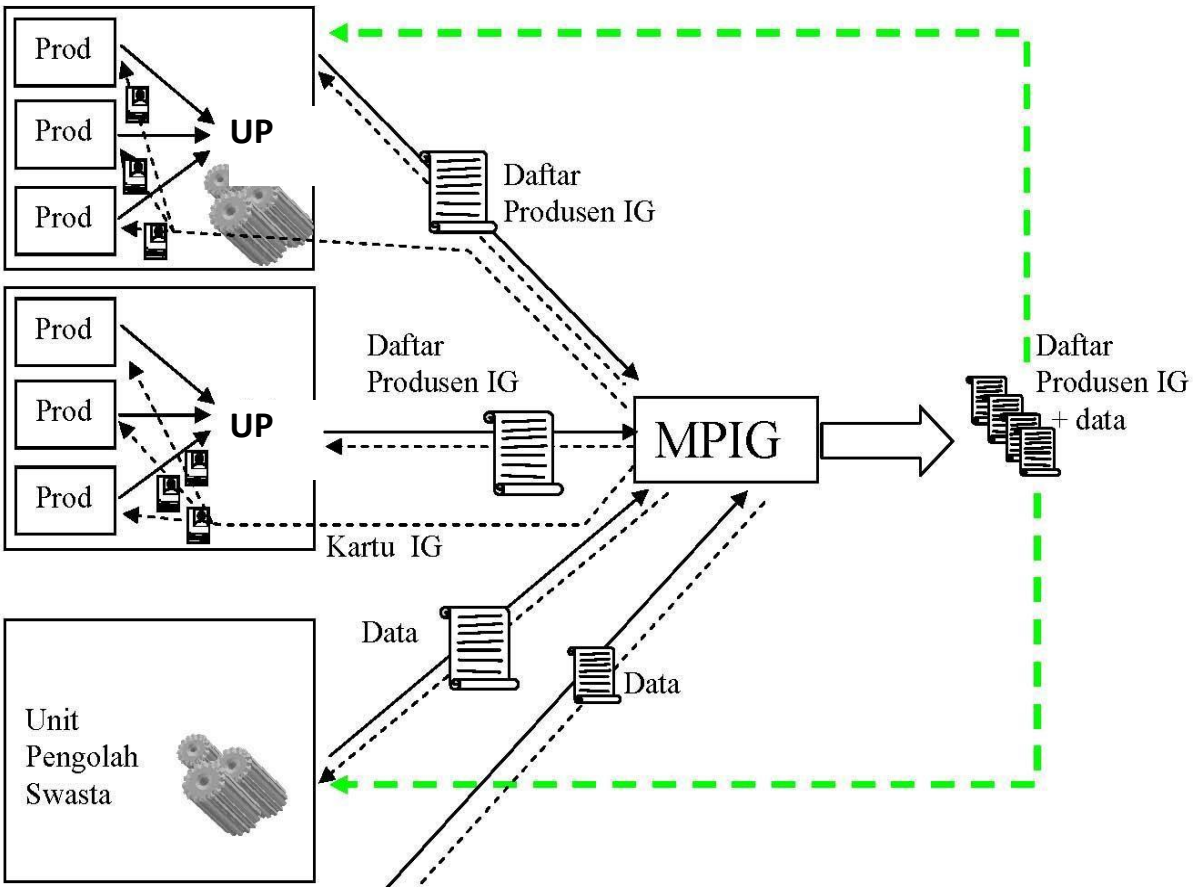


Figure 4. Arabica Coffee Traceability System in Ngada

Remarks:

- Each farmer group must register the names of producers as well as data on their plantations. These data is then sent to MPIG.
- Each independent producer must be registered directly by MPIG.
- Each processing unit (private or farmer group) must be registered by MPIG.

- MPIG delivers GI cards to respective producers and send a list of GI producers to each Processing Unit.
- During the harvest season, processing units must send data on cherries received and coffee produced, to MPIG.
- At the end of season, processing units must convey the total quantity of coffee sold.

4. Control of the Physical and Taste Quality of *'Flores Bajawa'* GI

In recent developments, consumers not only demand good quality coffee, but also healthy coffee (safe for health). The quality of coffee beans can basically be divided into two types, namely physical quality and taste quality.

During the processing process, sampling of Arabica coffee beans is carried out during the processing of each PPU. The coffee samples are analyzed for physical quality and taste quality in the laboratory of the Indonesian Coffee and Cocoa Research Institute in Jember to determine the extent of coffee quality produced by the farmers above. Then as a comparison, sampling is also carried out on local Arabica coffee (randomly) which is usually processed by farmers in general and also on market coffee.

5. Control of Uniqueness of Flores Bajawa Arabica GI Coffee and Award of Certificates to Processing Units

A GI certificate is requested by PU, after the processing of red cherries into HS coffee and two months of storage. Several "lots" must be made (meaning the production must be divided into separate parts), and each lot will be checked by MPIG for compliance with the Product Specification, traceability, and quality / uniqueness of the coffee.

a. <u>Lot Formation</u>

After processing (and 2 months of storage), coffee is worthy of a GI certificate. Each PU must group coffee into 10 to 15 lots. There are two types of farmer groups:

1. some of them work collectively: red cherries are bought from members, and processed together every day, until they become HS coffee and Green coffee.
2. Other farmer groups work semi-collectively: red cherries are depulped and ripened in a shared facility, and then each producer takes their HS coffee and dry it in front of their house. After drying and storage, in October/November, this coffee is brought

together, before being sold.

In the two types of farmer groups above, lot formation is carried out in different methods:

- For farmer groups working collectively, one lot is formed in one week of production. Because there are 3 months of harvest, there are between 10 and 15 lots.
- For farmer groups who work semi-collectively, the separation of production weeks seems very difficult. As a result, the solution is to form between 10 and 15 producer groups, which aggregate production from several producers, producing 10 to 15 lots. However, in some farmer groups like this, the production for each month is already separated, and the lot formation is somewhat different (production from each 3 months only has to be separated into 5 groups, to produce a total of 15 lots).

Private processing units may specify one lot/week of processing (as is the case with the first type of farmer group). Certification is requested for each of the 10 or 15 lots formed by the Processing Unit. MPIG will check if the taste and traceability requirements are met.

b. <u>Traceability Control</u>

For each lot, MPIG will check that the traceability of processing units must specify a list of red cherry sellers for each lot.

I. Geographical Indication Label

Coffee Packaging and Packages

All coffee packs and coffee packages sold with a GI certificate must include:

- Names ‘Indikasi Geografis’, ‘Arabica Coffee’, and ‘Flores Bajawa’.
- *‘Flores Bajawa’* GI logo, shown below (Figure 6),
- Lot code.

Use of name *‘Flores Bajawa’*

The name *‘Flores Bajawa’* can only be used for original / pure coffee which means that coffee sold under this name must have a composition of 100% of *‘Flores Bajawa’*. Coffee blends cannot be sold under this name. However, the name *‘Flores Bajawa’* may appear on the ingredient list for this blend. In this case, the percentage of *‘Flores Bajawa’* content used must be clearly stated.

The meaning of the label/logo is as follows:

- Picture of Ngadhu: Unification symbol of the Bajawa (Ngada) community,
- Writing "*'Flores Bajawa'*": Describing the original product of Bajawa (Ngada),
- Brown color: Illustrating the color of coffee and natural colors,
- Four transverse lines: Illustrating the Bajawa (Ngada) nature.



Figure 5: *'Flores Bajawa'* GI Logo

Protection is filed in the name of *'Flores Bajawa'*. Meanwhile, the word "Flores" or *"Kopi Bajawa"*, is not considered as misuse or imitation, and thus can be used by producers of non-'Flores Bajawa' GI.

National Geographical Indication Logo

The Indonesian National Geographical Indication Logo must also be attached. The National Geographical Indication Logo is as follows:



Figure 6 Indonesian National Geographical Indication Logo

CONCLUSION

The “Geographical Indication Protection Society of ‘Flores Bajawa’”, which was formed in 2009, and consists of farmer organizations and local private processors, filed an application for Geographical Indication for their local coffee. This application can be submitted considering that this coffee has uniqueness, namely Arabica coffee which is produced in the Ngada Regency with volcanic mountains, especially by traditional organizations called “farmer groups”.

Indeed, the quality of this unique product, namely ‘Flores Bajawa’, comes from a combination of all of the above factors. Unique local farmer organizations known as Flores Bajawa Arabica farmer groups, have known how to take advantage of the natural conditions of their area and how to create unique local products.

For a long time, the ‘Flores Bajawa’ potential has not been properly utilized, triggered by unsuitable processing methods (dry processing). There are only a few coffee lovers (connoisseurs) who have benefited from the wet-processed coffee flavor that is typical of the Ngada area in the last several years. However wet processing has developed rapidly, and this great product will be offered to more and more consumers. Geographical Indication protection is the only way to guarantee the highest satisfaction to these consumers by strictly adhering to the Product specifications and the origin of this coffee.

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APPENDICES

Appendix 1

List of Hamlets/Villages/Sub-districts and Elevation Covered in the GI Area of Ngada Regency

No	Hamlet/Village	Elevation (m a.s.l.)	District
1	Ubedolumolo	1,284	Bajawa
2	Beiwali	1,258	Bajawa
3	Bomari	1,223	Bajawa
4	Mangulewa	1,296	Golewa
5	Were I	1,162	Golewa
6	Susu	1,295	Bajawa
7	Rakateda II	1,194	Golewa
8	Peupalo	1,333	Bajawa
9	Wawowae	1,290	Bajawa
10	Dadawea	1,143	Golewa
11	Rakalaba	1,186	Golewa
12	Rakateda I	1,198	Golewa
13	Watu Jaji	1,304	Bajawa
14	Turekisa, Mangulewa	1,296	Golewa

Appendix 2

Standard Operating Procedures (SOP) for Processing *'Flores Bajawa'* Fruit

1. Wet Process, Dry Hulling

a. Harvest

- ✧ Prepare good and clean harvest facilities such as fruit containers, ladders, plastic sheets, and bags for dried, black and defective fruit.
- ✧ Cover the soil under the coffee canopy with a plastic sheet so that fallen fruit are easy to pick.
- ✧ To be processed properly, harvest must be done selectively. Pick ripe/red fruit only.
- ✧ Separate green, dry fruit, dirt etc. (then dry process the bad/inferior fruit).
- ✧ The minimum limit of healthy fresh red coffee fruit (BMSS) coffee to be processed is 95 percent.
- ✧ Keep the fruit clean.
- ✧ Do not store ripe fruit because it can rot, depulp it immediately on the same day.

b. Depulping

- ✧ Before depulping, red fruit are soaked in water, stir and separate the floating fruit (fruit attacked by coffee fruit borer pests, fruit with incomplete filling of seeds, etc.), then dry process it together with green, yellow, and dried fruit on the tree.
- ✧ Check for stones, iron and other hard objects, as they will damage the pulper.
- ✧ Immediately depulp fresh red fruit (do not delay).
- ✧ Clean the pulper before use.
- ✧ Make sure the pulper functions properly.
- ✧ Set the pulper until the depulping results are good, not broken, the HS coffee is not mixed with the skin, and conversely the skin is not mixed with the seeds.
- ✧ Wash/clean tools after use.
- ✧ Separate the pulp which is attached to the hard shell coffee beans (HS coffee).
- ✧ Separate the light HS coffee beans by soaking in water and stirring thoroughly.

c. Fermentation and Washing of Residual Mucilage

- ✧ The fermentation process is intended to shed mucilage for easy washing and also to get a good taste of coffee.
- ✧ Before fermenting, separate the remaining pulp from HS coffee because the pulp that is involved during fermentation will rot and contaminate coffee taste.
- ✧ The fermentation process can be carried out in a plastic bucket (perforated in the bottom) or a woven plastic bag to allow the mucilage to drain out. The used container must be clean and free from strong odors (for example: kerosene, pesticides, rubber, etc.). Do not use wooden or bamboo containers because they can cause the smell of rotten wood.
- ✧ The length of the fermentation process is 18 – 36 hours (not more than 36 hours), depending on when the fermentation starts. If it starts in the afternoon, the fermentation is carried out for 36 hours, but if it starts in the morning then fermentation is done for 18-24 hours, so it can be directly dried in the morning days after the fermentation time is reached.
- ✧ If the fermentation will be carried out for 36 hours then flush and stir HS seeds at the 18th or 24th hour, then drain and close again to continue the fermentation process for up to 36 hours.
- ✧ Wash the remaining mucilage after fermentation then proceed with sun drying.

d. Sun Drying

- ✧ Coffee drying is the most critical stage to obtain good physical and taste quality. An error at this stage will impair the resulting quality. To get good quality in Arabica coffee then drying must be done slowly, especially at the beginning (first 1–4 days).
- ✧ Sun drying until the final moisture content of 12 % is reached takes ± 15 days.
- ✧ Set the thickness of the seeds between 5 cm to 10 cm, not too thin. Specific for the first day, it can be set thinner (5 cm) to facilitate evaporation of water in the skin surface, but starting from the second day it must be thickened (minimum 7.5 cm to avoid drying too fast.
- ✧ Use clean plastic tarpaulin mats, dry floors made of cement or drying rack (better). The drying rack model can be seen in the image below.
- ✧ To avoid attack by fungi and other microbes, coffee must be turned over regularly

every 1-2 hours. At the beginning (first 1 – 2 days) reversal should be more frequent because coffee is still very wet.

- ✧ Cover coffee at night with a tarpaulin. Covering will be better if the tarpaulin is not in direct contact with seeds; given a space between seeds and cover to prevent condensation, the lid is set in a sloping position so that the condensed water droplets (inside above the coffee) flow sideways, do not fall onto the coffee.
- ✧ Avoid from water drops or rain. (Relatively) dry coffee will decay if it is in contact with water.
- ✧ Stop sun drying coffee when the moisture content reaches 12% or less. Check with a water content meter in the morning, or for an approximation it can be estimated by weighing one can of oil (volume of 19 liters) when it reaches a constant weight / does not decrease again every day for 3 days (approximately 8.0 kg / 19 liters) then sun drying can be stopped.
- ✧ Dry hard shell coffee (HS coffee) beans can then be stored or sent to exporters. In addition, HS coffee can be ground to remove the husks to produce green beans.
- ✧

e. HS Coffee Bean Packaging and Storage

- ✧ Coffee that will be taken by the buyer (exporter) is usually in the form of dry hard shell coffee (HS coffee) with a moisture content of 12%, because the exporter will grind it according to the shipping schedule.
- ✧ Coffee to be packaged is completely dry (moisture content of 12 %).
- ✧ Packing is done in new/clean plastic sacks and free from strong odors.
- ✧ Store temporarily in a clean warehouse, free of strong odors, free of smoke, free of cigarette butts and insect repellent, and not damp.
- ✧ Use wooden pallets (pads) under piles of sacks to avoid moisture from the floor surface, and not be in direct contact with walls.

f. Dry HS coffee bean dehulling

- ✧ Dry HS coffee bean dehulling is carried out to remove the hard shell (hornschill) using a special huller for dry HS coffee.
- ✧ Prepare a huller that can function properly, clean the inside and outside of the huller before use.
- ✧ Re-check the moisture content of coffee beans before dehulling (12%).

- ✧ Adjust the machine properly to avoid excessive cracking of seeds. The maximum tolerance for broken seeds is 3%.
- ✧ Control of the results of dehulling must be done regularly, stop immediately if there is too much broken seeds and reset the huller used.

g. Size Grading and Bean Sorting

- ✧ Coffee beans to be exported must meet the quality requirements of export coffee of SNI 01-2907-2008.
- ✧ Arabica coffee beans have no size type requirement, however uniformity of size is highly expected by buyers. If desired, sieve the seeds according to Large (L), Medium (M), and Small (S) sizes each with arrangement of sieves with hole diameter of 7.5 mm, 6.5 mm and 5.5 mm.
- ✧ Sort defective seeds (black seeds, cracks, holes, etc.) by using hands to achieve the desired grade.

h. Green Bean Packing and Storage

- ✧ Pack coffee beans weighing 60 kg (net) in new sacks that have been labeled, according to the above SNI.
- ✧ Use a new sack that is food grade (suitable for storing foodstuffs) free of mineral oil (non-mineral oil based jute-bag), label it with water-based ink (water-based marker).
- ✧ Temporarily store coffee in a clean warehouse, free of strong odors, free of cigarette butts and mosquito repellent, and not damp.
- ✧ Use wooden pallets under piles of sacks to avoid moisture from the floor surface.

2. Wet Process, Wet Hulling

a. Harvest

- ✧ Prepare good and clean harvest facilities such as fruit containers, ladders, plastic sheets, and bags for dried, black and defective fruit.
- ✧ Cover the soil under the coffee canopy with a plastic sheet so that fallen fruit are easy to pick.
- ✧ To be processed properly, harvest must be done selectively. Pick ripe/red fruit only.
- ✧ Separate green, dried fruit, dirt etc. (then dry process bad/inferior fruit).

- ✧ The minimum limit of healthy fresh red fruit (BMSS) coffee to be processed is 95 percent.
- ✧ Keep the fruit clean.
- ✧ Do not store ripe fruit because it can rot, depulp it immediately on the same day.

b. Depulping

- ✧ Before depulping, red fruit are soaked in water, stir and separate the floating fruit (fruit attacked by the coffee cherry borer pest, fruit with incomplete filling of seeds, etc.), then dry process it together with green, yellow, and dried fruit on the tree.
- ✧ Check for stones, iron and other hard objects, as they will damage the pulper.
- ✧ Immediately depulp fresh red fruit (do not delay)
- ✧ Clean the pulper before use.
- ✧ Make sure the pulper functions properly.
- ✧ Set the pulper until the depulping results are good, not broken, the HS coffee is not mixed with the skin, and conversely the skin is not mixed with the seeds.
- ✧ Wash/clean tools after use.
- ✧ Separate the pulp which is attached to the hard shell coffee beans (HS coffee)
- ✧ Separate the light HS coffee beans by soaking in water and stirring equally.

c. Fermentation and Washing of Residual Mucilage

- ✧ The fermentation process is intended to shed mucilage for easy washing and also to get a good taste of coffee.
- ✧ Before fermenting, separate the remaining pulp from HS coffee because the pulp that is involved during fermentation will rot and contaminate coffee taste.
- ✧ The fermentation process can be carried out in a plastic bucket (perforated in the bottom) or a woven plastic bag to allow the mucilage to drain out. The used container must be clean and free from strong odors (for example: kerosene, pesticides, rubber, etc.). Do not use wooden or bamboo containers because they can cause the smell of rotten wood.
- ✧ The length of the fermentation process is about 12 - 18 hours (one night).
- ✧ Wash the remaining mucilage after fermentation then proceed with sun drying.

d. HS Coffee Sun Drying

- ✧ Use clean plastic tarpaulin mats, dry floors made of cement or drying rack (better). An example of a drying rack model can be seen in the Figure of Appendix 8.
- ✧ During sun drying, routine reversal must be done every 1-2 hours, in the condition of full sunlight, sun drying is done only for 8 hours (one day), if the sunlight is not full, sun drying can be done for 2-3 days (depending on the irradiation length).
- ✧ Cover the coffee at night with a tarpaulin. Covering will be better if the tarpaulin is not in direct contact with seeds; given a space between seeds and cover to prevent condensation, the lid is set in a sloping position so that the condensed water droplets (inside above the coffee) flows sideways, does not fall onto the coffee. Avoid from drops of water or rain.
- ✧ Stop sun drying when the hard shell starts to look cracked (a sign that coffee beans are ready to be ground). In this condition, the moisture content of seeds reaches about 30%, so it is called wet HS coffee.

e. Wet HS coffee bean dehulling

- ✧ Dry HS coffee bean dehulling is done to remove the hard shell (hornschill) using a special huller for wet HS coffee.
- ✧ Prepare a huller that can function properly, clean the inside and outside of the huller before use.
- ✧ Set the huller properly to avoid the occurrence of excessive breakage of seeds. The maximum tolerance for broken seeds is 3%.
- ✧ Control of dehulling results must be carried out regularly, stop immediately if there are too many broken seeds and reset the used huller.

f. Sun drying (continued) of wet coffee beans (“semi-washed coffee”)

- ✧ Coffee beans resulting from wet hulled HS coffee (moisture content of about 30%) is often referred to as “semi-washed coffee”.
- ✧ Further sun drying of semi-washed coffee is carried out until the water content of the coffee beans reaches 12%. Sun drying is done on a drying floor, tarpaulin mat, woven bamboo pedestal or drying rack.
- ✧ Considering that the dried coffee no longer has horn skin, then during sun drying its hygiene must be maintained properly.

g. Size Grading and Bean Sorting

- ✧ Coffee beans to be exported must meet the quality requirements of export coffee

of SNI 01-2907-2008.

- ✧ Arabica coffee beans have no size type requirements, however, uniformity of size is highly expected by buyers. If desired, sieve the seeds according to Large (L), Medium (M), and Small (S) sizes each with arrangement of sieves with hole diameter of 7.5 mm, 6.5 mm and 5.5 mm.
- ✧ Sort defective seeds (black seeds, cracks, holes, etc.) using hands to achieve the desired grade

h. Packaging and Storage of Green Bean

- ✧ Pack coffee beans weighing 60 kg (net) in new sacks that have been given a label, in accordance with the SNI above.
- ✧ Use new sacks that is food grade (suitable for foodstuffs) free of mineral oil (non-mineral oil based jute-bag), label with water soluble ink (water-based marker).
- ✧ Temporarily store coffee in a clean warehouse, free of strong odors, free of cigarette butts and insect repellent, and not damp.
- ✧ Use wooden pallets under piles of sacks to avoid moisture from the floor surface.

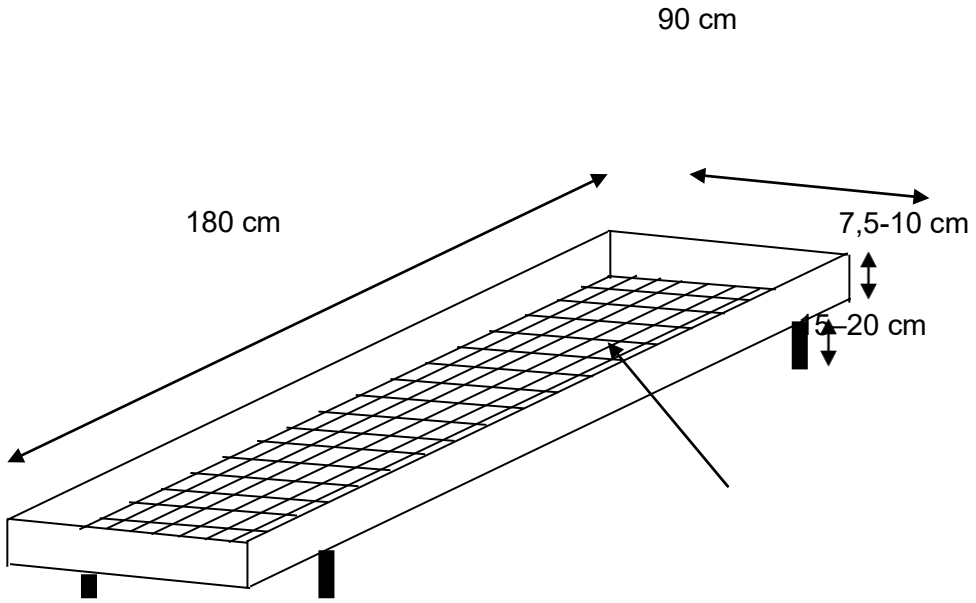
Appendix 3. Results of Physical Quality Analysis of *'Flores Bajawa'* Beans

No	PPU Sample Origin	WP			DP		
		MC (%)	Score	Quality	MC (%)	Score	Quality
1	Famasa	12.10	9.4	I	17	58	IVa
2	Sukamaju	12.04	8.3	I	19	62	IVb
3	Papataki	11.96	6.6	I	21	94	V
4	Papawiu	12.48	5.8	I	17	59	IV-a
5	Ateriji	12.29	8.6	I	16	63	IV-b
6	Wongawali	11.87	8.4	I	17	210	VI
7	Mezamogo	12.30	7.6	I	19	66	IV-b
8	Bowoso	11.90	5.2	I	15	36	III
9	Peu Palo	11.86	6.2	I	17	35	III
10	Lobo Butu	12.23	5.2	I	18	50	IV-a
11	Floba Mora	11.76	10.44	I	16	55	IV-a
12	Toni Tebu	12.14	10	I	16	61	IVb
13	Sinar Tani	12.14	10.5	I	19	36	III
14	Mora Sama	12.13	10.2	I	20	48	IV-a
15	Pasar Bajawa	-	-	-	19	114	V
16	Pasar Mataloko	-	-	-	18	145	V

Appendix 4. Results of Taste Test of *'Flores Bajawa'*

No	Name of PPU	Panelist 1	Panelist 2	Panelist 3	Panelist 4	Average
1	Toni Tebu	6	7	6	6.33	6.67
2	Lobo Butu	6.5	6	6	6.17	6.42
3	Floba Mora	6.5	7	6	6.5	6.38
4	Ateriji	6.5	7	7	6.83	6.13
5	Famasa	8	7.75	8	7.92	7.67
6	Mezamogo	7.75	7	7.25	7.25	7.42
7	Peu Palo	8	7.5	7.5	7.67	7.33
8	BoWoso	7	8.25	6.75	7.33	7.25
9	Papawiu	7.5	6.5	6.5	6.83	7.21
10	Papataki	7	7.75	6.5	7.08	7.08
11	Wongawali	6.5	6.5	6.5	7.5	7
12	Sukamaju	6.5	7.5	6	6.67	6.83
13	Sinar Tani	6.5	7	7	6.83	6.13
14	Mora Sama	6.5	7	6	6.5	6.38

Appendix 5. Drying Rack Coffee Dryer Model



Sand sieve wire or other materials. A sheet of grid/fish net/plastic bag is put on it