Development of Good Manufacturing Practice (GMP) in the Form of a Practical-Oriented Application for Household Coffee Processing Guidelines

M. Panji Pranadikusumah[1], Vela Rostwentivaivi[2], Ati Atul Quddus[3]
{ntvi@starenergy.co.id[1], velasinaga@uniga.ac.id[2], atiatulquddus@uniga.ac.id[3]}

Star Energy Geothermal Darajat II, Ltd. Jl. Raya Darajat Desa Karyamekar, Pasirwangi, Garut, Indonesia[1]
Fakultas Pertanian, Universitas Garut. Jl. Raya Samarang No. 52 A, Garut, Indonesia[2-3]

Abstract. Coffee is a commodity that has quality standards as a condition for meeting decent consumption. Coffee processing as a home industry has not implemented coffee processing practices that are in accordance with the specified standards. The absence of a guidebook and good coffee processing instructions are two basic questions related to the household coffee processing industry faced by D'Arffi Coffee in Garut Regency. Good coffee processing standards based on literature, regulations, and some references set by the coffee association. The household coffee processor requires good coffee processing and supporting instruments that are easy to understand and apply. Analysis from communication perspective found 17 indicators grouped into 4 (four) to discuss ethics, grammar, standardization, and information and communication. Output of the activity is a Good Coffee Processing Manual, communication materials that are ready and easy to implement. The user's feedback to outputs shows three positive responses, discussing guidebooks is easier, processing activities put in order, and behavior changes occur in the coffee processing environment.

Keywords: Coffee, Home Industry, Guidebook, Communication Materials

1 Introduction

Coffee is a plantation commodity that has an important role for the economic sector. The role of coffee in the economic sector contributes as a source of foreign exchange, farmers' income, job creation, regional development, drivers of agribusiness and agro-industry. Indonesia is the third largest coffee producing country after Brazil and Vietnam. The growth rate of coffee production is followed by the consumption pattern of the Indonesian people which shows an increase in coffee consumption per capita of the Indonesian population. Based on data from the Association of Indonesian Coffee Exporters and Industries (AEKI), household coffee consumption of Indonesian residents in the last eight years is shown in the following table.

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Table 1. Coffee Needs and Consumption in 2010-2016

Year	Total Population (soul)	Coffe needs (Kilogran)	Coffee Consumptiom (Kg/capita,year)
2010	237.000.000	190.000.000	0,80
2011	241.000.000	210.000.000	0,87
2012	245.000.000	230.000.000	0,94
2013	249.000.000	250.000.000	1,00
2014	253.000.000	260.000.000	1,03
2015*	257.000.000	280.000.000	1,09
2016**	260.000.000	300.000.000	1,15
Average	248.857.143	245.714.285,7	0,98

Source : Association of Indonesia Coffee Exporters and Industries, 2016 [1]
* Temporary numbers
** Estimated figures

Garut Regency is one of the districts in West Java producing coffee. The area of coffee plantations in Garut Regency is 4,189 hectares with production of 2,282 tons in 2016 [3]. Based on the data, the average coffee production is 1,693.68 tons per year with an average growth of 2.85 percent. In the form of green beans, coffee production and growth in the Regency are shown in the following table.

Table 2. Average Production and Growth of Rice Coffee in Garut Regency

year	Rice production (ton)	Production growth/decline (%)
2010	1.592,00	-
2011	1.635,00	2,70
2012	1.685,00	3,06
2013	1.776,00	5,40
2014	1.780,38	0,25
Average	1.693,68	2,85

Source: Plantation Office of Garut Regency 2014 (Data Processed) [5]

D'Arffi Coffee is one of the small-scale coffee agribusiness entrepreneurs in Garut Regency. D'Arffi Coffee cooperates with coffee farmers, buys crops, processes, then sells in green beans, roasted bean coffee and ground coffee. On the other hand, the benefits obtained by farmers are higher selling prices and getting education or technical cultivation guidance. D'Arffi Coffee is a small agro-industry that has grown from year to year. However, there are a number of things that are less noticed in the production process such as product hygiene. Product cleanliness is influenced by the layout of production equipment, cleanliness of the location, maintenance of facilities and infrastructure, hygiene of employees, sanitation, and others. Some aspects that need to be reviewed in D'Arffi Coffee's operational activities include training on employees handling food, controlling raw materials and other auxiliary materials used, controlling the use of additional materials, controlling personal hygiene of employees, controlling production processes and production equipment, controlling in handling and storing food to prevent contamination, control of cleaning tools, control of pests, and control of records or documentation.

As the business grows, D'Arffi Coffee needs to implement a quality assurance system by implementing Good Manufacturing Practices (GMP). GMP is a standard that must be used in one food business unit from plants because it is a basic requirement [2]. GMP is one indicator

that sanitation in production operations has been done well [7]. In addition, the layout of factory facilities is needed in accordance with the implementation of GMP, to overcome some obstacles in terms of the distance of moving material (material handling) that is less effective and efficient, such as cross movement due to the irregular layout of factory facilities [6].

The implementation of GMP must be documented in the Standard Operating Procedure (SOP), more precisely the Sanitation Standard Operating Procedure (SSOP). In the framework of monitoring internal and external audits are carried out. SSOP will provide several benefits for business units in ensuring the security system of coffee production, including: (1) providing a continuous schedule, (2) encouraging planning that guarantees repairs if needed, (3) identifying trends and preventing the occurrence of problems (4) ensure that every employee understands sanitation, (5) provides consistent training advice for employees, (6) demonstrates commitment to buyers and inspectors, and (7) improves sanitation practices in business units [9].

Coffee as an export commodity needs to have a predetermined standard, and therefore it is necessary to provide assistance so that D'Arffi Coffee operations meet the standards set by the government. The Government of Indonesia through the National Standardization Agency (BSN) has decided to adopt the ISO 9000 quality system on indicators of quality and food safety systems at ISO 22000. BSN has adopted the CAC HACCP system: Guidlines for application modified into SNI 01-4852-1998 (System Hazard Analysis and Critical Point Control / HACCP - as well as its implementation guidelines) and has set guidelines, namely the BSN Guidelines 1004-1999 (Guidelines for Preparation of the HACCP Plan) [8]. At present the guidelines have been revised to become BSN Guidelines 1004 - 2002 [4].

2 Method

The activity was carried out in the home industry processing coffee D'Arffi Coffee in Pasirwangi District, Garut Regency. The choice of location and respondents was done purposively based on the consideration that D'Arffi Coffee is a business actor engaged in coffee processing from upstream to downstream, has run a business consistently and has a strong desire to improve business performance. This GMP preparation activity was carried out in March and April 2019.

3 Results and Discussion

(Approach 1) Ethics

A Good Coffee Processing Manual was adapted through an ethical approach. This aims to make this book easy to understand and in accordance with the applicable rules in writing a Guidebook. This approach is divided into 4 indicators, including:

a Implement the Writing Ethics Standards

The standard writing ethics standard applied in the guidebook refers to the Indonesian Dictionary (KBBI) and the Indonesian Spelling General Guidelines (PUEBI) in 2016. Capital letters are used as the first letter in each word in the title, example Table 1. Location Requirements , Environment and Building. The word assignment, such as in, to, from, and, which, and for not using capital letters in the first letter. Examples of image titles, such as Figure 1. Illustration of Drainage that is not Stagnant. Abbreviations consisting of the initial letters of each word for a government institution are written in capital letters without dots, such as the Association of Indonesian Coffee Exporters (AEKI), Specialty Coffee Association of America (SCAA). Writing fractions with letters, such as half or half (1/2). It is hoped that readers will not only benefit from GMP but also familiarize readers with the latest ethical standards.

b Selective in Determining References (Reference Validation)

References used in the guidebook refer to the Indonesian National Standard (SNI) 01-2907-2008 concerning the Quality of Coffee Beans, Codex 2007, Regulation of the Minister of Manpower and Transmigration of the Republic of Indonesia concerning First Aid for Workplace Accidents, Minister of Manpower and Transmigration Regulation Republic of Indonesia concerning Terms of Installation and Maintenance of Light Fire Extinguishers, as well as Indonesian Coffee and Cocoa Research Centers.

c Consistency in the Use of Terms

This handbook consistently applies the term in coffee. The term is explained in the glossary (glossary) to provide understanding to the reader. As in the example: wet skin peeling machine (pulper), huller, green bean, and roasted bean.

d Ease of Search Index

Writing indexes in the guidebook aims to make it easier for readers to search for the term words on the pages of the book, for example the word acidity is on pages 17,18 and 34. While the word drainage is on pages 3 and 4.

(Approach 2) Grammar

The guidebook is very concerned about the grammar used. So that the language in question must be easily digested and understood by the reader. The grammar approach is divided into 5 (five) indicators, namely:

a Simplification

Language simplification is done starting from the postharvest coffee process. Activities starting from harvesting fresh coffee to storage are summarized in a coffee postharvest process flow which can be seen in Figure 1.

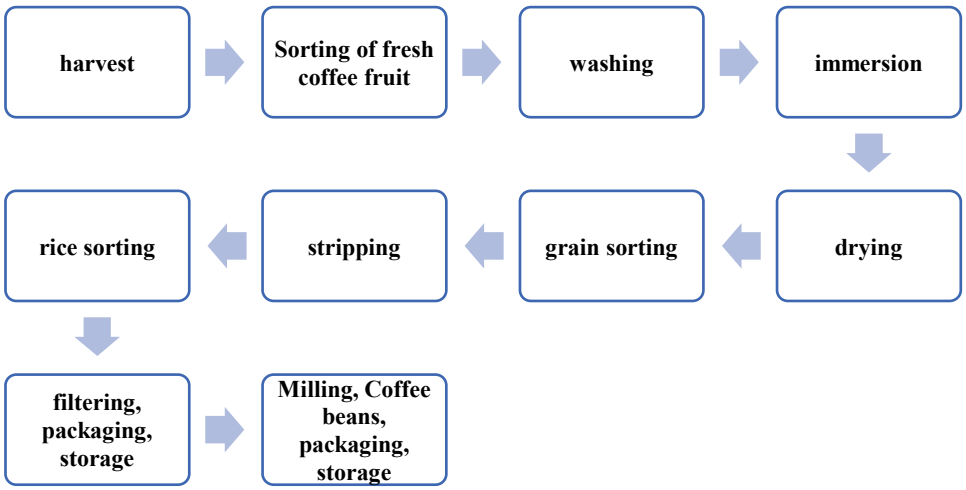

Figure 1. Flow of Coffee Postharvest Process

b Merger

Merger is applied by looking for similarities, both subject, activity and purpose. For example, combining location, environment, and building parameters into one part by discussing the requirements in each aspect.

Table 3. Location, Environment and Building Requirements

No.	Parameter	term
1	Location	a. Pollution free location, flood, and avoid waste
		b. Away from the fly nest with a distance of more than 500 meters
		c. Far from settlement
2	Environment	a. No smell or bad smell from sources of pollution (landfill)
		b. The yard is clean, neat and dry
		c. Sewer available
3	Building	a. The area of production space according to the type and size of the equipment and the number of employees
		b. Neat and one-way arrangement
		c. The floor is waterproof, strong, smooth, not slippery, and sloping
		d. The walls are waterproof, strong, flat, smooth, bright in color, and easy to clean
		e. The lighting is quite bright
		f. The ceiling is strong, flat, and has a distance of more than 3 (three) meters from the floor
		g. The exit opens to the outside
		h. Temperature, air quality, and air holes are controlled to prevent product damage due to heat, moisture or contamination
		i. All entry points into buildings are controlled from insects, rats and other disturbing animals

c Translation

Interpretation is applied in the guidebook by translating foreign languages into Indonesian, for example in the discussion of laboratory testing. Tests on coffee products were tested for compositions. Test composition with nutritional value test (nutrition fact) is the nutritional composition contained in coffee beans and listed on the packaging. The results of testing the nutritional value of proteins, carbohydrates, minerals, fats, vitamins, and water. Non-toxic test, which is a composition test that does not contain poison. Information on the test states that coffee is safe from ingredients that contain poison so it is safe for consumption. Other discussions such as primary defects (primary defects) include the color of coffee beans full of black, full sour taste, there are stones in the collection of seeds, although they are slightly able to influence the aroma and taste of the final brew. Secondary defects (secondary defects) include damage to broken or peeled skin, damage to coffee beans caused by insects.

d Structuring

The structuring of 9 (nine) parameters in the manual aims to facilitate the design of the subject matter. The parameters presented are as follows (parameter 1) location, environment, and building, (parameter 2) sanitation facilities, (parameter 3) production equipment, (parameter 4) raw materials and processing, (parameter 5) laboratory tests, (parameter 6) human resources, (parameter 7) storage of coffee products, (parameter 8) packaging, and (parameter 9) safety, health, and work security.

e Format uniformity

Formatting uniformity is done so that the manual is organized and neat. Uniformization starting from the size of paper used is B5. The format of the writing, including the types of writing are Caliber, space 1.15, spacing before 0pt and after 0pt, multiple line spacing, left-right-top-bottom margin (3-3-3-3), size of title and contents of each 20 and 16 respectively.

(Approach 3) Standardization

a Maintain Quality Control or Book Quality

Maintaining the quality of the manual is done by discussing the material, discussion, and through the review phase by the editor. This activity aims to keep the consistency of the book in accordance with applicable rules.

b Added Knowledge Base

Addition of information (knowledge base), especially in the coffee processing flow with 4 (four) types of processes, including: full wash, semi wash, honey, and natural. Processing flow can be seen in Table 4.

Table 4. Flow of Coffee Processing in General Has 4 Types of Processes

Steps	Full Wash	Semi Wash	Honey	Natural
1	Fresh coffee fruit is separated according to the level of maturity			
2	Coffee fruit is washed clean			
3	Soaked with clean water			
4	Drained			
5	Put coffee into a wet skin peeler (pulper)			Dry the coffee fruit and the skin until the moisture content is 11-12%
6	Soak for 36 hours. Soaking water is replaced for 10 hours		Dry the seeds for 1 month until the water content is 11-12%	Do reversal of coffee fruit regularly to dry evenly
7	Drain the coffee beans	Coffee beans are dried for 4-7 days until the water content reaches 11-12% and put in a huller	Do a periodic reversal to dry evenly	Put into a huller
8	Dry for about 6 hours until the moisture content is 24-25%			
9	Put the coffee beans into a huller			
10	Re-dry until the water content is 11-12% around 5-6 days			

c Application of Safety, Health and Work Safety (K3)

The addition of the 9th parameter is Safety, Health and Work Safety (K3) in the home-scale processing industry. This parameter adapts to the conditions of the D'Arffi Coffee processing industry. This parameter needs to be applied properly by the processing industry to ensure safe conditions and avoid various disturbances that occur. Interference can affect production both in quality and quantity. K3 discusses two important things, namely the Light Fire Extinguisher (APAR) and First Aid in Occupational Accident (P3K).

(Approach 4) Information and Communication

a Communication Material Visualization

The communication material in the guidebook is designed to help D'Arffi Coffee in giving instructions related to matters that need to be implemented, considered, or prohibited. For example, Figure 2. Beware of Slippery Floors as a form of warning so that anyone who passes through the area to be careful. Figure 3. Tight-free areas and insects are placed in an area that is safe from various pest disorders, such as in a coffee product storage warehouse.

Figure 2. Beware of Slippery Floors

Figure 3. The area free from Rodent and Insect

b Ease of absorption

Ease of application is done by the method of making communication material that is easily translated by the reader. The purpose of the communication material is in the guidebook as a guide or direction in the processing industry. In addition, it's easy to read terms because each word in the glossary is sorted by alphabet.

c Local Wisdom Approach

The approach to local wisdom with the use of local terms is also applied in the guidebook, such as the example of fresh coffee fruit that is red, yellow, brown is referred to as "fruit logs". This approach is expected to make it easier for readers from the local area to understand the term used in the "Good Coffee Processing Handbook for Home Industry"

d Addition of Relevant Materials

Addition of relevant material to enrich the information needed by the reader. This can be seen in table 5.

Table 5. Indications for Physical, Biological, Chemical Hazards and Prevention Management

Product	Indication		
	Physical hazards	Biological hazards	Chemical hazards
Fresh coffee fruit	Fresh coffee fruit stalks, dried leaves	Defects, rotten skin and flesh	Pesticide deposits
Prevention	Removing foreign objects	Avoid fruit from wet places or containers	Provide pesticides according to the dosage
Wet grain	Fresh coffee fruit branches, fresh coffee fruit skin	Rotten, the mucus layer that hasn't been released	Deposition from the washing process
Prevention	Removing foreign objects	Cleansing mucus through clean washing	Adjust the temperature and humidity of the storage space which occurs an enzymatic reaction that ends with damage and decay
Dry grain	Twigs, sand, horn skin, small stones	Mushrooms, dirt	Deposits from water used for washing and soaking
Prevention	(1) removing foreign objects, (2) avoiding using metal tools, such as staplers or paper clips	(1) separating the raw material from the final product, (2) storing the final product at a safe temperature	Adjust the temperature and humidity of the storage space which occurs an enzymatic reaction that ends with damage and decay
Rice	Sand, twigs, small stones, broken seeds	Warehouse pests during storage, microorganisms (fungi)	The scent that is around the storage room (paint, sharp-smelling fruits)
Preventive	(1) Remove foreign objects, (2) avoid using metallic tools, such as staplers or paper clips	(1) separating the raw material from the final product, (2) storing the final product	Adjust the temperature and humidity of the storage space which occurs an enzymatic reaction that ends with damage and decay
Sangrai Coffee Beans	Broken seeds, oil content	Warehouse pests during storage, microorganisms (fungi)	The aroma that is around the storage room (paint, sharp-smelling fruits)
Prevention	(1) removing foreign objects, (2) avoiding using metal tools (staplers or paper clips)	(1) separating the raw material from the final product, (2) storing the final product at a safe temperature	Adjust the temperature and humidity of the storage space which occurs an enzymatic reaction that ends with damage and decay
Coffee powder	Staples, gravel, paper	Microorganisms (fungi)	Change in aroma and taste
Prevention	(1) removing foreign objects, (2) avoiding using metal tools	(1) separating the raw material from the final product, (2) storing the	Adjust the temperature and humidity of the storage space which occurs an enzymatic

Product	Indication		
	Physical hazards	Biological hazards	Chemical hazards
	(staplers or paper clips)	final product at a safe temperature	reaction that ends with damage and decay

e Preparation of Follow-Up Recommendations

Recommendations for follow-up are also included in the guidebook in the form of additional equipment needed in processing coffee. The recommended equipment can be seen in Table 6.

Table 6. Equipment Recommendations

No.	Tool's name	Unit	Total
1.	Scales	Unit	1
2.	Fresh coffee fruit shelf	Unit	1
3.	Tub fermentation	Unit	1
4.	Wet skin peeling machine (pulper)	Unit	1
5.	Huller	Unit	1
6.	Coffee screen grader size 6,7,8	Unit	6
7.	Digital moisture testing tool	Unit	1
8.	Greenbean storage rack	Unit	1
9.	Overlay tarpaulin	Unit	10
10.	UV plastic	Rol	3
11.	Gunny sack	Unit	24
12.	Transparent plastic sacks	Unit	24
13.	Transparent plastic	Unit	100
14.	Mask	Box	1
15.	Gloves (washing)	Dozen	2
16.	Gloves (sorting)	Dozen	2
17.	Headgear (hairnet)	Box	1
18.	Boots	Unit	3
19.	Roof for processing rooms	Unit	2
20.	Cleaning tools and materials		
	- broom	Unit	2
	- mop	Unit	2
	- dustpan	Unit	2
	- bucket	Unit	2
	- broom stick	Unit	2
	- lap	Unit	2
	- bathroom brush	Unit	2
	- bathroom sponge	Unit	2
	- floor and carbolic deodorizer	Unit	1
	- duster	Unit	2
	- gun sprayer	Unit	2
	- hand soap	Bottle	1
21.	Trash can		
	- organic	Unit	1
	- an-organic	Unit	1
	- hazardous ingredients (B-3)	Unit	1
22.	Trash bag	Dozen	5

No.	Tool's name	Unit	Total
23.	Sink	Unit	2
24.	Hand washing soap place	Unit	2
25.	Dry cloth	Unit	4
26.	Light Fire Extinguisher (APAR)	Unit	1
27.	First aid kit		
	- Stacked gauze wrapped	Unit	20
	- Bandage (5 cm wide)	Unit	2
	- Bandage (10 cm wide)	Unit	2
	- Plaster (1.25 cm wide)	Unit	2
	- Fast plaster	Unit	10
	- cotton	Unit	1
	- Triangular cloth / mittela	Unit	2
	- Scissor	Unit	1
	- Safety pin	Unit	12
	- Disposable gloves	Unit	2
	- Gloves (couple)	Unit	2
	- Mask	Unit	1
	- Tweezers	Unit	1
	- Flashlight	Unit	1
	- Glasses for eye washing	Unit	1
	- Clean plastic bag	Unit	1
	- Aquades (100 ml lar. Saline)	Unit	1
	- Povidon Iodine (60 ml)	Unit	1
	- Alcohol (70%)	Unit	1
	- First aid kit in the workplace	Unit	1
	- Record the contents of the box	Unit	1

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