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## PELITAH: ZERO WASTE COFFEE PRODUCTION FOR SUSTAINABLE DEVELOPMENT OF WANAKA COFFEE CULTIVATION THROUGH SOCIAL EMPOWERMENT

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### Abstract

This study aims to analyze PELITAH Waste Coffee Production for Sustainable Development of Wanaka Coffee Cultivation through Social Empowerment. This research uses qualitative research with descriptive analysis approach. The types of data in this study consist of primary data and secondary data, primary data obtained from research respondents and secondary data obtained from literature studies. The collected data is presented using qualitative methods. PELITAH already changed people's behavior at the system level. This change community awareness in waste management. Through the processing of some of these derivative products, all coffee skin waste in every season are processed out by community. So there are no coffee skin waste burned by the community. The environment has changed and indirectly community's waste behavior improving the economy also maintains environmental sustainability.

**Keywords:** *PELITAH, Zero Waste Coffee, Production, Sustainable, Development.*

### A. INTRODUCTION

Coffee is an important beverage in most societies around the globe. Not only for consumer's delight of drinking it but also its economic value for the coffee bean producing and exporting countries (such as Indonesia) (Harvey et al., 2021; Andreola et al., 2019; Jefansa, 2022). Indonesia is the fourth-largest producer of coffee in the world after Brazil, Vietnam and Colombia with total production an estimated 660,000 metric tons of coffee beans in 2017 (Journal of Agricultural Socioeconomics Vol 13 No 2 July 2020). According to the USDA, among the ASEAN countries, Indonesia is known as the second largest coffee producer and exporter after Vietnam. Indonesia is geographically and climatologically well-suited for coffee plantations, near the equator and with numerous interior mountainous regions on its main islands, creating well-suited microclimates for the growth and production of coffee (Septiani & Kuwuryan, 2021; Mawardi et al., 2021).

Indonesia is an archipelagic country that is rich in natural resources and occupies a strategic location on the world trade map. This prompted many foreign traders to stop in Indonesia (Adinandra & Pujianto, 2020; Jaya et al., 2020). The process of assimilation of foreign culture and local culture occurs without going through many obstacles. Initially this process enriched Indonesia's cultural treasures; but as time goes by, the local culture is increasingly being displaced, as we can see in Indonesian coffee culture (Arifin, 2019; Wibowo, 2019).

Coffee is not a native plant of the Indonesian archipelago. At the end of the 16th century when Indonesia was still under Dutch colonial rule, the VOC brought the Arabica coffee plant into this country (Alexander & Nadapdap, 2019; Parnadi & Loisa, 2018). They are interested in breaking down the Arab monopoly on the world coffee trade. The Dutch colonial government first planted coffee seeds around Batavia (Jakarta), to the Sukabumi and

Bogor areas. Then due to the increasing market demand, coffee plantations began to be established in West Java, Central Java, East Java, and several areas in Sumatra and Sulawesi (Apriliyanto et al., 2018; Reszky & Hasmarini, 2021).

The development of coffee plantations led to the development of infrastructure in Central Java in the late 18th century. Roads and railroads were urgently needed to transport coffee from the interior of Java to ports where the beans were transported on ships for export. Before the second World War, Central Java had a very strong rail transportation system (Maulana et al., 2019; Muttoharoh et al., 2018). This system brings coffee, sugar, pepper, tea and tobacco from the province to the port city of Semarang. East Indonesia, East Timor, and Flores also produced coffee during this period, but these areas were still under Portuguese colony and the sources of Arabica coffee seeds were grown differently (Martinez et al., 2019).

Towards the end of the 19th century, coffee plantations in Indonesia, Sri Lanka, and Malaysia were attacked by coffee pests. This pest spreads very quickly and wipes out the entire plantation. This devastated the Dutch colonial government's coffee industry. The Dutch government did not stay silent and imported Liberica coffee seeds (Teniro & Zainudin, 2022; Martauli, 2018). This variety has a popularity that does not last long due to infection with the same pest. Then the Dutch planted Robusta coffee varieties that were more resistant to pests to replace coffee plantations that had been infected. Until now, Robusta occupies about 90 percent of the national coffee production (Desnky et al., 2018; Payne, 2022).

Early Dutch colonial period has played an important part in Indonesia's growth. One of the areas that became the center of coffee development during the Dutch colonial period was in West Java, in the Priangan Plateau, so the coffee known as Java Preanger (Pham et al., 2019). West Java is an area on the Java island where most of the area consists of mountains. Nevertheless, West Java is not the main coffee producer in Indonesia. Coffee brand from this region not as well known as Gayo Sumatra Arabica Coffee, Kintamani Bali Arabica Coffee and Toraja Arabica Coffee. Even though it has its own speciality than other coffee varieties. One of the coffee producers in West Java is Kamojang Forest Farmer Group known as "Kelompok Tani Hutan (KTH) Gunung Kamojang" which located in Kamojang, Laksana Village, Ibum District, Bandung Regency, West Java. This group cultivates and produces coffee under the brand of Wanaka Coffee. Wanaka Coffee won the 1st place on Indonesian Specialty Coffee Contest at the national level in 2020.

KTH Gunung Kamojang is located in Ring 1 of Indonesia Power Kamojang POMU Ltd, a geothermal energy company that located at altitude of 1500 meters above sea level. Geothermal as the main supply of renewable power plants need to be maintained for it's sustainability. The geothermal working scheme is the same as when we boil water in a teapot, the two main components needed are heat source and water in order to produce steam. So at the geothermal steam, the heat sources is magma in the earth's core are used to heat groundwater to produce steam. To maintain it's availability, the water in the soil should not be exhausted. There are two ways to maintain the availability of water in the soil. First, by manually injecting water left over from the production process and through natural charge or natural absorption of water into the soil. Beside conducting manual re-injections, Indonesia Power Kamojang POMU Ltd also focuses on natural recharge through maintain the environmental sustainability by planting hard trees such as Arabica Coffee trees.

Indonesia Power Kamojang POMU Ltd has planted 11.000 trees. Coffee trees are the most planted trees because it has economic benefits for the surrounding community. To develop economic growth of the community, Indonesia Power Kamojang POMU Ltd empower KTH Gunung Kamojang through the Corporate Social Responsibility (CSR) program for Coffee Cultivation and Processing. Through this program, the company can use it for company sustainability and at the same time help to increase economic level of the community.

Economic level of the community can be increased by sustainable coffee cultivation and empower the community to the post-harvest coffee processing. Through this program, the community have ready-to-serve coffee products which labeled with the “Wanaka Coffee” brand. In coffee production process Indonesia Power Kamojang POMU Ltd with KTH Gunung Kamojang also carry out an innovation, called Zero Waste Coffee Production.



**Figure 1. Wanaka coffee cultivation by KTH Gunung Kamojang**

The objectives of the Zero Waste Post-Harvest Coffee Cultivation and Processing program are: 1) Maintaining groundwater infiltration to maintain geothermal sustainability; 2) Maintaining soil structure to reduce the risk of landslide disasters; 3) Empowering the community through post-harvest coffee processing to increase community's economic; 4) Increasing public awareness for environmental protection; and 5) To ensure the protection of environment through effective waste management

## **B. METHOD**

This research uses qualitative research with descriptive analysis approach. The types of data in this study consist of primary data and secondary data, primary data obtained from research respondents and secondary data obtained from literature studies. The collected data is presented using qualitative methods. The discussion begins with analyzing the social analysis issue, then Zero waste production for Sustainable Development of Wanaka Coffee, then continues with Through PELITAH as Zero Waste Coffee Production.

## **C. RESULT AND DISCUSSION**

### **1. Social Analysis Issue**

Generally, highland communities has a good natural and social potential. In natural potency, Kamojang has tourism sector that can be developed such as craters, waterfalls, lakes, and beautiful natural scenery. In social sector, Kamojang as rural communities have social potencies such as mutual cooperation or known as *gotong-royong*, kinship relations, and homogeneous communities. Besides analyze social potential there are social issues of the community. Among them are: a) High unemployment rate in the Kamojang area because of limited choice of jobs at farming sector and limited capacity of the community to switch to industrial sector; b) Low level education in Kamojang, especially in Laksana Village, 4.1% of the society didn't finish elementary school and 4.4% are graduated from high school; and c) High poverty rate in Laksana Village with a poverty rate of 587household from a total population of 2,662 households, or equivalent to 22%.

## 2. Zero Waste Production For Sustainable Development of Wanaka Coffee and Cultivation Trough Social Empowerment

The Post-Harvest Coffee Cultivation and Processing Program fostered by Indonesia Power Kamojang POMU Ltd has begun in 2020 with coffee breeding, planting activities and post-harvest coffee cultivating, then creating the Wanaka Coffee brand. The Post-Harvest Coffee Cultivation and Processing Program managed by KTH Gunung Kamojang is the best solution for the community. Problems related to land ownership, limited community skills in coffee processing, the low economy of the community especially in the agricultural sector, and the habit on farming horticultural crops that may damage the soil structure. The Post-Harvest Coffee Cultivation and Processing Program solves all these problems through various activities in the program that involve the community as subjects in sustainable development.

Based on the coffee processing problems, the abundance of coffee skin waste are not managed by the community. The Waste produced from the process such as cherry peels and just throwing away the waste and even burning it. This activity is causing environmental pollution, especially air and soil from combustion fumes. These coffee skin waste also causing an unpleasant odor by piles of coffee skin waste.

Need an innovation to answer the community's waste problem. This innovation also plays role in answering to improve the community's economic by selling of packaged coffee products to coffee derivative products. The increasing group income has been measured through the Social Return on Investment (SROI) study. The innovation is Zero Waste Coffee Processing named PELITAH (Pengolahan Kopi Tanpa Limbah). This innovation creates a new habit for community to produce coffee environmentally friendly from upstream to downstream.



Figure 2. Coffee Roasting Process



Figure 3. Coffee Post Harvest Process using Solar System as New Renewable Energy



**Figure 4. Coffee Skin Waste Processing**

### **3. PELITAH as Zero Wase Coffee Production**

Through PELITAH innovation, there are 9,460 kg/ year of coffee skin waste that can be processed into many products. Coffee waste managed in various products, such as **cascara tea, cascara cookies, kombucha, coffee skin pellets, hand sanitizer and disinfectant**. Cascara is dried coffee skin that can be brewed as tea. The community also has an innovation to make cascara to other product. Cascara chrushed into powder, then make it into cascara cookies. Cascara also can be used to make kombucha by fermented the coffee skin. Coffee skin waste also produced into pellets for fish food. Beside, coffee skin that smels coffee, can be extracted as oil essence to add coffee scent in handsanitizer and disinfectant that produced by community due to response this pandemic situation.



**Figure 5. Hand Sanitizer from Cascara**



**Figure 6. Wanaka Cookies and Cascara Cookies**

#### **4. Impact of The Innovation**

The Innovation of Zero Waste Coffee Processing (PELITAH) is a new thing in the region. Processing skin waste through this innovation was a unique and new thing to do. This innovation provides an opportunity to improve the new way beyond the habit of the community.

Innovations in this program have an impact on Vulnerable Groups such as:

a. Unemployment

This innovation provide job opoortunities by involving 5 unemployed people in processing coffee skin waste into cascara tea and fish feed pellets.

b. Farm Labor

Previously, farm labor only worked in community-owned areas with daily pay, then through this activity farm labor managed 4.2 ha of land owned by Indonesia Power Kamojang POMU Ltd and were used for coffee cultivation activities.

c. Single Parent (Widow)

Through the involvement of the widows in the program in making health products in response to the Covid-19 Pandemic such as Hand Sanitizer and Disinfectant, it provides an economic improvement for the widows.

The sustainability of this program can be viewed from the Sustainability Compass that following four indicators:

a. Nature

Ha owned by Perhutani, the Community, and Indonesia Power Kamojang POMU Ltd are managed by the community to grow vegetables and coffee cultivation with intercropping method. 57,9,460 kg/year of coffee skin waste are made into several coffee derivative products.

b. Economic

Increase group income up to Rp 40 million/month through the sale of coffee and all its derivative products from coffee waste treatment. Increasing Wanaka Coffee price IDR 450.000/kg after Wanaka Coffee won the Indonesian Specialty Coffee Contest 1st place at the national level in 2020.

## c. Well Being

Empowered 40 coffee farmers, Increase capacity building of the community through several trainings and Improving skill in coffee processing for 7 members of vulnerable group.

## d. Social

Organizing 40 coffee farmers into KTH Gunung Kamojang Farmer Group and Collaboration with several stakeholders: The Government through the Agriculture and Forestry Service, PERHUTANI, Padjadjaran University, Partnership with Lapisan Sabilulungan Gallery and Karang Taruna Kampung Kamojang in program implementation.

From the previous discussion, it can be seen that several forms of culture and lifestyle of the Indonesian people have also colored the culture of drinking coffee in this country. Some of them are socialization and togetherness. In general, Indonesian people like to feel happy, this is widely applied in their spare time. Activities can be simple or complex as long as everyone is happy. So that there is more free time used to enjoy life rather than doing work personally. 'Chat' or chatting happens anywhere; on the veranda, public transport, the street, or at the market. So basically Indonesians are people who like to socialize, there are rarely people from one area who don't know each other

**D. CONCLUSION**

PELITAH already change people's behavior at the system level. This change community awareness in waste management. Through the processing of some of these derivative products, all coffee skin waste in every season are processed out by community. So there are no coffee skin waste burned by the community. The environment has changed and indirectly community's waste behavior improving the economy also maintains environmental sustainability.

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