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Impact of Green Business, Agripreneurship, and Innovation of the Robusta Coffee Agribusiness Supply Chain in Semarang Regency

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Abstract

Semarang Regency's potential agro-climate is quite suitable for growing Robusta coffee, including high rainfall, an altitude of 400-1000 meters above sea level, gentle to hilly topography, alluvial and latosol soil types, and air and soil humidity between 80-90%, which should be utilized to stimulate coffee development. robusta. The purpose of this study is to establish a link between the development of green business practices, optimization of agricultural entrepreneurship potential, and strengthening innovation to support the robusta coffee supply chain and its influence on the development of robusta coffee commodities in Semarang Regency. This study applies to qualitative descriptive approach designed to provide flexibility in obtaining in-depth information from primary sources to discover the substance of the phenomenon. The results of the study show the influence of the implementation of green economics, agripreneurship and innovation which results in 5 (five) aspects of optimization based on the literature, namely the existence of circular economic transformation, increasing competitive advantage, changes in the psychosocial mental attitude of business actors, efficiency of the robusta coffee commodity supply chain, and the development of a holistic business model. If optimization is carried out at least in the next decade, there will be an increase in economic value of more than 158% when compared to business as usual.

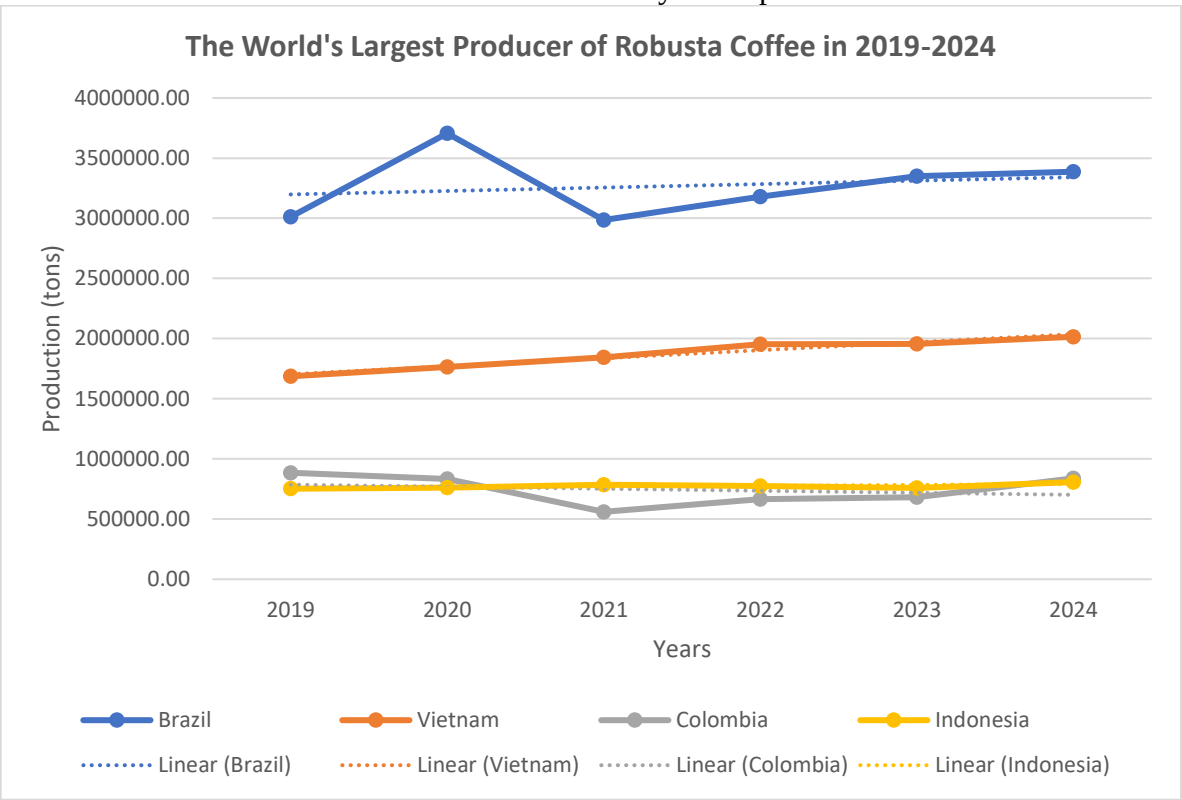
Keywords: *agripreneurship, green economics, robusta coffee, Semarang Regency.*

INTRODUCTION

Indonesia is the world's fourth largest coffee producer after Brazil, Vietnam and Colombia (https://www.fao.org/faostat/en/#data/QCL), with an average annual production of 774,960 tons/year in the last 5 years or only 23% of Brazil's production as the largest producer with an average production of 2,269,770 tons/year as seen in figure 1, even though our average harvest area (1,262,924 hectares) is only below Brazil (1,878,804.67 hectares). This shows that our average productivity is much lower so that revolutionary but sustainable productivity improvement steps are needed. Domestic coffee consumption also continues to increase, and currently there are 58% of respondents who consume coffee every day (https://data.goodstats.id/statistic/frekuensi-minum-kopi-publik-indonesia-2026-FqnUA) this opens up opportunities for coffee production as one of the people's favorite drinks to continue to be developed and expand market penetration.

Semarang Regency's potential agro-climate is quite suitable for the growth of robusta coffee, such as rainfall, altitude, topography, soil type and air and soil humidity should be utilized to stimulate population growth, especially in the centers of its production. Robusta coffee production based on the results of interviews with the BPP Jambu District, it was reported that Semarang Regency's robusta coffee production reaches more than 3,900 tons per year from an area of more than 1,200 hectares. Most of the traditionally cultivated products of coffee farmers are dried green coffee beans or so-called dried green beans which reach more

than 80% in the robusta coffee production supply chain, while the rest is processed by farmers who have roaster machines or processed at roasteries to be repackaged with branding from each coffee entrepreneur with daily small productions.

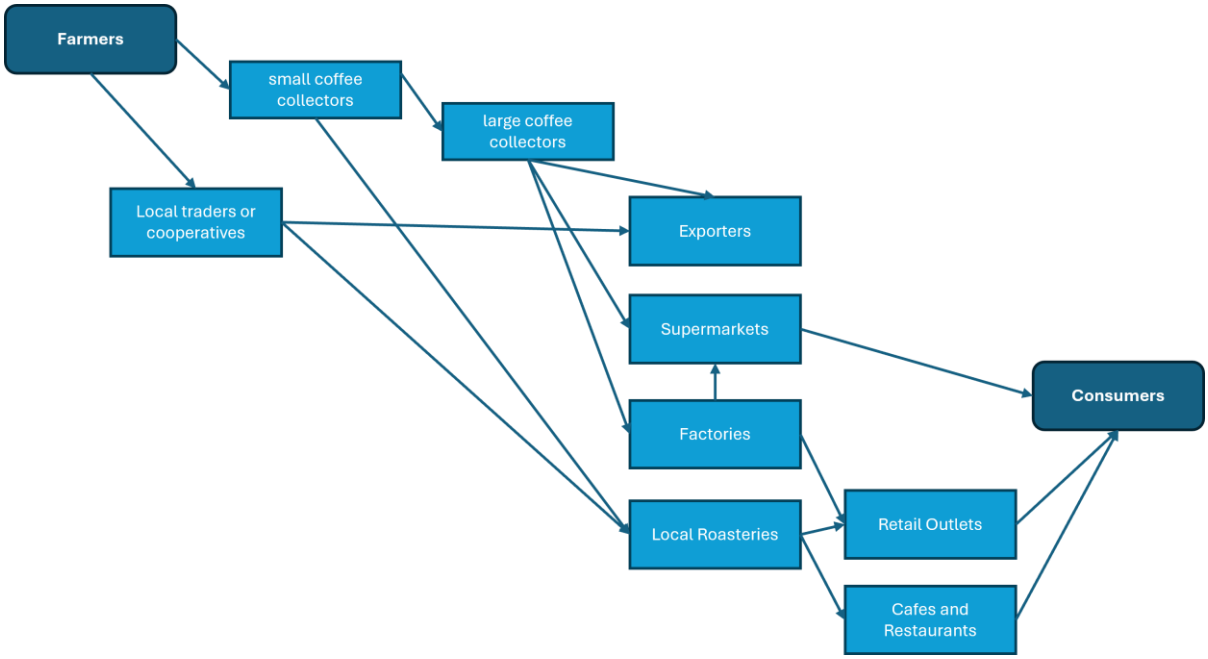


Source: processed from https://www.fao.org/faostat/en/#data/QCL , 2026.

Figure 1. The World's Largest Producer of Robusta Coffee in 2019-2024

Mount Kelir in the Jambu and Banyubiru Districts is the main producer of the best and widely known robusta coffee such as Sepakung Village, Kelurahan Village, and Bedono Village. Currently, 2 (two) MPIG (Geographical Indication Protection Communities) have been formed. The formation of MPIG Gunung Kelir in 2022 for robusta coffee and MPIG Javanica Coffee for arabica coffee in 2024. The great name of Mount Kelir Semarang Regency as a producer is proven by several wins in the Indonesian Specialty Coffee competition. However, the current condition in terms of branding has lost out to competing with neighboring districts, so that currently local pride has finally lost out to economic needs. Especially when seeing the efforts of Temanggung collectors who are willing to climb mountains through valleys to find the best coffee beans of Semarang Regency hidden among the misty hills of Mount Kelir at morning and dusk.

The challenge facing robusta coffee development in Semarang Regency is the long supply chain, as seen in Figure 2. Reaching consumers requires a long supply chain. This leads to distribution inefficiencies, high margin costs, and the risk of quality degradation. This, despite farmers' demands for competitive pricing, results in low selling prices and a negligible economic impact on improving the welfare of coffee farmers.

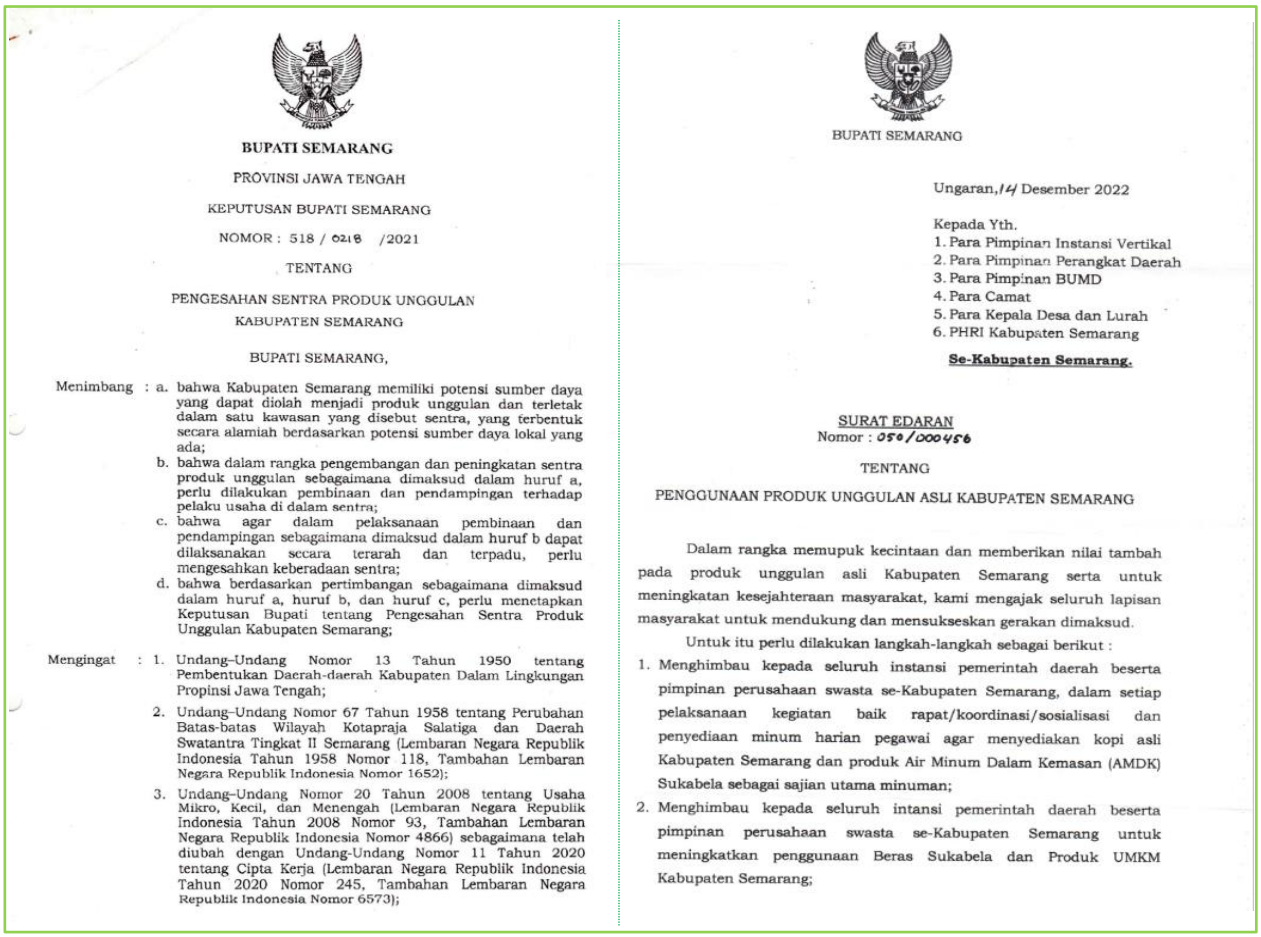


Source: Interview results, 2026

Figure 2. Common Supply Chain of Robusta Coffee in Semarang Regency

In Semarang Regency, in order to strengthen the image of Semarang Regency with various superior products, the Semarang Regent's Decree Number 518/0218 of 2021 concerning the Ratification of the Semarang Regency Superior Product Center, with the attachment to the decree designating Jambu, Banyubiru, Sumowono and West Ungaran Districts as local coffee production centers, and to support its implementation, it is strengthened by the Regent's Circular Letter Number 50/000456 dated December 14, 2022 concerning the Use of Original Superior Products of Semarang Regency, especially regarding the consumption of local coffee in Semarang Regency in the government, tourism, accommodation and hospitality sectors as shown in Figure 3.

The demand for environmentally friendly products and services and support for the "Go Green" campaign in robusta coffee production is a form of support for rural economic development and environmental preservation, which deserves a special place in building the robusta coffee value chain in Semarang Regency. The aim of this study is to establish the linkages between the development of green business practices, optimizing agricultural entrepreneurial potential, and strengthening innovation to support the robusta coffee supply chain and its impact on robusta coffee commodity development in Semarang Regency.



BUPATI SEMARANG

PROVINSI JAWA TENGAH

KEPUTUSAN BUPATI SEMARANG

NOMOR : 518 / 0218 /2021

TENTANG

PENGESAHAN SENTRA PRODUK UNGGULAN KABUPATEN SEMARANG

BUPATI SEMARANG,

Menimbang : a. bahwa Kabupaten Semarang memiliki potensi sumber daya yang dapat diolah menjadi produk unggulan dan terletak dalam satu kawasan yang disebut sentra, yang terbentuk secara alamiah berdasarkan potensi sumber daya lokal yang ada;
b. bahwa dalam rangka pengembangan dan peningkatan sentra produk unggulan sebagaimana dimaksud dalam huruf a, perlu dilakukan pembinaan dan pendampingan terhadap pelaku usaha di dalam sentra;
c. bahwa agar dalam pelaksanaan pembinaan dan pendampingan sebagaimana dimaksud dalam huruf b dapat dilaksanakan secara terarah dan terpadu, perlu mengesahkan keberadaan sentra;
d. bahwa berdasarkan pertimbangan sebagaimana dimaksud dalam huruf a, huruf b, dan huruf c, perlu menetapkan Keputusan Bupati tentang Pengesahan Sentra Produk Unggulan Kabupaten Semarang;

Mengingat : 1. Undang-Undang Nomor 13 Tahun 1950 tentang Pembentukan Daerah-daerah Kabupaten Dalam Lingkungan Propinsi Jawa Tengah;
2. Undang-Undang Nomor 67 Tahun 1958 tentang Perubahan Batas-batas Wilayah Kotapraja Salatiga dan Daerah Swatantra Tingkat II Semarang (Lembaran Negara Republik Indonesia Tahun 1958 Nomor 118, Tambahan Lembaran Negara Republik Indonesia Nomor 1652);
3. Undang-Undang Nomor 20 Tahun 2008 tentang Usaha Mikro, Kecil, dan Menengah (Lembaran Negara Republik Indonesia Tahun 2008 Nomor 93, Tambahan Lembaran Negara Republik Indonesia Nomor 4866) sebagaimana telah diubah dengan Undang-Undang Nomor 11 Tahun 2020 tentang Cipta Kerja (Lembaran Negara Republik Indonesia Tahun 2020 Nomor 245, Tambahan Lembaran Negara Republik Indonesia Nomor 6573);

BUPATI SEMARANG

Ungaran, 14 Desember 2022

Kepada Yth.
1. Para Pimpinan Instansi Vertikal
2. Para Pimpinan Perangkat Daerah
3. Para Pimpinan BUMD
4. Para Camat
5. Para Kepala Desa dan Lurah
6. PHRI Kabupaten Semarang

Se-Kabupaten Semarang.

SURAT EDARAN
Nomor : 050/000456

TENTANG

PENGGUNAAN PRODUK UNGGULAN ASLI KABUPATEN SEMARANG

Dalam rangka memupuk kecintaan dan memberikan nilai tambah pada produk unggulan asli Kabupaten Semarang serta untuk meningkatkan kesejahteraan masyarakat, kami mengajak seluruh lapisan masyarakat untuk mendukung dan mensukseskan gerakan dimaksud.

Untuk itu perlu dilakukan langkah-langkah sebagai berikut :

1. Menghimbau kepada seluruh instansi pemerintah daerah beserta pimpinan perusahaan swasta se-Kabupaten Semarang, dalam setiap pelaksanaan kegiatan baik rapat/koordinasi/sosialisasi dan penyediaan minum harian pegawai agar menyediakan kopi asli Kabupaten Semarang dan produk Air Minum Dalam Kemasan (AMDK) Sukabela sebagai sajian utama minuman;
2. Menghimbau kepada seluruh intansi pemerintah daerah beserta pimpinan perusahaan swasta se-Kabupaten Semarang untuk meningkatkan penggunaan Beras Sukabela dan Produk UMKM Kabupaten Semarang;

Source: Bapperida Semarang Regency, 2026

Figure 3. Regent's Regulation and Regent's Circular Letter regarding the Development and Consumption of Superior Local Products in Semarang Regency

LITERATURE REFERENCES

Green economy is defined as a sustainable business process that aims to improve the economic conditions of a region while protecting the environment from negative impacts and ensuring the maintenance of a positive image of a company or a particular production chain so that it can increase public trust and thus form green capital (White et al., 2025). This model is based on the principles of zero waste management, low-carbon growth, reduced greenhouse gas emissions, resource efficiency through production processes that produce minimal waste or no waste that pollutes the surrounding environment, thereby creating social welfare simultaneously with nature conservation (Cato, 2012, White et al., 2025). Environmentally friendly agricultural practices that directly support the implementation of a green economy are being developed to generate added value without negatively impacting the environment (Sanchez et al., 2022).

To achieve a sustainable level green Economically, environmentally friendly innovation is needed that can produce new products with high economic value while producing waste or residue that can be used as raw materials for subsequent production processes, thus building a sustainable circular economy (Cato, 2012). The basic concept of a circular economy is the same as the natural cycle where each output of one entity will become an input factor for the next entity, and this process will continue to repeat without

interruption. In the agricultural sector, the application of this method is carried out in the utilization of agricultural waste to become organic solid fertilizer, liquid organic fertilizer, bioenergy producers such as coffee skin briquettes and organic waste biogas (Sanchez et al., 2018). The correlation between the green economy and the circular economy based on agricultural commodities lies in the design of regenerative systems, where resource efficiency and low-carbon growth can be achieved through an integrated value chain model to ensure that human well-being will remain below the ecological ceiling (Raworth, 2018).

The power of agripreneurship, especially through the role of farmer groups, MSMEs, roasteries, farmer cooperatives, or MPIG, is the main driver in transforming the traditional coffee supply chain with low added value into a more exploitative one in order to build a more optimal value chain to improve the welfare of cooperative members or farmer group members or other agricultural institutional members who have a role to initiate, drive and preserve steps to optimize the added value of agricultural products produced or innovate to produce derivative products with high economic value or carry out social innovations to form farmers who are financially literate and IT literate, as well as the ability to build local brand branding that is able to reach remote areas of the country and even export (Barrett et al., 2019; Iskandar & Rahmah, 2024; Istighfarani, 2025; Neilson & Biénabe, 2026). In addition, with increased technical and non-technical skills, they are expected to become multitasking farmers, thereby shortening the supply chain and resulting in significantly increased income levels (Lambrechts, 2020).

RESEARCH METHODS

This study applies a qualitative descriptive approach designed to provide flexibility in obtaining in-depth information from primary sources to discover the substance of the phenomenon without relying entirely on numerical measurements (Oranga & Matere , 2023). Primary data were extracted through focused interviews with key informants such as coffee farmers, coffee entrepreneurs, the Jambu sub-district head and his staff, and employees of the Jambu Sub-district Agricultural Extension Center (BPP) to understand the readiness and actual behavior of stakeholders in adopting green business practices and innovation in the supply chain. This data collection was strengthened by secondary data from the Semarang Regency Statistics Agency (BPS) and the Semarang Regency Agriculture, Fisheries, and Food Service to map the physical conditions of the agro-climate-supporting environment and productivity levels in the study area. In addition, this study integrates a few elements of exponential forecasting as part of a dynamic trend analysis to project the growth trajectory of the robusta coffee agribusiness in Semarang Regency over the next decade based on trends in the last 5 years. Through this research method, the study is expected to comprehensively map and build an economic development concept formed as a result of the collaboration of green economy practices, optimization of agropreneurship, and optimization of supporting innovations.







RESULTS AND DISCUSSION

Regarding green economy development in Semarang Regency, research by Ardila & Sitepu (2025) stated that a green economy development strategy in Semarang Regency needs to encompass at least five main aspects, those are sustainable land protection, renewable energy utilization, sustainable tourism, water resource management, and climate-resilient agriculture (Ardila & Sitepu, 2025). The study revealed that three strategic aspects are directly related to agricultural development. So agriculture should be placed as the trigger of development chain because it serves as a provider of raw materials for industries, significantly increasing the added value of commodities. This is especially case for coffee, which also has an artistic element for its connoisseurs. Without innovation, the coffee market will remain stagnant and risk being eroded by more modern, efficient entrepreneurs offering superior service.

Based on information from the Semarang Regency, the value of the robusta coffee commodity in 2025 reached around IDR 150,938,920,000 calculated from the sale of green coffee. beans all grade with a selling price of IDR 66,000/kg. To see the impact of the implementation of green economic, agripreneurship and innovation that produces 5 (five) aspects of optimization based on literature, namely the existence of circular economic transformation, increasing competitive advantage, changing the psychosocial mental attitudes of business actors, efficiency of the robusta coffee commodity supply chain, and building a holistic business model (Banunaek et al. , 2022; Cato, 2002; Raworth , 2018; White et et al. , 2025).

Explanation of the form of transformation that has developed from holistic implementation efforts based on green aspects. economic , agropreneurship and innovation in strengthening the robusta coffee supply chain in Semarang Regency include :

1. Circular economy transformation

   A circular economic metabolism is beginning to take shape, replacing the linear "take-make-dispose" business

model. The mounds of coffee husks left to oxidize naturally and collected in "*jugangan*" (a digged hole which is usually used a place to throw the organic or household waste) that produced smelly leachate, attracted flies to breed, and damage landscape and caused an unpleasant odor. These have now been transformed into high-quality organic fertilizer rich in NPK that can be utilized in their coffee fields and plantations, especially during the vegetative growth period (Iskandar, 2022). Some farmers are also trying to make dried coffee husk briquettes for use as fuel. The "zero waste agribusiness" movement has raised awareness among robusta coffee farmers that all goods produced have economic value if they are in the right hands. The impact of increasing farmers' income from this business is not too large, but it is very helpful for farmers to reduce the cost of providing fertilizer, which is currently relatively expensive, which is in line with research by Iskandar & Rahmah (2024). The implementation of a circular economy in robusta coffee in Semarang Regency increases added value by around 5%.

2. Increasing competitive advantage

   The increasing competitive advantage of Semarang Regency's robusta coffee relies on its unique flavor profile, which tends toward a "light body" without an intense and lingering bitter aftertaste, a flavor anomaly that is actually a genuine attraction for the modern market. Furthermore, the superior agroclimate of Gunung Kelir should no longer be a passive comparative advantage, but rather a trigger for improving the quality of the resulting coffee product. Efforts have been made to implement a "red cherry only" system, where farmers are required to harvest only ripe coffee to maintain quality from green bean to ground coffee, ensuring its prime quality. The establishment of the Gunung Kelir MPIG for robusta coffee and the Javanica Coffee MPIG for arabica coffee has also encouraged increased production, equitable distribution, and improved coffee bean quality, while also enhancing Semarang Regency's image as a producer of high-quality specialty coffee. Unfortunately, the hope of establishing a large cold storage facility to maintain coffee stocks in anticipation of fluctuations in production with market demand has not yet been realized, so the practice of purchasing green beans continues to this day.

   The added value generated by this aspect is around 5% and will be higher if it is green The amount of beans absorbed by markets outside the region is getting smaller.

3. Changes in the psychosocial mental attitudes of business actors

   Farmers' mental readiness and increased adaptability will help drive the survival of coffee cultivation and marketing businesses. They enthusiastically learn something initially unfamiliar, seeing it to sustain their businesses and foster a culture of innovation that can help them address the challenges they face in a sustainable manner. Developing this culture of innovation takes a long time, typically 3-5 years or more. The psychosocial changes experienced by farmers who willingly and has intention to learn new things, such as barista training, IT utilization (including e-commerce and modern mechanized agricultural machinery), financial literacy, and public speaking, have fostered a more confident, independent, and adaptive attitude to technological developments and market preferences. This finding aligns with research by Banunaek et al. (2022) and Mustikawati et al. (2024), which found that farmers who engage in this approach are generally more confident and adaptable. Some farmers got some orders from European Union nations and Middle East nations, even they have a brand

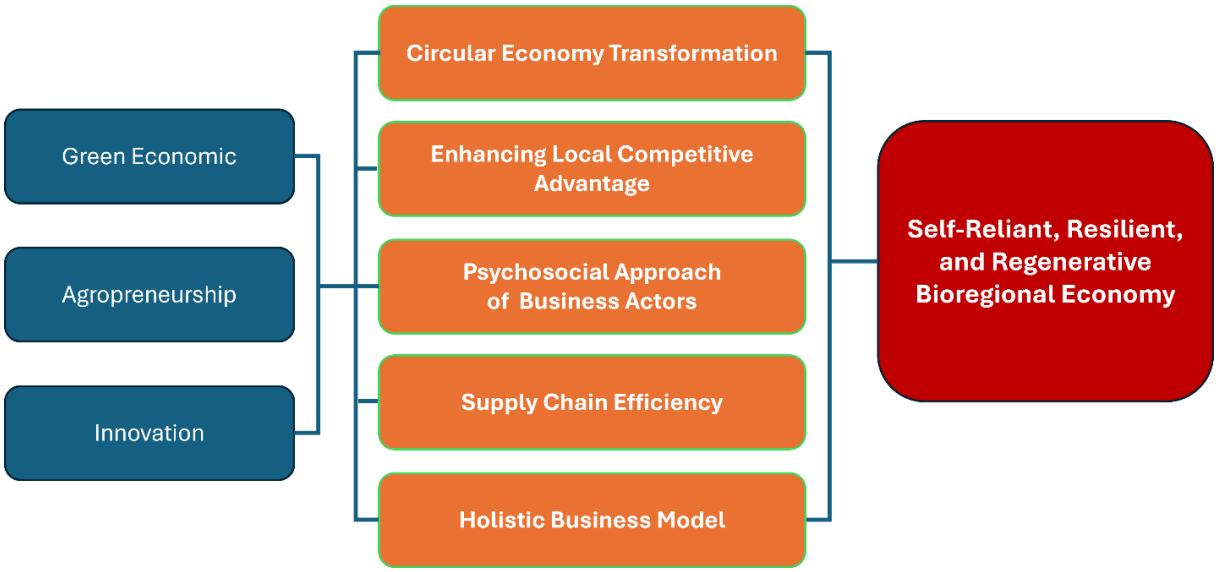
themselves, they prefer use MPIG Gunung Kelir as the brand of their products, almost of them in roasted bean formed. So impact of the farmer's institutional strengthening has been positively felt by all members. The added value generated by this aspect reaches 5-10% and will increase with consistent implementation.

4. Efficiency of the robusta coffee commodity supply chain

   MPIG Gunung Kelir is a key player in optimizing production and shortening the supply chain, enabling direct trade with consumers or distributors due to its proprietary brand (the Gunung Kelir brand) and the full support of the Semarang Regent for broad market penetration. MPIG is also expected to be a catalyst for startups to survive and sustain coffee production, serving as an incubator for small entrepreneurs until they are ready to market their own products independently. This shortened supply chain is expected to allow small farmers to receive a larger share of profits than before. However, the consequences include ensuring consistent quality, production continuity, and adequate processing capacity to meet market needs. This situation also fosters a high level of trust among farmers in MPIG, which has consistently optimized its agripreneurship role. The estimated added value generated from this aspect is between 10-15%.

5. Building a holistic business model

   With the establishment of a healthy and resilient production climate. Currently, a fairly close relationship has been established between the government as an enabler, which provides a legal umbrella for a cool coffee commodity production business climate for local coffee production, academics who are always trying to explore fresh new innovations and strive to be problem solvers faced in robusta coffee cultivation, and entrepreneurs who have placed great trust in MPIG to accept the production of MPIG member farmers. The role of the media is also quite important in strengthening the image of Gunung Kelir Coffee to continue producing premium robusta coffee that will always leave a mark on the hearts of fans. The increase in value in this aspect is around 10% compared to business-as-usual practices.

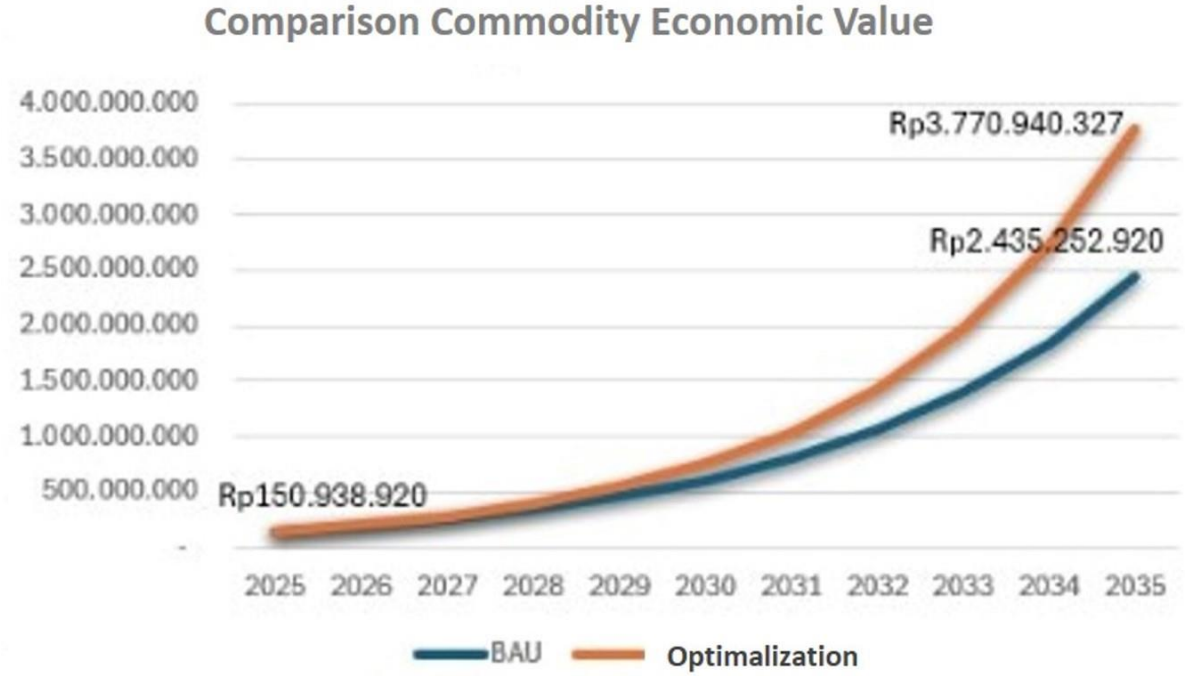


Source: Analysis Results, 2026

Figure 5. Research Construct Framework

As shown in Figure 5, the process flow for implementing a sustainable green economy, strengthening agropreneurship, and appropriate innovation can form a self-reliant, resilient, and regenerative bioregional economic system, that some of whose indicators have been pioneered, although they are still not optimal. This bioregional economic method is expected to create economic progress that runs simultaneously with nature conservation and social justice for communities in rural areas in the production centers of superior robusta coffee products in Semarang Regency, such as in Jambu District, Banyubiru District, Sumowono District, and West Ungaran District.

With the implementation carried out which was obtained from the respondents, then based on the exponential forecasting the aggregate added value of 5 aspects of optimization activities, a comparison of cash flows from robusta coffee supply chain activities in 2034 obtained a value 158% higher if optimization is carried out consistently compared to business as usual conditions even though it has the same economic value at the start. This calculation can be seen in Figure 6.



Source: Analysis results, 2026.

Figure 6. Simulation of Comparative Analysis of Business-As-Usual activity with 5 aspects of Optimization

CONCLUSIONS AND SUGGESTIONS

Conclusion

Green implementation economic, agripreneurship and innovation that produces 5 (five) aspects of optimization based on the literature, namely the existence of circular economic transformation, increasing competitive advantage, changing the psychosocial mental attitude of business actors, efficiency of the robusta coffee commodity supply chain, and building a holistic business model. In general, the increase in added value from this activity reaches 30-45% if it can be implemented consistently. This self-reliant, resilient and regenerative bioregional economic system can create economic progress that runs simultaneously with nature conservation and social justice for communities in rural areas in robusta coffee production centers in Semarang Regency. If optimization is carried out at least in the next decade, there will be an

increase in economic value of more than 158% when compared to business-as-usual.

Suggestions

The suggestions that can be conveyed are:

1. There is a need to strengthen the integrity of business actors to consistently maintain quality and continue to develop to expand market penetration.
2. It is necessary to hold training programs according to the needs of farmer group members to improve their agripreneurship spirit.
3. The need to provide equipment assistance to MPIG members who can maintain constant production or whose productivity continues to increase.
4. The need for quality consistency and, if necessary, regular monitoring to maintain production continuity and the quality of commodity output.

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