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Strategies to Enhance the Productivity of Yellow Bean Coffee Through Seed Certification and Value-Added Nursery Practices

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ABSTRACT: This study aims to develop strategic approaches to enhance the productivity of Yellow Caturra coffee cultivated in Mount Mandalagiri, Garut Regency, Indonesia. Since 2012, Mandalagiri coffee farmers have experienced a decline in yields, primarily due to the use of seedlings that are not well-suited to the volcanic soil conditions of the region. Although the area possesses significant potential for coffee cultivation expansion through the national social forestry programme, the availability of certified Yellow Caturra seedlings remains limited. This research employed a qualitative descriptive approach to obtain an in-depth understanding of the certification process for Yellow Caturra nurseries and the potential value added from nursery activities to improve productivity. Data were analysed using the SOAR framework (Strengths, Opportunities, Aspirations, and Results) to identify strategic priorities for sustainable productivity enhancement. The findings highlight three main strategies: (1) the selection of superior Yellow Caturra parent plants and the integration of Good Agricultural Practices (GAP) within nursery operations to ensure seed certification; (2) capacity building and skill enhancement for seed breeders to strengthen the quality and scalability of seedling production; and (3) the promotion of Yellow Caturra coffee as Garut's distinctive specialty product. These strategies underline the critical roles of certification, human resource development, and regional branding in improving productivity and ensuring the long-term sustainability of coffee cultivation in Mandalagiri.

Keywords: Strategy, SOAR, Certification, Value Added, Coffee.

INTRODUCTION

Indonesia continues to face various challenges and opportunities in terms of coffee productivity and quality. Efforts to improve both aspects include the certification of superior coffee seedlings, which not only enhances the competitiveness of Indonesian coffee in the global market but also contributes to improving farmers' livelihoods (Indonesia Invesment, 2024).

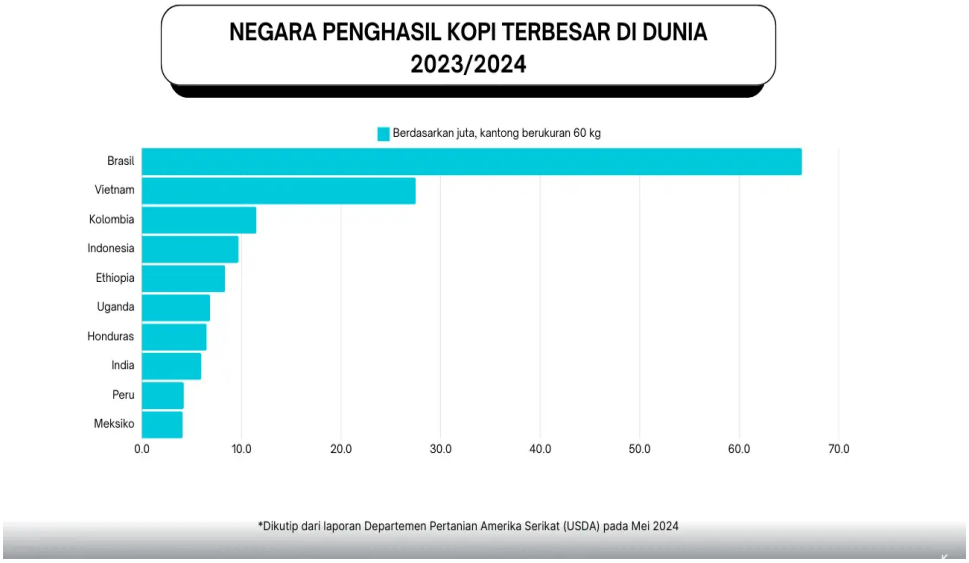

Figure 1. The Largest Coffee-Producing Countries in the World, 2023/2024

According to data from the United States Department of Agriculture (USDA), Indonesia is the fourth-largest coffee-producing country in the world after Brazil, Vietnam, and Colombia. Nevertheless, a considerable productivity gap persists when compared to Brazil and Vietnam, which account for the majority of global production (International Coffee Organization, 2021a; Proença et al., 2022a). This productivity gap reflects systemic constraints in Indonesia's coffee value chain, including the uneven adoption of modern cultivation practices, inadequate access to quality inputs, and limited institutional support for smallholder farmers.

Approximately 96% of Indonesia's coffee plantations are owned and managed by smallholder farmers, while private and state-owned plantations account for only about 4%. Although this distribution demonstrates the strong role of smallholders in maintaining the national coffee supply, it also exposes structural weaknesses. Many farmers face limited technical knowledge, lack of access to superior planting materials, and poor post-harvest management systems. The average productivity of Indonesian coffee is only 0.77 tons per hectare, far below its potential optimal yield of up to 3 tons per hectare. The low productivity can be attributed to several factors, such as aging coffee trees, limited access to certified seedlings, and the absence of Good Agricultural Practices (GAP) implementation in farming systems (Kementan Ditjenbun, 2014). These challenges collectively constrain the ability of smallholder farmers to achieve economies of scale and to compete effectively in global markets. This condition is largely attributed to factors such as the aging of coffee trees, restricted access to superior seedlings, and the insufficient application of Good Agricultural Practices (GAP) (Ashardiono & Trihartono, 2024; Ridwan et al., 2020).

Garut Regency, an agrarian region in West Java, has vast areas of coffee plantations, particularly on the slopes of Mount Papandayan and Mount Mandalagiri, located in Cikandang Village. Since 2012, coffee farmers in Cikandang have been cultivating coffee, yet the productivity levels remain relatively low and unsatisfactory. One major cause is the use of seedlings that are incompatible with the volcanic soil composition of the Mandalagiri highlands. The mismatch between seed variety and local soil characteristics has led to declining yields, discouraging many farmers from

maintaining or expanding their coffee plantations. As a result, farmer motivation to continue coffee cultivation has gradually diminished, with some turning their focus toward more profitable horticultural crops. (Laporan Pertanian Kabupaten Garut, 2021).

Nevertheless, several farmers have reported higher yields when cultivating a distinct variety known as kopi biji kuning (Yellow Caturra coffee), which appears to grow optimally in the agroecological conditions of Cikandang. This variety has unique sensory attributes and aesthetic appeal, giving it the potential to become a distinctive specialty product for Garut's coffee industry. However, the availability of Yellow Caturra seedlings remains extremely limited, and there is no certified nursery or specialized seed producer responsible for propagating this variety. The absence of certified yellow caturra seed sources poses a significant barrier to consistent quality production and limits the scalability of coffee cultivation in the region.

The potential for expanding coffee plantations in Mandalagiri has grown substantially with the implementation of a social forestry program in Cikandang Village, in 2025 covering an area of 994 hectares (Menteri Lingkungan Hidup dan Kehutanan, 2019). The opportunity for coffee cultivation in this region is not accompanied by sufficient availability of yellow bean coffee seedlings, which remain highly limited. Most farmers in Cikandang perceive coffee trees merely as a supplementary crop to their primary horticultural farming. Consequently, coffee cultivation and management practices are still inadequate and have yet to align with Good Agricultural Practices (Adinandra & Pujianto, 2020; Amrulloh et al., 2024).

Based on these observations, the key problems identified in this study are low coffee productivity resulting from unsuitable and uncertified seedlings, limited availability of Yellow Caturra certified seedlings, and suboptimal management practices that fail to meet GAP standards. These interrelated challenges highlight the need for an integrated and strategic approach to improving both productivity and sustainability in Mandalagiri's coffee cultivation.

To address these challenges, this study applies the SOAR (Strengths, Opportunities, Aspirations, and Results) framework, which provides a positive strategic analysis tool to explore opportunities for enhancing productivity through certification and value-added activities. The SOAR framework differs from traditional SWOT analysis by focusing on what works well and what can be expanded, rather than on weaknesses or threats. It encourages participatory strategy formulation that leverages existing strengths and collective aspirations to achieve measurable outcomes (Ria Susanti, 2024). Through this framework, the study aims to identify how local farmers' inherent strengths and available opportunities can be harnessed to build a sustainable model of coffee productivity in Mandalagiri.

The main objective of this research is to determine strategic pathways to enhance the productivity of Yellow Caturra coffee in Mount Mandalagiri, Cikandang Village, by focusing on two essential dimensions namely seedling certification, which ensures genetic quality and sustainability, and value-added nursery development, which enhances farmer capacity and economic returns.

Accordingly, the research question formulated is how can coffee productivity in Mandalagiri be improved through the certification and value-added development of Yellow Caturra coffee seedlings. This question is explored through a qualitative descriptive approach that integrates field

observations, stakeholder interviews, and SOAR-based analysis. The outcomes are expected to provide a comprehensive framework for sustainable coffee development in Mandalagiri, serving as a reference for policymakers, cooperatives, and community-based organizations engaged in the coffee value chain. Moreover, the findings aim to contribute to broader discussions on improving seed system governance, promoting certified coffee varieties, and strengthening the competitiveness of Indonesia's specialty coffee sector on the global stage.

The SOAR framework is a positive-oriented strategy that highlights the strengths of coffee farmers in Mandalagiri through four dimensions: Strengths, Opportunities, Aspirations, and Results (Fuadi, 2020; Kurniati & Adrianto, 2021). The objective of this study is to formulate strategies for enhancing the productivity of yellow bean coffee in Mount Mandalagiri, Cikandang Village. The research problem focuses on the low productivity of coffee in Mandalagiri, which is closely linked to the limited and uncertified supply of yellow bean coffee seedlings as well as the need to strengthen value-added practices in seed certification and nursery management (Chiputwa et al., 2015).

Value added is defined as the difference between the value of the output produced and the cost of inputs utilized in the production process (Proença et al., 2022b)**.** In agribusiness, value added is derived not only from physical processing but also from quality improvement, certification, and branding (Tamru & Minten, 2023). Value added is generated through the calculation of costs and benefits of yellow bean coffee seedling cultivation, which will ultimately be enjoyed by farmers (Alkautsar M, Hermina T, 2023; Fauziah & Ikhwana, 2015). Previous research on the nursery business of Liberica Tungkal Komposit (Libtukom) coffee in Tanjung Jabung Barat Regency demonstrated that Libtukom coffee seedling enterprises generate relatively high income (Minsyah & Dan Defira Suci Gusfarina, 2021; Sari et al., 2018).

Seed certification is a formal process designed to ensure that seeds or seedlings meet established quality standards related to genetic purity, health, and viability (Kementan Ditjenbun, 2014), (Lubis et al., 2020a). The objective is to enhance productivity, competitiveness, and the sustainability of production (Ghufron Rosyady et al., 2024). The study of coffee seed certification encompasses both the understanding and implementation of certification processes that must be undertaken by coffee farmers. Research conducted by Zacharie R. and Deny S. on the competitiveness of Indonesian coffee in the international market revealed a decline, primarily due to the deterioration in quality and the lack of certification among coffee farmers (Ihsanuddin, 2023; Zacharie & Denny, 2024). Several other studies have primarily focused on the development of coffee cultivation practices, coffee processing, and the economic competitiveness of coffee products (Fizriani et al., 2021; Hermina et al., 2023; Zimmermann, 2023).

METHOD

This study employed a qualitative descriptive method to obtain an in-depth understanding of the certification process of Yellow Caturra coffee seedlings and the value-added analysis of nursery activities (Mile, Matthew B.; A. Michael Hubberman, 2014). The qualitative approach was

appropriate for exploring meanings constructed by individuals within their social contexts (John W. Creswell & Poth, 2017).

Data were collected through semi-structured interviews using source triangulation, involving Yellow Caturra farmers, officers of the Plantation Seed Supervision and Certification Center (BPSB), coffee experts, and entrepreneurs. Interviews explored farmers' awareness of certification, nursery management, and perceived economic benefits. Complementary participant observation was conducted to document nursery practices from parent plant selection, seed processing, germination, to planting readiness following Good Agricultural Practices (GAP) standards.

Data were analyzed using the SOAR (Strengths, Opportunities, Aspirations, and Results) framework, emphasizing positive potentials and opportunities for developing certified nurseries (Stavros & Cole, 2013). Analysis followed an interactive model involving data reduction, data display, and conclusion drawing. The SOAR stages included: (1) descriptive synthesis and data reduction; (2) identification of strengths, opportunities, aspirations, and results; and (3) strategy formulation by integrating SA, SR, OA, and OR combinations to produce strategic recommendations for enhancing Yellow Caturra nursery development and coffee productivity (Nur Ichwan et al., 2024; Rismayanti et al., 2023; Wijayanti et al., 2024).

RESULT AND DISCUSSION

Data collection in this study was carried out through semi-structured interviews using a triangulation approach involving three main sources: coffee farmers in Mandalagiri, officers from the Plantation Seed Supervision and Certification Center (BPSB), and coffee experts. This method ensured that the information obtained was both credible and comprehensive, allowing validation of perspectives from multiple stakeholders regarding the certification of Yellow Caturra coffee seedlings and the potential value added from nursery activities. The results revealed that most farmers in Mandalagiri are familiar with the term "seed certification," yet their technical understanding of the procedures, administrative requirements, and stages involved in obtaining certification remains very limited. Only a small number of farmers have detailed knowledge of certification, and that knowledge is typically derived from informal interactions with local nursery operators. The majority of farmers are unaware of the necessary documentation, cultivation standards, and institutional processes required to obtain official certification from agencies such as BPSB. This limited understanding is one of the main reasons why Yellow Caturra seedlings in Mandalagiri have not yet been formally certified.

Coffee cultivation in Cikandang Village, particularly in the Mandalagiri highlands, has distinct characteristics due to the presence of a local coffee variety known as Yellow Caturra. This variety originated from Red Bourbon coffee, which underwent natural mutation after being cultivated in the volcanic soil of Mandalagiri, producing beans with a yellow hue. This unique mutation gives Yellow Caturra its identity as a specialty variety indigenous to Garut. Several farmers have cultivated and propagated this coffee independently, and their harvests have consistently retained the distinct physical and sensory characteristics of the yellow bean. However, the existing nursery practices are still small-scale and primarily intended for local use. Farmers generally produce

seedlings only to meet personal or community needs, not for broader commercial purposes. The propagation process is mostly self-taught, relying on personal experience or informal guidance from neighboring nurseries. In terms of growing media, farmers commonly use organic materials readily available in their environment, such as fertile soil, sheep manure, and composted coffee husks. The abundance of livestock in Cikandang makes sheep manure an easily accessible fertilizer. Farmers believe that this organic combination enhances soil fertility and accelerates natural seedling growth. These practices demonstrate strong adaptation to local ecological conditions and resource optimization, yet they have not been systematically aligned with the principles of Good Agricultural Practices (GAP). Furthermore, nursery processes have not been formally documented, making it difficult to ensure consistency, traceability, and quality control.

Interviews with farmers confirmed that none of the Yellow Caturra seedlings currently in use are certified. The reasons include insufficient technical knowledge, financial limitations, time constraints, and geographical distance from certification institutions, which hinder access to relevant information and administrative assistance. Some technical and administrative requirements, such as maintaining uniform mother plants, ensuring varietal purity in planting areas, and providing documentation of varietal origin, are challenging to fulfill under the current conditions. Most farmers in Mandalagiri cultivate coffee using traditional methods on limited land with minimal technical support, which makes compliance with certification standards difficult. Nevertheless, there is a strong sense of local pride and recognition of Yellow Caturra's uniqueness, and farmers have expressed interest in obtaining certification if adequate support mechanisms are provided.

From the institutional perspective, the representative of BPSB explained that the certification process for coffee seedlings begins with an application submitted by farmers or farmer groups. The basic requirements include ownership or legal access to a mother plant garden, completion of a certification form, and submission of relevant technical data. The process proceeds with document verification, followed by field inspections of the nursery and mother plants to ensure uniformity, plant health, and adherence to GAP. Laboratory testing is also conducted to assess seed viability and purity. Once all requirements are met, BPSB issues an official certificate of seed quality. Regarding the potential for certifying local varieties such as Yellow Caturra from Mandalagiri, BPSB confirmed that it is possible, provided the variety undergoes registration as a local cultivar and passes the DUS (Distinctness, Uniformity, Stability) test. Based on its unique characteristics and adaptation to local soil conditions, Yellow Caturra has strong potential to be officially recognized as a specialty variety from Garut Regency.

The certification process, however, remains challenging for smallholder farmers. Major obstacles include limited access to technical knowledge, relatively high costs, long administrative procedures, and inadequate field assistance. In addition, weak institutional structures among farmer groups, such as inactive or unregistered cooperatives, hinder collective applications that could reduce costs and streamline certification. To address these barriers, BPSB has organized regular training programs, provided technical manuals, and assigned Plant Seed Supervisory Officers (PBTs) to assist farmers in the field. Collaboration with the Plantation Office (Dinas Perkebunan), Agricultural Extension Centers (BPP), and field extension officers has also been established to deliver on-site technical supervision. Despite these initiatives, access to information and farmer

participation remain limited, particularly in remote areas. BPSB representatives emphasized that clustering farmers into collective groups can improve efficiency in certification and strengthen organizational capacity. Awareness of certification benefits among farmers remains relatively low, yet interviews indicated that once farmers observe the economic advantages-such as higher yields and increased prices for certified seedlings-interest and motivation rise significantly. This pattern suggests that demonstration and peer-to-peer learning can be powerful tools in promoting certification adoption.

The synthesis of these findings indicates that Mandalagiri coffee farmers possess a foundational understanding of nursery management and certification, although their practices remain largely informal. Several farmers have already begun independent propagation of Yellow Caturra seedlings, utilizing locally available resources and demonstrating basic skills in plant selection and organic fertilization. These local innovations form an important starting point for establishing a certified nursery system. However, gaps persist in technical compliance, recordkeeping, and coordination with certification authorities. Limited technical support and the absence of institutional partnerships have delayed the formal certification of Yellow Caturra seedlings, despite their potential to represent Garut's agricultural identity.

Improving communication and coordination between farmers, cooperatives, and institutions such as BPSB is therefore essential. Strengthening these linkages can help farmers fulfill documentation requirements, adopt standardized nursery management practices, and ensure conformity with GAP. The potential for certifying Yellow Caturra seedlings is substantial, given the unique genetic traits of the variety and its strong local adaptation. Developing a strategic model based on certification, value addition, and farmer empowerment could transform Mandalagiri into a center for high-quality, certified coffee seedling production. The application of the SOAR framework in this context highlights that Mandalagiri farmers already possess strengths such as local knowledge, suitable agroecological conditions, and distinctive varietal characteristics. Opportunities lie in government support programs, consumer demand for traceable and sustainable coffee, and regional branding initiatives. By aligning these strengths and opportunities with farmer aspirations-such as achieving higher productivity and recognition for Garut's specialty coffee-positive results can be realized.

In conclusion, the findings show that while Mandalagiri farmers have a strong foundation in traditional nursery practices, institutional collaboration and technical guidance are necessary to achieve full certification compliance. The integration of local wisdom with formal certification systems offers a pathway toward sustainable productivity enhancement. Through improved organization, capacity building, and coordinated partnerships, Yellow Caturra can emerge as a certified, value-added variety representing both the cultural heritage and economic resilience of Garut's coffee sector. This transformation would not only increase farm-level income but also strengthen the region's reputation within Indonesia's growing specialty coffee market.

Interviews with Yellow Caturra coffee farmers in Mandalagiri revealed that the primary motivation for establishing independent nurseries is to meet their own needs for plantation expansion and the replacement of unproductive coffee trees. By producing seedlings independently, farmers expressed greater confidence in the quality of their planting material, as they have direct knowledge

of the seed source and its characteristics. This self-reliant approach not only reduces dependence on external suppliers but also enhances farmers' sense of ownership and control over the sustainability of their plantations.

Based on cost simulations conducted with Mandalagiri coffee farmers, seedling production activities generate significant economic value added. For a typical production cycle involving 10,000 seedlings, the total production cost was estimated at approximately IDR 12.65 million with an average cost of IDR 1,265 per seedling. Market prices for healthy, ready-to-plant coffee seedlings range between IDR 2,000 and IDR 3,000 per plant, resulting in a profit margin of IDR 700 to IDR 1,700 per seedling. On a scale of 10,000 seedlings, this translates to a potential gross value added of IDR 7 million to IDR 17 million per production cycle. These figures demonstrate that nursery activities are not only technically feasible but also financially rewarding, even when operated at a smallholder scale.

Beyond the direct financial benefits, independent nursery practices also produce non-monetary value added, including improved efficiency in seedling procurement, assurance of genetic quality through careful selection of parent trees, and the preservation of local coffee varieties adapted to Mandalagiri's volcanic soils. Such activities contribute to the long-term sustainability of coffee cultivation and strengthen farmers' self-sufficiency. They also align with the broader objectives of sustainable agriculture, particularly in promoting localized input production and reducing dependence on external seed sources.

Although no formal certification or guaranteed market currently exists for Yellow Caturra seedlings, farmers remain highly motivated to continue nursery activities to satisfy internal plantation needs. They view nursery work as a form of self-sufficiency and local resilience, essential for maintaining their unique regional coffee heritage. Many farmers consider producing their own seedlings a strategy for ensuring the continuity of their farms, serving as a reserve for replanting or future expansion. However, farmers also recognized that the acquisition of official certification would significantly enhance their motivation by providing formal recognition of quality, opportunities for higher selling prices, and potential participation in the national certified nursery system. Consequently, institutional support in the form of technical assistance, certification guidance, and information access is crucial to optimize the value added of Yellow Caturra nurseries and to position Mandalagiri as a model for sustainable, community-based coffee seed production in Garut.

Identification of SOAR (Strenght, Opportunity, Aspiration dan result)

The Yellow Caturra coffee of Mandalagiri possesses several inherent strengths that make it a promising candidate for certified seedling development. Genetically, this variety demonstrates strong resistance to pests, high productivity, and excellent adaptability to Garut's volcanic soil, which is rich in minerals and nutrients. These biological and environmental compatibilities position Yellow Caturra as a superior parent stock for propagation. Furthermore, the relatively low cost of seedling production, supported by the availability of local organic materials such as sheep manure and composted coffee husks, enhances production efficiency. The combination of resilient

genetics, environmental suitability, and accessible organic inputs allows farmers to produce high-quality seedlings with minimal external dependency, thereby strengthening the sustainability of local coffee farming systems.

From the perspective of opportunities, Yellow Caturra holds substantial branding potential as a distinctive symbol of Garut's specialty coffee. The ongoing implementation of Indonesia's social forestry program provides new prospects for expanding cultivation areas, offering smallholders access to managed forest lands. Moreover, the growing domestic and international demand for premium coffee varieties continues to stimulate the market for certified, high-quality seedlings. With its unique genetic and sensory characteristics, Yellow Caturra could be formally registered as a local superior variety, a move that would increase both its recognition and market value.

In terms of aspirations, the primary goal of Mandalagiri's coffee farmers is to obtain official certification for Yellow Caturra seedlings, granting them legal recognition and enhancing competitiveness in the coffee value chain. Farmers also aspire to establish a dedicated seedling center that functions as a hub for the regeneration of Yellow Caturra stock while simultaneously strengthening the branding of Garut coffee as a regional identity. Their long-term vision is to position Mandalagiri as the national-if not international-icon of Yellow Caturra coffee production, combining quality assurance, traceability, and regional pride.

The expected results of implementing a SOAR-based strategy include measurable improvements in both the productivity and quality of coffee seedlings, leading to higher farmer income and the creation of a sustainable nursery ecosystem for Yellow Caturra coffee. Certification is expected to serve as a formal indicator of quality, ensuring the continuity of local coffee production and protecting the genetic heritage of this unique variety. Ultimately, these outcomes would contribute not only to the preservation of Garut's agricultural biodiversity but also to strengthening the local economy through the establishment of a resilient and competitive seed production system.

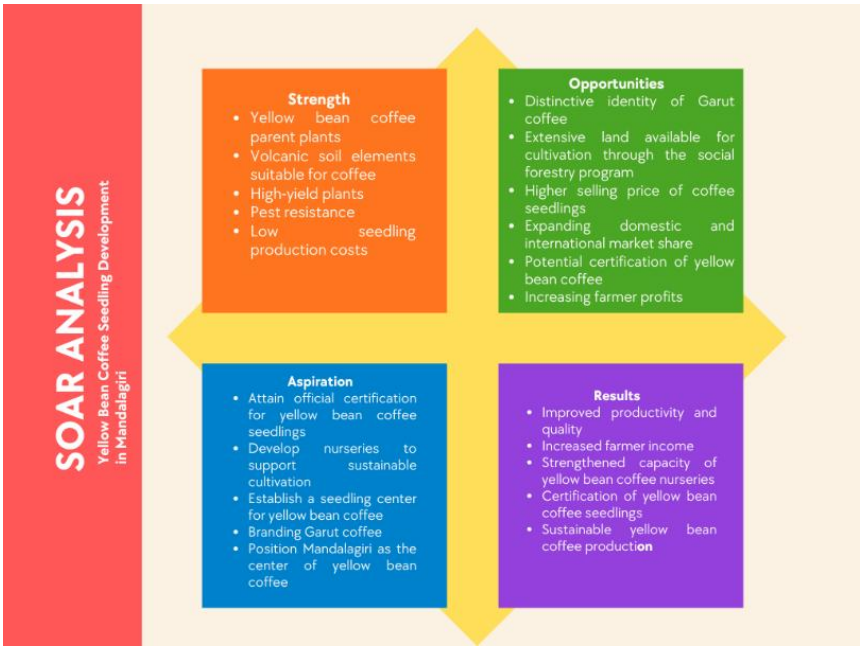

Figure 2. SOAR Analysis

The SOAR analysis conducted in this study emphasizes the potential, opportunities, and positive outcomes that can be achieved in developing Yellow Caturra coffee seedling production in Mandalagiri. The integration of the four SOAR dimensions: Strengths, Opportunities, Aspirations, and Results provides a constructive framework for designing actionable strategies that enhance productivity, competitiveness, and sustainability in the local coffee seed system.

The Strength–Aspiration (SA) dimension highlights the strategic use of Mandalagiri's inherent strengths to realize farmers' long-term aspirations of establishing a certified seedling center and positioning Yellow Caturra as the emblematic variety of Garut coffee. The genetic superiority of Yellow Caturra, its high productivity, pest resistance, and exceptional adaptability to Garut's mineral-rich volcanic soil form the biological foundation for a sustainable and efficient nursery system. Moreover, the low production cost supported by the availability of local organic inputs such as sheep manure and coffee-husk compost allows for affordable yet high-quality seedling production. To translate these advantages into tangible outcomes, several implementation measures are proposed: the selection of parent plants and nursery management in accordance with Good Agricultural Practices (GAP) to achieve seed certification; the application of BPSB standards to ensure varietal uniformity; the continued use of local organic resources to maintain cost efficiency and quality; the preparation and submission of a local variety certification proposal to the Center for Plant Variety Protection (PPVT); and branding efforts for Yellow Caturra through local coffee festivals, social media campaigns, and labeled packaging that reinforce its regional identity.

The Strength–Result (SR) dimension focuses on leveraging existing strengths to achieve desired outcomes such as increased productivity, higher farmer income, certified seedling production, and long-term sustainability. Implementation actions include expanding production capacity to reach an economic scale of at least 10,000 seedlings per year, integrating GAP principles throughout the seedling process to ensure quality and competitiveness, and developing partnerships with cooperatives to facilitate collective distribution of certified seedlings to both local farmers and regional markets. Through these measures, Mandalagiri's farmers can transform their traditional nursery practices into an economically viable, standardized, and market-oriented system.

In the Opportunity–Aspiration (OA) dimension, the analysis identifies how available opportunities such as Garut's unique coffee identity, the social forestry program, and the growing domestic and global demand for premium coffee can be harnessed to fulfill farmers' aspirations of creating a certified Yellow Caturra seed center. Strategic actions include applying for the use of social forestry land to expand mother plant gardens, collaborating with the Plantation Service (Dinas Perkebunan) and BPSB to organize technical training programs on seed certification, and launching the "Garut Yellow Coffee" campaign to position Yellow Caturra as a regional flagship product in both domestic and international markets. In addition, enhancing human resource capacity through technical training and nursery business management workshops is crucial for strengthening the professionalism and entrepreneurial skills of local coffee farmers. By aligning institutional support with farmers' aspirations, these initiatives can accelerate the transition from informal nursery operations to an officially recognized certified seedling center that contributes to local economic resilience.

The Opportunity Result (OR) dimension focuses on utilizing policy support and market opportunities to ensure that expected outcomes such as productivity growth, income improvement, and sustainability are achieved. Key implementation strategies include establishing a cluster of seedling producers to collectively access certification subsidies and reduce costs, developing digital marketing channels for seedling sales through agricultural e-commerce platforms and coffee exporter networks, and participating in agricultural fairs and expos to promote Yellow Caturra seedlings to a wider audience. Furthermore, developing a comprehensive Standard Operating Procedure (SOP) aligned with certification standards is essential to maintain quality assurance from the nursery to the distribution stage. These actions would enable Mandalagiri to build a competitive advantage in the seedling sector while aligning local initiatives with broader market trends and policy frameworks supporting sustainable agriculture.

The SOAR analysis reveals that improving Yellow Caturra coffee productivity in Mandalagiri can be effectively achieved through several integrated strategies. The first is the selection of parent trees and the integration of Good Agricultural Practices (GAP) into the nursery process to ensure the production of high-quality and competitive certified seedlings. The second involves enhancing the competence and capacity of Yellow Caturra seedling producers, including formal certification for seed breeders and the establishment of a structured knowledge-sharing system among farmers. The third strategy emphasizes socialization and promotional campaigns to elevate Yellow Caturra as Garut's distinctive coffee product, thus strengthening its regional branding and market recognition. Lastly, maintaining a sustainable business ecosystem for Yellow Caturra coffee supported by certification, innovation, and market access will enable Mandalagiri to reach broader market potential while preserving the unique genetic and cultural heritage of this local coffee variety. Collectively, these strategies embody the essence of the SOAR framework by aligning strengths and opportunities with shared aspirations and measurable results, forming a roadmap toward a sustainable and competitive coffee nursery system in Mandalagiri.

CONCLUSION

Based on the SOAR analysis, several optimal strategies can be formulated to enhance the productivity of Yellow Caturra coffee cultivation, particularly through strengthening seed certification and nursery development. The first strategy emphasizes the selection of superior Yellow Caturra parent plants combined with the integration of Good Agricultural Practices (GAP) throughout the nursery process. This approach ensures that the resulting seedlings meet high standards of quality, competitiveness, and readiness for certification. Implementing GAP also enables farmers to standardize nursery procedures, improve plant health, and fulfill official certification requirements. The second strategy focuses on improving the competence of seed breeders and expanding the production capacity of Yellow Caturra nurseries. Strengthening human resources through technical training, mentoring, and institutional collaboration will equip farmers with the necessary skills and knowledge to consistently produce certified, high-quality seedlings. This effort also contributes to establishing a sustainable and efficient seed production system in Mandalagiri. The third strategy involves promoting and socializing Yellow Caturra coffee as a distinctive specialty product of Garut. Strong branding efforts—through local campaigns, festivals,

and media promotion—can enhance public recognition, increase market demand, and elevate the selling value of both Yellow Caturra seedlings and coffee beans. Together, these strategies reflect the strengths and opportunities available to Mandalagiri's coffee farmers, which must be optimized to improve productivity, expand market access, and reinforce the competitiveness of Yellow Caturra as a unique hallmark of Garut coffee.

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