

Sembalun Coffee Downstreaming Strategy to Strengthen Income Stability and Economic Resilience of Farmers in East Lombok

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ABSTRACT

The high quality and superior taste of Sembalun coffee have not been fully utilized optimally in downstream development because the resulting derivative products are still limited and mostly still in the form of raw coffee beans, so the economic added value is not maximized. This study aims to evaluate the Sembalun coffee downstream strategy to optimize the added value of local coffee products, thereby strengthening the income stability and economic resilience of farmers in East Lombok. The study used a systematic literature review approach from the SpringerLink database, ResearchGate, Google Scholar, and national repositories (SINTA, Garuda) related to the development of the coffee agro-industry in Sembalun. Data were analyzed using a descriptive qualitative approach with an emphasis on the study of the importance of developing coffee derivative products to increase product added value. The results of the study indicate that strategic efforts undertaken can include improving the quality of post-harvest processing, strengthening farmer institutions, and developing innovative products and marketing. Geographical Indication (GI) registration contributes to product competitiveness in national and international markets, while regular training and the development of coffee-based tourism education can increase farmer capacity and expand market access. The main obstacles faced include limited product innovation and suboptimal marketing networks. Research findings indicate that product innovation and marketing network expansion are key factors in increasing coffee's added value and sustainably improving farmer welfare. Therefore, the development of coffee downstreaming needs to be supported by increased product innovation, strengthened marketing networks, collaboration between farmers, business actors, and the government, as well as targeted policies and ongoing training to improve human resource capacity, thereby ensuring the sustainability and competitiveness of the Sembalun coffee agribusiness.

Keywords: Coffee Downstreaming, Added Value, Farmer Income, Sembalun Coffee

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INTRODUCTION

Nationally, the agricultural sector plays a crucial role in driving economic growth while strengthening national food security. This positively impacts economic growth and improves public welfare. Coffee is a leading plantation commodity with high economic value, not only providing a

source of income for farmers but also a major export product, generating significant foreign exchange after rubber (Immanuel & Cornelius, 2025). Continuous efforts to improve coffee productivity and quality are crucial to ensure Indonesian coffee remains competitive in the global market (Rahim et al., 2024).

Coffee farmers in Indonesia face numerous challenges that impact their well-being and productivity. One major issue is their reliance on selling raw coffee beans, resulting in minimal added value for farmers. Coffee prices in both global and national markets fluctuate frequently, making farmers' incomes unstable and vulnerable to economic changes. Most farmers still use traditional, inefficient techniques and tools and struggle to access funding and training to improve production quality. Infrastructure in coffee-producing areas remains inadequate, with impenetrable roads and limited storage facilities, increasing logistics costs and increasing the risk of crop damage. Furthermore, the coffee supply chain, dominated by middlemen and intermediaries, is further reducing farmers' profits, leaving them with insufficient income to improve their well-being. Addressing this issue requires an integrated solution encompassing technological advancements, equitable market access, and institutional or government support to strengthen farmers' position within the value chain and ensure the sustainability and improved well-being of the Indonesian coffee sector (Sebayang et al., 2025).

Indonesia has the potential for high-quality coffee, particularly due to the unique flavors derived from its various leading coffee-producing regions. However, the development of coffee downstream processing in Indonesia has not been optimal, limiting its added value. Most quality coffee is still exported as raw beans, although processes such as roasting, milling, and packaging can significantly increase its value. Obstacles to coffee downstream processing include inconsistent bean selection, inadequate processing technology, and a lack of integrated training and policy support. Therefore, planned and sustainable coffee downstream processing is crucial to increase coffee's selling value, strengthen farmers' positions, and expand both domestic and international markets (Wibowo et al., 2024).

East Lombok Regency relies heavily on agriculture as a key sector in the regional economy, particularly in Sembalun, a coffee production center for both Arabica and Robusta coffee. This sector contributes significantly to regional income and serves as a source of livelihood for farmers. Amidst global challenges, the agricultural sector experienced the smallest decline compared to other sectors, demonstrating its crucial role in maintaining community well-being. The presence of fertile land and a suitable climate, particularly in Sembalun District, further strengthens the potential for sustainable agriculture in East Lombok, including the potential of Sembalun coffee (Putri et al., 2025).

Sembalun coffee is known as a key commodity in East Lombok, West Nusa Tenggara (NTB), with its distinctive flavor and high quality. Coffee grown in the Sembalun highlands boasts distinctive agronomic properties and flavor qualities, making it a high-value commodity for both domestic and export markets. Environmentally friendly cultivation practices, or eco-farming, have the potential to support sustainable coffee production. However, these practices face various obstacles, such as limited institutional support, difficulty accessing modern technology, and underdeveloped downstream markets, limiting the added value available locally. This product serves as a primary livelihood for local farmers, despite significant price volatility in the market, which impacts their economic resilience (Pradita et al., 2024).

Coffee farmers in Sembalun often face unstable incomes due to fluctuating coffee prices. Therefore, strategic steps are needed to secure farmers' incomes, one of which is through the development of derivative products that can increase the added value of coffee through a downstream strategy. The downstream process involves the development of processed coffee products, such as high-quality ground coffee, fermented coffee drinks, or other products like organic fertilizer. Downstream coffee processing, which includes further processing such as secondary processing, packaging, branding, and marketing of processed products, is considered a strategic step

to increase added value and improve the welfare of coffee farmers. However, value chain analysis shows that most of the final profits from coffee products often accrue to downstream parties such as processors, retailers, and exporters (Chandra et al., 2023). Thus, farmers, as primary producers, receive a relatively small share of the income, unless vertical integration, high-value product certification, or policies supporting local coffee processing are implemented. These strategies are crucial to ensure greater value is captured by coffee farmers and their well-being.

A coffee downstreaming strategy can be implemented by providing a variety of processed coffee products, helping farmers reduce their dependence on coffee bean sales, which are prone to price fluctuations. Furthermore, product innovation helps Sembalun coffee remain competitive and penetrate broader markets, both domestically and globally (Fakhruddin & Syamsu, 2023). Despite the potential, the development of Sembalun coffee derivatives still faces many obstacles, including limited processing facilities, limited business capital, and limited ability to market these processed products. Not only technical factors, but socio-cultural aspects of the community must also be considered in the downstreaming process to ensure it does not conflict with farmers' lifestyles and habits. Direct farmer involvement in product development is key to the success of downstreaming.

The primary problem underlying this research is the uncertainty and challenges in implementing the Sembalun coffee downstreaming strategy, which impacts the income stability and economic resilience of coffee farmers in East Lombok. Despite coffee's significant potential and widely recognized quality, this has not been matched by the development of underdeveloped downstream processing, with its derivatives still in the form of beans or raw coffee. This is due to various challenges still faced by farmers and business actors, such as limited access to modern processing technology, weak institutional frameworks, and limited product marketing. Furthermore, coffee processing at the farmer and business levels has not been optimal in implementing quality standards and good processing techniques, which significantly impacts the quality of the final product. On the other hand, the distribution of economic benefits in the coffee value chain shows that the majority of profits accrue to downstream business actors, while farmers, as the primary producers, receive a relatively small share. Another factor hampering downstream development is the lack of synergy between farmers, entrepreneurs, and the government, which results in limited marketing networks and product innovation. Therefore, there is an urgent need for an integrated and sustainable approach so that the development of Sembalun coffee downstreaming can provide significant economic benefits and strengthen farmers' economic resilience.

This study aims to: 1) evaluate the Sembalun coffee downstreaming strategy as an effort to increase income stability and strengthen the economic resilience of coffee farmers in East Lombok; 2) identify various obstacles that hinder the development of downstreaming; 3) examine the role of product innovation and marketing network expansion in increasing the added value of coffee and the welfare of farmers in a sustainable manner; and 4) provide a comprehensive overview as well as applicable recommendations in supporting the development of a highly competitive coffee agribusiness.

This research is expected to make a significant contribution to the development of Sembalun coffee agribusiness, particularly in increasing added value through the implementation of downstreaming strategies. The results of this study will be useful in providing useful information and recommendations for farmers, business actors, and policymakers in designing programs and policies that can support income stability and economic resilience of coffee farmers in East Lombok. Furthermore, this research will serve as a reference in developing product innovations and expanding marketing networks so that coffee products can penetrate national and international markets. Another benefit is as a source of insight for academics and agribusiness practitioners in understanding the importance of collaboration between various parties to encourage downstreaming of coffee as a strategic step to improve farmer welfare in a sustainable manner. Thus, this research can also be a basis for increasing the competitiveness of Sembalun coffee in a competitive market.

METHODS

This research method uses a systematic literature review approach by identifying, evaluating, and synthesizing relevant literature. The search strategy was conducted in various databases such as SpringerLink, ResearchGate, Google Scholar, and national repositories (SINTA, Garuda) related to the development of the coffee agro-industry in Sembalun. Inclusion and exclusion criteria were applied to filter the articles, until finally the articles were selected after passing a quality assessment using the criteria. Data from these articles were analyzed using a thematic approach to identify patterns and narrative synthesis to illustrate the importance of developing coffee derivative products to increase product added value.

The units of analysis selected were Sembalun coffee farmers, business owners, and relevant institutions involved in the coffee downstream chain in the area. The location of this study was Sembalun District, East Lombok Regency, West Nusa Tenggara. Therefore, this study encompasses a comprehensive analysis of the coffee chain, from individual farmers to the downstream business chain, supporting the sustainability and enhancing the added value of Sembalun coffee products.

The data used in this study is secondary data from documents, reports, and official sources related to the coffee agribusiness in East Lombok through a literature review. The independent variables in this study consist of downstream strategies covering processing, packaging, branding, and marketing; product innovation; human resource capacity; and marketing networks. The dependent variables are income stability and the economic resilience of coffee farmers. Secondary data serves as supporting and complementary data obtained from various official documents and reports relevant to the research topic.

The data collection method used was a descriptive quantitative approach, utilizing secondary data to study the Sembalun coffee downstreaming strategy in an effort to strengthen income stability and economic resilience of coffee farmers in East Lombok. The data analysis from the literature was critically analyzed by comparing research results, identifying emerging patterns, and identifying knowledge gaps. Data analysis included descriptive analysis to describe real conditions and inferential analysis such as regression and path analysis to examine relationships between variables. Furthermore, qualitative analysis was used to confirm that the proposed downstreaming strategy aligns with the social and institutional realities of Sembalun coffee farmers in East Lombok.

RESULT AND DISCUSSION

Characteristics and Potential of Sembalun Coffee

Sembalun coffee grows and thrives in the highlands of Sembalun District, East Lombok Regency, at an altitude of between 900 and 1,200 meters above sea level. Its proximity to Mount Rinjani significantly influences its volcanic activity, which plays a crucial role in creating agro-climatic conditions that are highly conducive to coffee growth. The temperature in the Sembalun area is relatively cool and stable, while rainfall is fairly evenly distributed throughout the year, helping to maintain soil moisture and coffee plants. Furthermore, the soil in Sembalun is highly fertile due to its richness in volcanic minerals from volcanic eruptions, which enrich the soil's nutrients and increase its fertility. This combination of comfortable temperatures, sufficient water, and fertile soil directly impacts the health of the coffee plants, the coffee bean formation process, and the resulting unique flavor (Hidayat et al., 2024). Therefore, the Sembalun region has a unique ecological advantage as one of the centers of high-quality coffee production in Indonesia.

Sembalun coffee has distinct quality characteristics, with its distinctive flavor derived from a combination of altitude, soil type, and cultivation techniques passed down through generations by local farmers. Its flavor profile is characterized by balanced acidity, subtle floral notes, and hints of fruit and spice, providing a unique sensory experience for coffee connoisseurs. This uniqueness not only characterizes Sembalun coffee but also provides an added value that differentiates it from other conventional coffees. Results show that total acidity is directly proportional to the altitude at which the coffee is grown, while caffeine levels do not consistently

follow the altitude pattern. The degree of browning in Sembalun coffee (arabica) is higher than in Senaru and Karang Sidemen (robusta), which is also characterized by differences in the unique volatile compound profiles of each location (Hidayat et al., 2024).

The high quality characteristics of Sembalun coffee make it highly potential to penetrate the specialty coffee market, a market segment that values coffee with exceptional quality and distinctive flavors. In the context of economic development, this potential is crucial for downstream efforts, where the quality of the primary product serves as the primary basis for further processing and value-added marketing. In other words, the better the quality of the coffee produced at the farm level, the greater the opportunity for that product to be processed into various derivative products and penetrate a broader and more competitive market (Chandra et al., 2023). Therefore, maintaining and improving the quality of Sembalun coffee is not only crucial for competitiveness in the local market but also key to success in developing the value-added coffee industry in the future.

Sembalun coffee farming is still largely run by small-scale farmers with limited land and family-based management practices. The production process is largely semi-traditional, while post-harvest processing technology varies among farmers. Consequently, the quality of the coffee beans produced is inconsistent, particularly in terms of size, dryness, and product cleanliness. This inconsistent quality presents a challenge in building a stable product image in the market, particularly when targeting the premium segment, which demands high quality standards (Gabriel & Lubis, 2025). Improvements in quality and standards are needed to ensure coffee products can meet increasingly demanding market expectations.

In addition to its ecological advantages and product quality, the Sembalun area also offers strong synergy potential between coffee development and the tourism sector. Sembalun is known as one of the leading tourist destinations in West Nusa Tenggara, boasting stunning mountain views, the popular Mount Rinjani hiking trail, and agro-tourism that attracts many tourists. This potential opens up significant opportunities to integrate coffee into a leading product with tourism, for example through educational tours on coffee cultivation and processing, the establishment of single-origin coffee shops, and the sale of processed coffee products as regional souvenirs (Kurniatun et al., 2023). This integration of coffee and tourism not only helps expand the coffee market but also directly increases added value for the local community and strengthens Sembalun's identity as a tourist destination that prioritizes superior agricultural products and local wisdom.

The vast potential of Sembalun coffee, supported by ideal geographic and climatic conditions, still faces various obstacles. One major obstacle is farmers' limited access to sufficient business capital to expand production and improve processing quality. Furthermore, farmers face difficulties in adopting modern technologies for processing and quality improvement due to a lack of targeted market information and strong, reliable economic institutions that can strengthen their bargaining position in the supply chain. Most farmers still sell their produce in the form of coffee beans or green coffee beans, whose prices are highly susceptible to fluctuations in the international market, leaving them with a weak bargaining position and uncertain income. Therefore, the enormous potential of Sembalun coffee can only be maximized if there is a planned, sustainable, and institutionally based strengthening of the downstream processing system that truly champions the interests of farmers and local businesses. This approach must include infrastructure development, increasing the capacity of businesses to meet global market standards, and empowering economic institutions capable of managing the supply chain more efficiently and fairly (Pradita et al., 2024).

Value Chain and the Role of Downstreaming

From an agribusiness economic perspective, downstreaming plays a key role in addressing the unequal distribution of value within the coffee supply chain. Through downstreaming, farmers no longer merely act as raw material suppliers but can also be directly involved in product

processing, packaging, and even marketing. Through further processing, such as roasting, grinding, and packaging with local brands, the added value of coffee products increases significantly, reflected not only in higher selling prices but also in strengthening the product's image based on geographic origin, which offers strong competitiveness in the specialty coffee market (Wibowo et al., 2024). Thus, downstreaming is an effective structural strategy for improving farmers' economic position within the coffee agribusiness system while reducing their dependence on downstream businesses.

The success of the downstreaming process depends heavily on the quality and strength of existing institutions at the local level. Institutions act as the primary link that coordinates various critical aspects, from product quality standardization, production facility provision, processing asset management, and equitable profit distribution among members. Institutional strengthening is not only a determining factor but also a key prerequisite for downstreaming to proceed beyond a small scale or as an experiment, but also to develop into a stable and competitive business system in the long term (Prasekti et al., 2025).

Downstream processing relies not only on institutional factors but also requires adequate technological mastery in the post-harvest and processing stages. Critical processes such as well-controlled fermentation, standardized drying, high-precision roasting, and stringent quality control all require complex and in-depth technical knowledge. Limited access to the necessary technology and a lack of competent human resources can lead to a decline in the quality of the final product and its failure to meet premium market requirements. This can be achieved through structured training programs, regular technical assistance, and strategic partnerships with educational institutions and more advanced and experienced coffee industry players, allowing for continuous improvement in the quality of downstream products and enabling them to compete at a higher market level (Gisisi & Purwaningsih, 2025).

Within the value chain, downstreaming plays a role that extends beyond the economic aspect to encompass social and institutional dimensions. When the downstreaming process is designed in a participatory manner, it can create a more equitable distribution of value, strengthen social ties among farmers, and advance economic independence at the village level. Within the framework of regional development, Sembalun coffee downstreaming has the potential to become a key driver of the local economy, based on the region's superior resources. However, without planning based on a comprehensive value chain analysis, the downstreaming process can lead to inefficiencies, conflicts of interest, and ultimately business failure. In-depth value chain analysis is an essential foundation for formulating a downstream strategy that can strengthen the income stability and sustainable economic resilience of coffee farmers.

The Impact of Coffee Downstreaming on Farmers' Income

Income stabilization mechanisms through downstream processing can be achieved through processes such as roasting, branding, and direct marketing, which increase value capture, allowing greater profit margins to remain within the producer community. Furthermore, downstream products with longer shelf lives, such as roasted and pouch-packaged coffee, can alleviate liquidity pressures that typically arise seasonally due to irregular harvest periods. This provides flexibility in product marketing, allowing producers to sell their products more freely according to market conditions. This approach is supported by various case studies in Indonesia, which show that profit margins increase when coffee producers manage the downstream process themselves. Therefore, downstream processing is a crucial strategy for helping stabilize incomes and strengthening the economic independence of coffee farming communities (Widadie et al., 2025).

Price risk reduction and income diversification can be achieved through downstreaming, where farmers or farmer groups can combine various income sources, such as green bean sales, processed coffee products, and agro-tourism services. This strategy significantly reduces

dependence on fluctuating green bean prices in the global market. Product diversification, such as single-origin Sembalun or packaged specialty coffee, helps absorb the impact of commodity price shocks that frequently occur in international markets (Fuadi et al., 2025). Empirical findings in Indonesia indicate that farmers who diversify their income channels have greater income stability and are more resilient to price fluctuations for their primary commodity. This is consistent with research showing that coffee farmers with diversified business models earn significantly higher incomes than those who rely solely on conventional green bean sales, making diversification a crucial strategy for improving the economic resilience and welfare of coffee farmers in Indonesia (Alansa et al., 2022).

The downstreaming process in the agricultural sector can increase the total value of products, but this does not necessarily have a positive impact on farmer household income if internal profit sharing is not carried out fairly and transparently. The main obstacle often lies in a margin structure that favors processors, through high capital costs, disproportionate operational wages, and internal pricing that is less favorable to farmers. Studies show that distribution channels managed by producer organizations generally generate higher profits than individual initiatives, as networks and joint marketing strategies can minimize risk and increase the project's economic value. Therefore, the success of downstreaming depends heavily on sound financial analysis and collaboration between business actors to achieve efficiency and optimal returns on investment (Widadie et al., 2025).

Research in Indonesia has shown that the implementation of agroforestry and eco-farming systems, particularly those combined with certification and access to premium markets, can significantly increase the income and social well-being of farming communities. The study results indicate that these systems not only positively impact household economic conditions but also support forest security and local food security. In some regions, agroforestry contributes more than 60% to farmers' income, and most farmers who adopt these systems are considered prosperous. Downstream strategies that integrate sustainability and product quality principles can create economic value while strengthening the long-term socio-economic resilience of farming communities (Pradita et al., 2024).

Sembalun Coffee Downstream Implementation Strategy

Rekomendasi awal dalam pengembangan kelembagaan adalah mengadopsi model berbasis kolektif, seperti koperasi produksi atau unit usaha Badan Usaha Milik Desa (BUMDes), yang berfungsi untuk memfasilitasi pengumpulan hasil panen, penjaminan mutu produk, pengolahan kopi dalam skala kecil (roasting), serta pemasaran secara bersama. Model ini diharapkan dapat mengurangi biaya produksi per unit sekaligus memperkuat posisi negosiasi di pasar. Bukti dari penelitian di Wonogiri dan daerah lainnya mendukung efektivitas penerapan model tersebut dalam meningkatkan keberdayaan pelaku usaha serta nilai tambah produk kopi (Widadie et al., 2025). Improving technical and managerial skills is crucial through structured training programs. This training covers post-harvest processing techniques such as sorting, fermentation, and drying, as well as roasting and coffee quality control. Furthermore, training in business skills such as simple accounting, branding, and digital marketing is also needed to strengthen business management. Training programs can be integrated into local curricula and implemented in collaboration with universities or researchers to accelerate technology transfer. Sustainability studies emphasize that strong technical skills are crucial for maintaining product quality over the long term (Pradita et al., 2024).

Geographical Indication (GI) registration for Sembalun coffee is a crucial strategy that not only provides a unique identity and legal protection for the product but also serves as a driver for increased market access, both nationally and internationally, as well as increasing the selling price and added value of the product. With GI status, Sembalun coffee is legally recognized as a regional specialty with unique characteristics based on its geographic origin, cultivation, and specific

processing methods, thus distinguishing it from similar products on the market. This legal protection prevents imitation and exploitation of the product name by external parties, maintains authenticity, and supports the economic and social sustainability of local farmers. Furthermore, GI certification helps improve product quality through standardization of cultivation and post-harvest processes, and strengthens Sembalun coffee's reputation as a superior commodity with high competitiveness in the global market (Mafiroh & Cahyarini, 2023).

Wibowo et al.'s (2024) study examined the empowerment efforts of the Makmur Farmers Group in Magetan Regency through the development of coffee downstreaming, implemented simultaneously with the development of the potential of local tourism villages. The results showed that empowerment through downstreaming was able to improve coffee product quality, production process efficiency, and the managerial capabilities of MSMEs. Furthermore, branding development and digital marketing strategies proved effective in expanding the market reach of Plangkrongan specialty coffee to the national level. This study emphasized the importance of collaboration between local governments, universities, and the private sector in providing technological support, training, and marketing facilities to overcome these various obstacles. All of these efforts support increasing the added value of local coffee, have a positive impact on farmers' income and welfare, and strengthen the potential of tourism villages as coffee agribusiness destinations, thus becoming a model for sustainable local economic development in agricultural areas.

The development of coffee downstreaming in Sembalun, East Lombok, is strongly linked to coffee empowerment and processing efforts in Magetan Regency. Both regions are optimizing the potential of local superior coffee through a downstreaming process that involves processing harvested crops into finished products with higher sales value. In Sembalun, coffee downstreaming focuses not only on technical processing and improving product quality but also involves developing coffee ecotourism based on local cultural wisdom as a strategy to support marketing and community empowerment. This aligns with the MSME empowerment approach in Magetan, which integrates technical training, business management, and digital marketing to expand markets and improve farmer welfare. Both regions demonstrate the critical importance of collaboration between government, academia, and the private sector in providing technological support, marketing facilitation, and strengthening human resource capacity to address various production and marketing challenges. Therefore, an integrated coffee downstreaming model based on local potential and cultural wisdom can be an effective strategy for increasing the added value of coffee products and empowering farming communities in various coffee-producing regions in Indonesia.

Based on the above, the most effective steps to develop coffee downstreaming in areas like Sembalun require increased product innovation and strengthened marketing networks, involving collaboration between farmers, businesses, and the government. This collaboration is crucial because innovation without effective marketing will not yield optimal results. Recent research in the Indonesian coffee industry shows that implementing innovation in the supply chain and production process can improve work efficiency and make coffee products more competitive in both local and international markets. This innovation includes improving quality and product variety, and utilizing technology to support production and distribution (Saptarini & Putrayasa, 2019). With effective collaboration and appropriate innovation, coffee downstreaming in Sembalun can advance, sustainably improving the income and well-being of coffee farmers.

CONCLUSION

The Sembalun coffee downstreaming strategy in East Lombok holds significant potential for strengthening farmers' income stability and economic resilience through the development of agro-industry based on superior varieties, the implementation of good post-harvest techniques, and institutional strengthening. Geographical Indication (GI) registration contributes to product competitiveness in national and international markets, while regular training and the development

of coffee-based educational tourism can improve farmers' knowledge and skills and expand the market for Sembalun coffee products. Identification of various obstacles hampering the downstreaming process indicates limitations in product innovation and an underdeveloped marketing network. The research findings emphasize the importance of product innovation and marketing network expansion as key factors in increasing coffee's added value and sustainably improving farmer welfare. Based on these research findings, it is recommended that coffee downstreaming development be supported by efforts to increase product innovation and strengthen marketing networks through synergy between farmers, business actors, and the government, supported by targeted policies and increased human resource capacity through ongoing training.

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