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Living Income Realities and the Sustainability of East Java's Single Origin Coffees

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Abstract

Smallholder coffee farmers in East Java, Indonesia, remain income-poor despite producing high-value, single-origin coffees. Applying the Fairtrade Living Income (FLI) framework, this study assesses whether existing value-chain governance supports decent rural livelihoods. The study used a mixed-methods design comprising structured surveys, focus group discussions, and market reports across four single-origin coffee clusters (Ijen-Raung, Anjasmoro, Arjuno, and Argopuro-Gumitir). The study estimated the Living Income Reference Price (LIRP) and examined value distribution under different governance models. Results show that between 2014 and 2023, market prices remained below the LIRP in three clusters: Anjasmoro, Arjuno, and Argopuro-Gumitir. This condition suggests systemic and persistent income deficits. Only the Ijen-Raung cluster generated a surplus, which was driven primarily by exceptional terroir-based premiums rather than structural equity. The study concludes that value-chain governance can improve value distribution and farmer empowerment but cannot offset depressed farm-gate prices, nor does export participation guarantee economic resilience. Hence, sustainable single-origin coffee production in the region would require price-stabilization mechanisms that adopt the LIRP as a minimum-price benchmark. This shifts policy focus from productivity to socio-economic equity.

Keywords coffee value chain, fairtrade price, living income, smallholder farmers, value chain governance.

1. Introduction

The global coffee industry represents a critical pillar of the agricultural economy, heavily reliant on the labor of millions of smallholder farmers (Kaido & Fuyuki, 2021). Indonesia, as one of the world's largest coffee producers, occupies a strategic position in this global market, particularly driven by the rising consumer demand for high-quality, single-origin coffees. However, a pervasive paradox exists within this sector. Despite the high retail value and economic significance of the commodity, coffee production frequently fails to provide a sustainable livelihood for the small-scale producers operating at the base of the value chain (Ion et al., 2024).

This persistent economic vulnerability is largely driven by structural inefficiencies, extreme price volatility, and profound power asymmetries within agricultural supply chains (Gneiting & Arhin, 2023). Smallholder farmers often bear the brunt of market fluctuations and escalating

FMI Jawa Timur XVIII 2026
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Vol. 4
20-22 Oktober 2026

production costs, while capturing a disproportionately small fraction of the final retail value (Gneiting, 2021).

Meanwhile, traditional fairtrade mechanisms, while well-intentioned and historically instrumental in establishing minimum price guarantees and social premiums, have proven insufficient to fully bridge the income gap for small-scale producers (Marcuta et al., 2023). These conventional interventions frequently fail to account for region-specific production costs and the complex socio-economic realities of rural farming households.

In response to these limitations, the concept of a living income has gained significant traction in contemporary agricultural discourse as a more comprehensive and equitable benchmark for assessing farmer welfare.

Defined as the net annual income required for a household in a particular place to afford a decent standard of living for all members, a living income encompasses essential needs such as nutritious food, decent housing, education, healthcare, and provisions for unexpected events (GIZ, 2020). The pursuit of a living income shifts the paradigm from basic poverty alleviation to ensuring long-term economic resilience and sustainable community development.

Operationalizing this concept, Fairtrade International introduced the Living Income Reference Price (LIRP) framework. Unlike conventional market-driven pricing models, the LIRP aims to recalibrate commodity prices by explicitly aligning them with the actual costs of sustainable production, viable farm sizes, and the localized living income benchmark (Fairtrade International, 2019).

Initial assessments, such as the pioneering 2019 LIRP study for coffee in Aceh Gayo, Indonesia, have demonstrated the framework's potential to highlight actual income disparities and inform equitable price-setting mechanisms. Similar methodologies have recently been applied to other Indonesian commodities, such as cocoa, revealing pervasive and persistent income gaps despite ongoing sustainability interventions (Motovska et al., 2024). Despite these advancements, the applicability of the LIRP framework in other prominent Indonesian coffee-producing regions remains largely unexplored.

East Java, a vital production hub renowned for its diverse single-origin coffees (such as those from the Ijen-Raung, Anjasmoro, Arjuno, and Argopuro-Gumitir clusters), presents a unique ecosystem. The region is shaped by specific agro-climatic conditions, distinct cultural cultivation practices, and complex value chain dynamics (Kaido & Fuyuki, 2021). Furthermore, East Java's coffee sector faces systemic bottlenecks, including reliance on intermediaries and limited bargaining power, which continually erode smallholder profitability (Ion et al., 2024).

Understanding the feasibility of integrating LIRP within this distinct context necessitates localized, empirical analysis rather than the extrapolation of data from other regions. Addressing this critical gap in the literature, this study investigates the feasibility and potential implications of adopting Fairtrade Living Income (FLI) standards for single-origin coffee production in East Java, Indonesia.

FMI Jawa Timur XVIII 2026
e-ISSN: 3026-4499
Vol. 4
20-22 Oktober 2026

The primary objective of this study is to analyze the cost of sustainable production, household living expenses, and productivity benchmarks to establish localized LIRPs for differentiated coffee clusters. By assessing the persistent income gaps across these clusters and evaluating the effectiveness of existing supply chain governance structures, this research aims to propose shared-value pricing models. Ultimately, this study provides actionable insights to inform policy decisions, foster equitable value chain governance, and promote sustainable agroindustry development in the region.

2. Literature Review

2.1 Living Income and the Living Income Reference Price (LIRP)

The concept of a living income has emerged as an important benchmark for assessing the welfare of agricultural producers, particularly smallholder farmers participating in global commodity markets. Unlike poverty-based measures, a living income refers to the net annual income required for a household to afford a decent standard of living, including adequate food, housing, healthcare, education, and a financial buffer for unforeseen events. This perspective emphasizes long-term economic resilience and sustainable rural development rather than merely meeting subsistence needs.

To operationalize this concept, Fairtrade International introduced the Living Income Reference Price (LIRP), which estimates the minimum price required for farmers to achieve a living income while maintaining sustainable production practices. The LIRP framework incorporates living costs, viable farm size, productivity levels, and production costs, making it more context-specific than traditional fair-trade pricing mechanisms. Previous applications of the LIRP approach in Indonesian coffee and cocoa sectors have demonstrated persistent income gaps despite the presence of sustainability programs and market interventions.

2.2 Coffee Value Chain Governance

Value chain governance plays a crucial role in determining how economic benefits are distributed among actors within agricultural supply chains. Existing literature suggests that smallholder coffee farmers often face structural disadvantages due to unequal bargaining power, limited market access, and dependence on intermediaries. As a result, farmers frequently receive only a small proportion of the final retail value despite bearing substantial production risks.

Previous studies have highlighted the importance of governance mechanisms that promote transparency, coordination, and equitable value distribution. Inclusive Value Chain (IVC) models, farmer cooperatives, and direct marketing arrangements have been shown to strengthen farmers' bargaining positions, improve market access, and promote shared economic benefits. Conversely, supply chains dominated by downstream actors may create dependency relationships that limit farmer autonomy and income generation.

2.3 Sustainability Challenges in Coffee Production

The global coffee industry is characterized by significant challenges related to sustainability

FMI Jawa Timur XVIII 2026
e-ISSN: 3026-4499
Vol. 4
20-22 Oktober 2026

and farmer livelihoods. Although demand for specialty and single-origin coffee continues to increase, economic gains are not always transmitted to producers. Factors such as volatile commodity prices, rising production costs, and market power asymmetries contribute to persistent income insecurity among smallholder farmers. Traditional fair-trade systems have provided minimum price guarantees and social premiums; however, they have often been insufficient to ensure a living income because they do not fully reflect local production costs and household needs.

In Indonesia, coffee-producing regions are additionally affected by limited bargaining power, reliance on intermediaries, and uneven access to premium markets. Research on direct marketing schemes and specialty coffee value chains indicates that stronger producer organizations and better governance arrangements can enhance farmer welfare, yet substantial income gaps often remain.

2.4 Research Gap

While previous studies have examined living income frameworks and coffee value chains, empirical evidence regarding the application of the LIRP framework in major Indonesian coffee-producing regions remains limited. Most existing assessments focus on specific regions such as Aceh Gayo or on other agricultural commodities. Consequently, there is insufficient understanding of whether current value chain governance arrangements in East Java's single-origin coffee sector can generate living incomes for farmers. This study addresses that gap by evaluating LIRP benchmarks and value distribution across the Ijen-Raung, Anjasmoro, Arjuno, and Argopuro-Gumitir coffee clusters, thereby contributing to the literature on sustainable coffee production and equitable value chain governance.

3. Research Method

To investigate the feasibility and potential implications of adopting Fairtrade Living Income (FLI) standards, that is technically conducted by measuring the cost of sustainable production, household living expenses, and productivity benchmarks to establish localized LIRPs for differentiated coffee clusters in East Java, Indonesia, this study employed a mixed-methods research design. The empirical investigation was targeting differentiated single-origin coffee value chains situated across the regencies of Banyuwangi, Bondowoso, Jombang, Pasuruan, and Jember.

East Java serves as a highly relevant study area due to its substantial contribution to the national coffee output and the structural dominance of small-scale producers. In 2019, the region recorded a total coffee plantation area of 90,735 hectares, yielding 45,279 tons. While large state-owned and private plantations accounted for 16.3% and 17.7% of total production respectively, smallholder farmers (totaling 338,776 individuals) cultivated most of the land (73,108 hectares), contributing 66% (40,990 tons) to the region's overall coffee output (Central Bureau of Statistics East Java Province, 2020).

A three-stage sampling technique was utilized to systematically select representative respondents and isolate value chains that produce differentiated, high-value coffees. In the first

FMI Jawa Timur XVIII 2026
e-ISSN: 3026-4499
Vol. 4
20-22 Oktober 2026

stage, the population of smallholder coffee producers in East Java was geographically stratified into seven clusters based on prominent mountain ranges: Ijen-Raung, Anjasmoro, Arjuno, Argopuro-Gumitir, Semeru, Bromo, Wilis, and Lawu. These geographical demarcations were selected because distinct climatic conditions, volcanic soil typologies, and altitudes fundamentally define the unique flavor profiles (terroir) of the coffees cultivated in each respective area.

The second stage applied purposive filtering criteria to identify communities specifically cultivating differentiated coffees within the initial seven clusters. The inclusion criteria required the possession of Geographical Indication (GI) certificates—a prerequisite for establishing single-origin identity in premium markets—and established engagement with export markets. Consequently, four clusters met these stringent criteria and were retained for the study: Ijen-Raung, Anjasmoro, Arjuno, and Argopuro-Gumitir.

The third stage involved the identification and selection of key informants within the four retained clusters. Informant identification was executed through a multimodal approach. Initially, surveys were cross-referenced with the participant registry of the Cup of Excellence events, organized annually by the Specialty Coffee Association of Indonesia (SCAI).

Concurrently, a digital footprint analysis was conducted on e-commerce platforms using targeted search queries (e.g., "single-origin coffee AND [cluster name]"). Access to the identified key informants was subsequently facilitated through institutional support from major industry bodies, including SCAI, the Association of Indonesian Coffee Exporters and Industries (GAEKI), the Association of Indonesian Coffee Farmers (APEKI), and the Indonesian Coffee Council (DEKOPI). Additional operational inputs from regional traders and commercial roasteries were also incorporated into the sample framework.

Primary data collection was focused on extracting micro-level economic variables, including governance mechanisms, value distribution, farm productivity, agricultural practices, and the precise cost structures of differentiated coffee value chains.

The respondent base spanned multiple tiers of the value chain: smallholder farmers, secondary processors, and international buyers. Table 1 delineates the distribution of key informants and the timeline of data collection across the clusters.

Table 1. Key informants and data collection

Cluster	Key informants	Data collection
Ijen-Raung (Arabica beans)	Smallholder farmers (Kalipuro, Sumber Wringin); Secondary Processors (Ijen Lestari, Green Ijen). Group size: ~60 farmers (Kalipuro); ~150 farmers (Sumber Wringin); 2 Processors	Primary data collection for income and cost data was conducted during the peak coffee harvesting period in 2024.
Anjasmoro (Excelsa beans)	Smallholder farmers (Asosiasi Kopi Wonosalam); Processors (Rubath Kopi, Devarie	

FMI Jawa Timur XVIII 2026
e-ISSN: 3026-4499
Vol. 4
20-22 Oktober 2026

	Coffie) Group size: ~230 farmer members; 2 Processors	
Arjuno (Arabica beans)	Smallholder farmers (Asosiasi Petani Kopi Pasuruan) Group size: ~153 farmer groups	
Argopuro-Gumitir (Robusta beans)	Smallholder farmers (Ketakasi cooperative) Group size: ~178 members	
FGDs	Cooperative leaders, processors, and representatives from coffee industry associations (SCAI, GAEKI, APEKI, DEKOPI)	

Qualitative data were collected from in-depth interviews and FGDs in mid-2024 to complement quantitative findings. Multiple key stakeholders consisting of cooperative leaders, processors, and representatives from coffee industry associations (SCAI, GAEKI, APEKI, DEKOPI) were involved.

In addition, secondary data were compiled to establish macroeconomic baselines, specifically the cost of a decent living and longitudinal commodity pricing. Data regarding the cost of living were extracted from official statistical reports published by the Central Bureau of Statistics (BPS), while domestic coffee price indices were sourced from the Ministry of Agriculture (Directorate General of Estate Crops, 2020). International futures market prices for coffee were retrieved from real-time commodity exchange databases to reflect global price volatility.

The analytical core of the quantitative phase utilized the Living Income Reference Price (LIRP) by Fairtrade International. LIRP indicates the price needed for an average farmer household with a viable farm size and an adequate productivity level to make a living income from the sales of their crop. It mathematically determines the minimum farm-gate price a typical producer needs to earn a decent livelihood from their primary crop (Fairtrade International, 2019). The LIRP formula is presented as follows:

Price x Total Volumes Produced = Cost of Decent Living + Cost of Sustainable Production.

Structured surveys and field interviews provided granular parameters on production techniques, variable and fixed costs, aggregate yields, and net incomes. These parameters were inputted into the LIRP formula to quantify prevailing income gaps. To ensure contextual accuracy, the cost components utilized within the formula were derived using a Sustainable Livelihood Approach (SLA) and rigorously cross-validated against regional data from the National Socio-Economic Survey (Susenas). Furthermore, historical income simulations and scenario analyses were executed using longitudinal variables (i.e.: coffee prices and farm size variations spanning 2014–2023) to project how reconfigured value chain structures could optimize livelihood outcomes.

FMI Jawa Timur XVIII 2026
e-ISSN: 3026-4499
Vol. 4
20-22 Oktober 2026

To complement and contextualize the results, qualitative data were synthesized through Focus Group Discussions (FGDs). These interactive sessions encompassed a broad spectrum of value chain actors—ranging from primary producers and cooperative leaders to downstream processors and institutional representatives. The triangulation of mathematical price modeling with qualitative thematic analysis enabled a robust examination of the initiatives' real-world applicability and the underlying socio-economic dynamics dictating value distribution within East Java's coffee sector.

4. Finding and Discussion

The architectural configuration and institutional governance of a value chain profoundly dictate the socio-economic outcomes, profit margins, and long-term sustainability of its participants. An extensive assessment to the four single-origin clusters—Ijen-Raung, Anjasmoro, Arjuno, and Argopuro-Gumitir—reveals significant and persistent variations in how economic value, bargaining power, and operational risks are distributed among smallholder farmers, secondary processors, and international traders.

Based on the assessment, the production, processing, and export of single-origin coffee clusters in East Java are regulated by distinct structural models, which can be broadly categorized into two predominant paradigms: the Creating Shared Value (CSV) model and the Inclusive Value Chain (IVC) framework. Value chain governance is fundamentally about the management of the rules of the sector, encompassing coordination, revenue generation, reinvestment, and market management. In the agricultural sector, particularly the coffee industry, this governance determines whether smallholder farmers can escape the poverty trap [Nelson et al., 2020; Wibowo, 2022; Wibowo, et al., 2024). Table 2 delineates the fundamental characteristics, lead integrators, and the precise mathematical distribution of value across the final export price for each investigated cluster.

Table 2. Value chain characteristics and profit distribution in the four clusters

Cluster (Coffee Variety)	Lead Integrator (Governance)	Value Distribution Farmer : Processor : Trader
Ijen-Raung (Arabica)	Secondary Processors (CSV)	11 : 54 : 35
Anjasmoro (Excelsa)	Farmer Association (IVC)	16 : 52 : 32
Arjuno (Arabica)	Lead Farmers (IVC)	15 : 50 : 35
Argopuro-Gumitir (Robusta)	Cooperative (IVC)	15 : 49 : 36

As presented in Table 2, the distribution of value is heavily skewed toward downstream actors across all models, reflecting systemic inefficiencies and profound inequities that have long characterized Indonesian coffee value chains. This structural asymmetry frequently results in vertical market failures, wherein upstream actors—specifically the primary cultivators—capture disproportionately less value compared to secondary processors and international traders (Wibowo et al., 2024; Wibowo et al., 2021).

The Ijen-Raung Cluster. The Ijen-Raung cluster, geographically situated in the volcanic highlands of Bondowoso and Banyuwangi, is globally renowned for its exceptional Arabica

FMI Jawa Timur XVIII 2026
e-ISSN: 3026-4499
Vol. 4
20-22 Oktober 2026

coffee, which possesses distinct flavor profiles directly influenced by the mineral-rich volcanic soil. Within this cluster, the value chain is organized under a Creating Shared Value (CSV) model, primarily orchestrated by secondary processors such as Ijen Lestari and Green Ijen. These entities operate as the central nodes of the network, acting as vital integrators who procure Arabica cherries directly from smallholder farmers residing in the Kalipuro and Sumber Wringin subdistricts. The CSV model in Ijen-Raung is characterized by processors assuming a comprehensive array of value-adding functions. After harvesting, the coffee cherries undergo primary processing, predominantly utilizing the wet processing method—a complex sequence involving pulping, fermenting, washing, and drying—which is typically centralized at washing stations managed by these processors. Beyond physical processing, these secondary processors provide critical technical assistance, establish stringent quality control protocols, and actively facilitate access to high-value international markets, exporting green beans to countries such as Germany, Canada, Taiwan, and South Korea. Financially, the income distribution within this CSV model starkly reflects the concentration of value addition at the processing stage. Approximately 11% of the final export price is retained by the smallholder farmers, while a commanding 54% is captured by the processors, leaving the remaining 35% to international exporters. This disproportionate share allocated to processors highlights their pivotal role in enhancing product value through advanced processing technologies, marketing expenditures, and supply chain financing (Waarts & Termeer, 2023). However, an analysis of the power dynamics within the Ijen-Raung cluster reveals a highly complex relationship fraught with dependency. While processors are indispensable integrators who connect rural farmers to global markets and prioritize traceability and transparency, their overarching influence over quality standards, price determination, and market access creates a structural hierarchy that can lead to profound dependency for smallholder farmers. This dependency limits the smallholders' control over pricing mechanisms and overall market influence.

The Anjasmoro Cluster. The Anjasmoro cluster, located in the Jombang regency, presents a unique case study in differentiated coffee production, focusing primarily on the cultivation of Excelsa coffee. Excelsa beans are celebrated for their robust flavor profile and elevated caffeine content, maintaining a specialized appeal in distinct market segments, particularly for blends and premium instant coffee formulations. The value chain here is deeply anchored by an Inclusive Value Chain (IVC) model, heavily supported by smallholder farmers in the Wonosalam subdistrict whose livelihoods hinge on Excelsa cultivation. The central integrating entity in this cluster is the Asosiasi Kopi Wonosalam, a formalized farmer association comprising approximately 250 members. This association plays a transformative role in aggregating the produce of multiple smallholders, thereby significantly enhancing their collective bargaining power and enabling them to negotiate more favorable prices in both domestic and international markets, including exports to Germany, Malaysia, Egypt, and Japan. In terms of processing, post-harvest Excelsa cherries are subjected to primary wet processing at centralized facilities strictly managed by the farmer association, ensuring adherence to quality standards and best practices to yield superior green beans. The income allocation reflects a slightly more equitable distribution compared to the CSV model, where approximately 16%

e-ISSN: 3026-4499
Vol. 4
20-22 Oktober 2026

of the final price is allocated directly to the farmers, 52% is retained for processing operations managed by the association, and 32% goes to international traders. The IVC model in Anjasmoro operates on foundational principles of collaboration, trust, transparency, and shared responsibility (Minten et al., 2018). The association implements profit-sharing arrangements to ensure appropriate compensation and plays a pivotal role in capacity building by providing training programs focused on quality improvement and sustainable farming practices. Furthermore, the association has been instrumental in securing Geographical Indication (GI) certification, thereby stimulating demand through collective branding. Nevertheless, while this cluster exhibits a more balanced power dynamic due to the prominence of the farmer association, the association itself can inadvertently become a concentrated center of power, influencing decision-making processes and the internal distribution of benefits among its members. The efficacy of this model is therefore highly contingent upon stringent internal governance, uncompromising transparency, and rigorous accountability to its members.

The Arjuno Cluster. Nestled in the foothills of Mount Arjuno in the Pasuruan Regency, the Arjuno cluster is esteemed for producing high-quality Arabica coffee beans, highly sought after by local and international roasters due to the unique microclimate and volcanic soil that impart distinctive flavor notes. The flourishing of this cluster is not solely attributable to its favorable terroir but is fundamentally driven by an innovative IVC model where few lead farmers act as primary value chain integrators. These lead farmers, typically local individuals possessing larger plots of land and superior agricultural acumen, serve a critical function beyond mere cultivation; they bridge the pervasive gap between smallholder farmers in subdistricts like Prigen and lucrative global markets, including South Korea, Japan, Taiwan, and New Zealand. Primary processing of coffee cherries—encompassing pulping, fermenting, washing, and drying—typically occurs either at the individual farm level or within centralized facilities overseen by these lead farmers. By rigorously overseeing the processing stage, lead farmers ensure unparalleled consistency in quality and strict adherence to sustainable agricultural practices. Financially, the profit allocation within the Arjuno cluster sees approximately 15% of the final retail price directed at the primary farmers, 50% to the processing stage (managed by lead farmers), and 35% to international traders. A significant strategic advantage of this lead farmer-driven model is its ability to establish direct trade relationships with international buyers, effectively circumventing traditional intermediaries and empowering farmers to secure higher prices for their premium produce. Furthermore, lead farmers actively invest in the branding and marketing of Arjuno Arabica coffee. However, this structural model inherently generates a hierarchical paradigm within the value chain. While it undeniably empowers the community at a macro level, it harbors the potential to marginalize less experienced or less resourceful smallholders who are dependent on the lead farmers for market access and technical guidance. Consequently, the long-term sustainability and inclusivity of the Arjuno model are inextricably linked to the lead farmers' ability to equitably represent the interests of all local farmers and guarantee a fair distribution of accrued benefits.

The Argopuro-Gumitir Cluster. Located on the productive slopes of the Argopuro-Gumitir highlands in the Jember regency, this cluster is distinguished by its exceptional production of

FMI Jawa Timur XVIII 2026
e-ISSN: 3026-4499
Vol. 4
20-22 Oktober 2026

Robusta coffee beans. Unlike the more delicate Arabica, the Robusta variety is celebrated for its robust flavor, high caffeine content, and superior resistance to pests and diseases, making it highly desirable for espresso blends and instant coffee formulations. The value chain here is a prime exemplar of collective action, spearheaded by formalized farmer cooperatives, most notably the Ketakasi cooperative. Smallholder farmers in the Bangsal subdistrict cultivate Robusta on highly fragmented, individual plots, frequently engaging in intercropping to augment their livelihoods and manage climatic risks. However, it is their collective aggregation through the Ketakasi cooperative that exponentially increases their total productivity and market leverage. The cooperative provides vital access to centralized processing facilities equipped with modern technology, primarily utilizing the wet method to minimize post-harvest losses and ensure bean consistency. The cooperative's primary strategic objective is the establishment of direct trade relationships with international buyers across Europe, the United States, Singapore, and Brunei Darussalam. By consolidating output, the cooperative profoundly enhances its bargaining power during price negotiations. The value distribution reflects this structural alignment: approximately 15% of the final price is allocated to individual farmers, 49% covers processing and cooperative operations, and 36% is captured by international buyers. Crucially, this 15% allocation excludes the supplementary earnings derived from the cooperative's annual profit-sharing mechanisms. While this distribution might initially appear imbalanced, it is critical to acknowledge the substantial capital expenditures borne by the cooperative in transforming raw cherries into market-ready, export-grade green beans, encompassing infrastructure maintenance, technological upgrades, and international marketing expenses (Maguire-Rajpaul et al., 2015). This cooperative model cultivates a profound sense of ownership among its members, emphasizing transparency through established pricing protocols and profit-sharing agreements. Furthermore, the cooperative strategically allocates significant resources toward capacity building, offering specialized training programs focused on quality improvement, sustainable farming methodologies, and financial literacy, thereby empowering farmers to make informed agronomic decisions.

Empirical Assessment of the Living Income Reference Price. To rigorously quantify the economic viability of these diverse value chains and to ascertain whether they facilitate a decent standard of living, the Living Income Reference Price (LIRP) was calculated for each cluster. The LIRP framework, pioneered by Fairtrade International, represents a transformative shift in addressing structural disparities. Unlike traditional pricing mechanisms dictated solely by supply and demand, the LIRP mathematically aligns commodity prices with the actual costs required to achieve a sustainable livelihood, encompassing nutritious food, decent housing, education, healthcare, and provisions for unexpected events (Fairtrade International, 2019). The LIRP model relies on several core parameters: the cost of a decent standard of living or the living income benchmark, a sustainable yields benchmark, a viable farm size designed to fully employ available household labor, and the cost of sustainable production necessary to achieve those yields. Following established guidelines, this study utilized a standardized viable farm size of 1.3 hectares—a threshold representing 100% of the household's income generated exclusively from coffee cultivation. The 2023 empirical data expose a stark and alarming

FMI Jawa Timur XVIII 2026
e-ISSN: 3026-4499
Vol. 4
20-22 Oktober 2026

disparity between the estimated LIRP benchmarks and the actual market prices prevailing across the majority of the clusters in East Java. Table 3 presents a comparative analysis of the LIRPs against actual market prices for both raw coffee cherries and processed green beans.

Table 3. Actual Market Price vs. Living Income Reference Price (LIRP)

Cluster	Price Ratio of Cherry (Market/LIRP)	Price Ratio of Green Bean (Market/LIRP)
Ijen-Raung	2.05	1.37
Anjasmoro	0.87	0.48
Arjuno	0.72	0.56
Argopuro-Gumitir	0.87	0.39

The empirical findings reveal that the Ijen-Raung cluster stands as a highly successful outlier. In 2023, cultivating 1.3 hectares of Arabica coffee generated a net income of IDR 52,187,537, against a sustainable production cost of IDR 23,944,371. The calculated LIRP was IDR 14,641 per kilogram for cherries and IDR 87,845 per kilogram for green beans. Benefiting from immense international market appreciation for its distinct terroir, the actual market price for cherries soared to IDR 30,000 per kilogram, exceeding the LIRP by a factor of 2.05. Similarly, the green bean market price reached IDR 120,000 per kilogram, 1.37 times higher than the LIRP. Consequently, farmers in the Ijen-Raung cluster achieve exceptionally strong returns, generating sufficient income to sustain a decent living for their families and workers, allowing them to rely solely on coffee farming for their livelihood. Conversely, the Anjasmoro, Arjuno, and Argopuro-Gumitir clusters operate in a state of severe and persistent income deficit. In the Anjasmoro cluster, despite a net coffee income of IDR 56,759,119 and a highly efficient production cost of IDR 15,071,650, the market systematically undervalues the Excelsa crop. The actual market price for cherries (IDR 12,000/kg) fulfilled only 87% of the required LIRP (IDR 13,814/kg). The deficit is even more catastrophic for green beans, where the market price of IDR 40,161/kg met a mere 48% of the IDR 82,882/kg LIRP. A remarkably similar pattern of market failure is observed in the Arjuno cluster. Here, the LIRP was calculated at a substantial IDR 20,970 per kilogram of cherry and IDR 125,819 per kilogram of green beans, driven by high production costs of IDR 22,474,439. Actual market prices fell drastically: IDR 15,000/kg for cherries (0.72 of LIRP) and IDR 70,000/kg for green beans (0.56 of LIRP). The Argopuro-Gumitir cluster, producing Robusta, faces the most extreme disparities in the processing stage. The LIRP for cherries was determined at IDR 11,471/kg, against an actual market price of IDR 10,000/kg (0.87 of LIRP). However, the LIRP required for green beans is IDR 68,826/kg, yet the prevailing market price was a disastrously low IDR 27,000/kg—equating to only 39% of the living income benchmark.

Rational Economic Behavior. The LIRP calculations provide profound theoretical insight into the rational economic behavior of smallholder farmers across East Java. The data incontrovertibly explains why farmers exhibit a strong, overarching preference for selling their raw agricultural product as unprocessed cherries rather than undertaking the value-addition process to produce green beans. Across all four clusters, the relative financial return for selling

FMI Jawa Timur XVIII 2026
e-ISSN: 3026-4499
Vol. 4
20-22 Oktober 2026

cherries is substantially higher when mathematically benchmarked against its specific LIRP compared to the return on green beans. In Ijen-Raung, selling cherries yields a 205% return on the LIRP, compared to 137% for green beans. In Argopuro-Gumitir, cherries fulfill 87% of the LIRP, whereas green beans fulfill a catastrophic 39%. By focusing exclusively on cherry sales, farmers strategically maximize their immediate profitability and liquidity. More importantly, this behavior serves as a critical risk-mitigation strategy. Processing coffee cherries into green beans is an intricate, capital-intensive, and highly risky endeavor. The wet processing method requires specialized infrastructure, vast amounts of water, prolonged labor for fermentation and drying, and strict moisture control. Any deviation in these variables can lead to severe quality degradation (e.g., mold, over-fermentation), resulting in immediate financial loss. Furthermore, selling green beans often involves delayed payment cycles from international buyers or processors. By selling cherries at the farm gate, smallholder farmers successfully transfer these immense processing risks, infrastructural capital expenditures, and temporal financial burdens entirely onto the secondary processors, lead farmers, or cooperatives. While the cross-sectional empirical data from 2023 vividly highlights immediate economic vulnerabilities, longitudinal simulations conducted over a contiguous ten-year period (2014–2023) expose systemic, enduring market failures that threaten the very foundation of the agricultural sector. The decadal simulation unequivocally demonstrates that the Ijen-Raung cluster is an anomaly. Throughout the entire ten-year period, market prices in this cluster consistently remained higher than their respective LIRPs, shielding farmers even during periods when global market prices were historically depressed. This enduring success might be the result of a unique confluence of advantages: exceptionally high international market appreciation for its specific Arabica terroir, coupled with relatively lower localized living and production costs.

Conversely, the longitudinal data for the Anjasmoro, Arjuno, and Argopuro-Gumitir clusters paints a grim picture of agricultural distress. Over the entire 2014–2023 period, market prices within these three clusters have consistently and stubbornly remained below all calculated LIRPs, regardless of farm size scenarios. This persistent deficit indicates that farmers in these clusters have been trapped in a cycle of receiving remarkably low returns from coffee cultivation. This is a vulnerability that was acutely exacerbated during periods of severe market depression, specifically the global price crises of 2019 and 2020. This trend is highly indicative of underlying structural issues, primarily low farm-level productivity and asymmetric power relations within the global supply chain.

A critical and alarming macroeconomic disconnect is evident in the longitudinal analysis. While the LIRPs have continuously ascended in a linear fashion—driven by the escalating costs of essential household needs, rampant inflation affecting agricultural inputs (such as fertilizers and agrochemicals), and the rising cost of hired labor—local coffee market prices have utterly failed to keep pace. This decoupling between the true cost of a decent standard of living and the price paid for raw agricultural commodities poses profound, existential implications for the future of coffee production in East Java. Without immediate and aggressive structural interventions, coffee farming in these deficit regions will become increasingly unviable, fundamentally unappealing to the next generation of farmers, and threaten the socio-economic fabric of rural

FMI Jawa Timur XVIII 2026
e-ISSN: 3026-4499
Vol. 4
20-22 Oktober 2026

communities.

Consequently, smallholder farmers operating in these clusters are forced to recognize that they cannot rely on coffee cultivation as their primary or singular source of income. To ensure household survival and mitigate exposure to global market volatility, farmers are compelled to transition toward diversified livelihood strategies, seeking supplementary off-farm income streams or engaging in multi-commodity agroforestry by cultivating alternative plantation crops or raising livestock. The empirical evidence derived from this study demonstrates that integrating fairtrade principles and Living Income standards into shared value chains is not merely an ethical imperative, but an economic necessity for creating sustainable opportunities for smallholder farmers. The findings vividly highlight the multifaceted challenges encircling East Java's coffee farmers, including limited market development for single-origin varieties, profound information asymmetry, and entrenched power imbalances. These factors coalesce to precipitate vertical market failures, wherein upstream producers capture a fraction of the value compared to their downstream corporate counterparts.

The comparative analysis between the Creating Shared Value (CSV) and Inclusive Value Chain (IVC) governance models provides critical insights for structural reform. The study suggests that IVC models—such as those operating in Argopuro-Gumitir, Anjasmoro, and Arjuno—offer a fundamentally more balanced incentive structure, yielding benefits to both upstream and downstream participants. IVC clusters demonstrate superior structural performance by empowering farmers with direct, democratic control over primary production processes, fostering transparency, and promoting the equitable distribution of generated value. Furthermore, the IVC paradigm inherently encourages the reinvestment of profits back into the community, financing local infrastructure development and capacity building, which perfectly aligns with modern consumer preferences for traceable, ethically sourced coffee.

In stark contrast, the CSV model, while highly successful in the unique terroir of Ijen-Raung, relies heavily on external corporate actors—specifically secondary processors. This structural reliance often results in a disproportionate retention of value at the processing stage, fundamentally reducing direct farmer involvement, limiting their long-term economic autonomy, and fostering dependency. However, it is a critical theoretical takeaway that structural empowerment through an IVC model is insufficient to guarantee a living income. As unequivocally evidenced by the empirical data, despite the robust, highly organized cooperative governance present in Argopuro-Gumitir and the sophisticated lead-farmer integrations in Arjuno, producers in these clusters still face severe, chronic income gaps. This finding aligns seamlessly with broader, global industry observations which indicate that even the most meticulously designed corporate sustainability programs, extensive capacity building, and localized governance reforms cannot overcome the macro-structural barriers of globally dictated depressed farm-gate prices.

The success of the CSV model in Ijen-Raung in delivering a living income was entirely contingent upon highly favorable, terroir-driven market appreciation and external price premiums, rather than the inherent equity or architecture of the value chain structure itself. For

FMI Jawa Timur XVIII 2026
e-ISSN: 3026-4499
Vol. 4
20-22 Oktober 2026

most agricultural clusters, engagement in export value chains offers a double-edged sword: it provides access to stable international markets and infrastructure but simultaneously exposes highly vulnerable smallholders to extreme global market volatility and stringent, costly quality standards dictated by powerful international buyers. Therefore, achieving a Living Income requires a paradigm shift. Historically, corporate and governmental interventions have obsessively focused on agricultural productivity enhancements—training farmers to produce higher yields under the assumption that volume equates to prosperity. Yet, from a living income perspective, productivity is not an end. Escalating production costs—fertilizers, agrochemicals, and labor—act as a critical intervening variable; increased yields frequently fail to translate into increased net profitability if the costs required to achieve those yields eclipse the market price (Wibowo et al., 2026).

5. Conclusion

This empirical investigation demonstrates that while the export-oriented coffee sector offers access to stable international markets, it simultaneously exposes vulnerable smallholder farmers to severe market volatility, stringent quality demands, and asymmetric power dynamics. Consequently, participation in global value chains for differentiated coffee does not inherently guarantee a decent standard of living, as evidenced by the persistent income deficits across the majority of the analyzed clusters. A comparative evaluation of value chain governance models reveals that Inclusive Value Chain (IVC) frameworks provide a substantially more balanced incentive structure than Creating Shared Value (CSV) models. However, structural empowerment alone is insufficient to secure economic resilience. The continuous ascent of local living costs has not been matched by corresponding upward trends in farm-gate coffee prices. This decoupling presents an existential threat to the livelihoods of farming families and the future continuation of coffee production in East Java. Therefore, effective value chain governance must transcend simple transparency and technical capacity building. It must proactively integrate aggressive risk management and robust price stabilization strategies. Addressing the living income gaps of coffee farmers in a meaningful, structural way demands a procurement-oriented approach. Coffee procurement practices must evolve to explicitly internalize the true cost of sustainable production and the fundamental human right to a decent standard of living. To transition vulnerable coffee clusters toward sustainability, it is essential to adopt the LIRP as a foundational, non-negotiable reference for minimum price guarantees within shared value strategies. Utilizing LIRP not merely as an analytical metric, but as an enforceable benchmark for commercial trading, could definitively stabilize farmer incomes, shield them from market fluctuations, and enhance long-term socio-economic resilience. This inclusive approach strongly aligns with global mandates for socio-economic and environmental sustainability, representing a critical, scalable pathway to advancing poverty reduction, ensuring rural development, and building climate resilience in global agricultural supply chains. Future research should critically investigate the long-term viability of FLI-based pricing models amidst severe market volatility. Furthermore, undertaking comparative analyses across diverse geographic regions and alternative agricultural commodities will be essential to validate the scalability of these models.

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