



FROM FARM TO MARKET: BANANA SUPPLY CHAIN EFFICIENCY AND PROFITABILITY IN SRI LANKA

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Banana (*Musa* spp.) is a staple fruit cultivated on about 9 million hectares worldwide. In Sri Lanka, despite the substantial production, limited information is available comparing the efficiency and value distribution of local and export banana supply chains. Hence, this study analyzes the supply chain efficiency of bananas from the farmer to the consumer with a special focus on post-harvest losses (transporting, distributing), initial capital investment for cultivation, and profit distribution in both local and export markets. Interviews were conducted at the Manning Market in Peliyagoda and the Rajanganaya export processing unit. Collected data include transport volumes, buying and selling prices, quantities rejected and processed, and farmers' production costs and profits. The research revealed significant differences between local and export markets. Farmers invest approximately Rs. 360,000 per acre and Rs. 601,000 per acre for cultivation in local and export markets respectively. The local market loses up to 40% of its harvest due to inefficient storage, inappropriate transport modalities, and an intermediary-dominated disintegrated supply chain while the export market has hardly any post-harvest losses due to the use of high-tech cold-chain supply chains and centralized quality inspection. The study further indicated extreme gaps in profit realization between the two markets. The local market is affected by sharp seasonal price swings (Rs. 50-200/kg) while the export market benefits from fixed pricing (Rs. 165/kg). The most striking finding of this study is that local farmers receive only 20-30% of the final retail price in contrast to the guaranteed returns secured by export-oriented farmers, highlighting severe imbalances within the value chain. These findings highlight the critical need to modernize local banana supply chains through enhanced post-harvest management practices and stronger value chain integration, thereby reducing food wastage and improving farmer incomes. The pack house in Rajanganaya, where 50% of the produce meets export quality and the remaining is sold to local supermarkets or value-added, presents an implementable model of improvement throughout Sri Lanka. These findings indicate that strengthening post-harvest processes and fostering greater supply chain coordination hold significant potential for improving the economic sustainability of banana cultivation in Sri Lanka.

Keywords: banana farming, supply chain efficiency, post-harvest loss, Sri Lankan agriculture

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INTRODUCTION

Bananas are a significant fruit crop with production estimated to be over 125 million metric tons annually worldwide. India leads global production at about 26% of the total production, followed by China at 9%, Indonesia at 6%, and Brazil at 5% (FAOSTAT, n.d.). Though some countries grow bananas only for domestic consumption, nations like Ecuador, the Philippines, and Costa Rica are major exporters and dominate international banana trade (FAOSTAT, n.d.). On one side, there are large, export-focused plantations that rely on modern technology and standardized practices. On the other hand, millions of smallholder farmers continue to grow bananas mainly for household use or local markets, often using traditional methods (Singh & Atre, 2018). Banana cultivation is a core part of Sri Lanka's agriculture. Having centuries of experience growing bananas, different regions in Sri Lanka have developed their own specialties. Bananas are grown all over Sri Lanka, but some areas, particularly in the intermediate and dry zones, are more suited to large-scale production due to climate and soil. Even in the presence of such widespread cultivation, the post-harvest loss and profit-sharing practices are a concern to the banana business in Sri Lanka (Athukorala et al., 2020). Post-harvest loss in banana cultivation should be a concern during handling, storage, transportation, and marketing as bananas are highly perishable and prone to damage due to their soft texture and sensitivity to temperature and handling. However, there is no current mechanism to ensure the quality of the product and prevent post-harvest loss in the local market. The present study intends to investigate post-harvest loss and investment in local and export markets. The objective of the study is to compare the cost of cultivation and analyse the banana wastage percentage in both local and export markets.

METHODOLOGY

Multi-stage sampling procedure was employed within the research. Stage 1 employed a purposive selection of local and export markets. This ensured wide market coverage through a representative market selection. Rajanganaya in the North Central Province was selected as the export market due to its function as the pilot banana export hub under the Agriculture Sector Modernization Project, while Peliyagoda Manning Market was chosen as the representative terminal wholesale market for the local supply chain. Stage 2 was a random sampling to select one type of banana from both local and export markets. The last stage (stage 3) was a random sampling for the selection of 30 lorry drivers in each market, 20 vendors in the local market, and 25



farmers supplying bananas to both Rajanganaya and Manning Market. In addition, 10 export processing staff and agents at Rajanganaya were interviewed. The total sample comprised of 85 respondents, covering the farmers, transporters, vendors, and exporters in the banana supply chain.

Data collection tools included structured questionnaires, semi-structured interviews, and field observations. Structured questionnaires were used for quantitative data such as transport volumes, buying and selling prices, wastage percentages, and cultivation costs. Semi-structured interviews provided qualitative insights into farmer constraints, market dynamics, and supply chain bottlenecks. Field observations were conducted at both study sites to validate reported practices and measure wastage percentages more accurately.

RESULTS AND DISCUSSION

Cultivating Cost (Local Market)

Sri Lankan banana farmers invest about Rs. 360,000 per acre on expectations of earning a decent profit. This huge investment encompassing expenses from land preparation through to labour often fails to yield returns adequate to meet even the basic break-even point due to disorganized supply chains and seasonal fluctuations in prices. Although cultivation provides the essential foundation, it is the effectiveness of subsequent post-harvest and supply chain processes that ultimately determines the extent to which farmers can secure a viable and sustainable income. The average total cost per acre of Ambul cultivation comprises several important factors.

Table 1: Cultivation cost for the local market farmer.

Type of Expense	Cost (Rs.)
Land Preparation	10,000.00
Suckers	18,750.00
Fertilizers	50,000.00
Labor	80,000.00
Other (Tea, Food, Diesel)	200,000.00
Total	358,750.00

Cultivating Cost (Export Market)

Banana farming for export demands bigger investments and more quality requirements compared to local markets. Producers who supply foreign buyers spend around Rs. 601,000 per acre, which is nearly double the cost of local cultivation. This is due to specialized inputs like irrigation facilities, high-quality suckers planted in packets, and compliance with export certifications. Such standards, despite being costly, are required to meet the high-quality demands of markets like Dubai, where Sri Lanka's "Baby Banana" brand is traded. The average cost of planting Ambul (bananas) per acre includes several significant expenses.



Table 2: Cultivation cost for the export market farmer.

Type of Expense	Cost (Rs.)
Land Preparation	25,000.00
Suckers	96,000.00
Irrigation	150,000.00
Fertilizers	100,000.00
Labor	80,000.00
Other	150,000.00
Total	601,000.00

More importantly, their supply chain with refrigerated transport, centralized processing at places like Rajanganaya, and direct market linkages offers year-round stable prices of Rs. 165/kg.

Transport (Local Market)

The Peliyagoda Manning Market is supplied with a steady stream of bananas from several major producing areas in the Southern and Southeastern regions of Sri Lanka. They include Embilipitiya, Buttala, Hambegamuwa, Hambantota, Matara, Sooriyawewa, and Balangoda. These regions produce high volumes of bananas, especially those commonly accepted on wholesale and retail markets. These farmers usually employ medium-sized lorries to transport the harvest to Peliyagoda. The trip normally takes between 6 and 12 hours, which depends on the distance covered as well as conditions on the roads.

In most cases, the farmers sell to collectors or agents, who go ahead and find transportation to Colombo. That is convenient but with a price in most instances. Transportation prices are a vital element in the banana value chain. Farmers and merchants stated that they incur between Rs. 4.50 to Rs. 8 per kilogram to carry bananas to Peliyagoda, with varying fuel costs, loading, and return cost logistics.

Transport (Export Market)

Unlike the fragmented local supply chain, export bananas utilize a more organized path through dedicated processing centers like Rajanganaya. Bananas in these are loaded into 40-foot containers (~12,960 kg per container) with palletization and refrigeration. This expert handling comes at a price, however transport and processing account for about 34% of the final export value. Even if the system reduces physical damage within local markets, exporters still experience high logistics prices and bureaucratic bottlenecks eroding profits.

The transport system for the local market is a classic case of such failures, bananas stacked on open lorries suffer 15-30% damage when reaching markets, without either temperature control or airtight covering to preserve the fragile fruit. During local



banana harvesting, just like in the harvesting process for the export market, bananas can be cut at the banana farm itself, properly packed into crates, and sent to the market. This can eliminate 15-30% wastage during transport.

Wastage (Local Market)

One of the greatest issues identified by farmers and traders in the local market is the loss of quality in transit. Many of them still use primitive methods like bulk stacking, which give very little protection. As a result, bananas get bruised or spoiled when they arrive in Peliyagoda. Merchants stated that 15% to 30% of each load that arrives is damaged, depending on the distance travelled and the means utilized in packing. This dramatically discounts the fruit and limits its marketability. From the stock, 10% of bananas were thrown away by retailers because they became overripe.

Wastage (Export Market)

Sri Lanka's banana export sector has become a model for effective use wherein each fruit gets into its best market. 50% meet strict export requirements and thus enter high-quality global market products, 16% are distributed into local supermarkets where appearance and quality level is not strict, but quality is maintained, and 34% becomes value-added to get products like banana chips, and flour that creates an alternative income. By diversifying market outlets rather than relying on export perfection, industry avoids waste while deriving the highest economic value.

The international market operates very efficiently, recording nearly-zero post-harvest losses through highly advanced cold-chain logistics and quality control systems, while the local market is stuck in a spiral of wastage and inequality. Farmers supplying the local market experience losses of up to 40% of the crop, mainly due to inadequate storage, poor handling, and heavy reliance on intermediaries. This contrast between the two systems presents both challenges and opportunities for Sri Lanka's agriculture.

Table 3: Summary table

	Local Market	Export Market
Cultivation cost per acre	Rs. 360,000.00 (approx.)	Rs. 601,000.00 (approx.)
Transport system	Open lorries, 6-12 hours, Rs. 4.50–8.00 /kg, 15-30% damage during transit	Refrigerated 40 ft containers, palletized, 34% of export value is logistics
Price per kg	Rs. 50-200 (seasonal fluctuations)	Rs. 165 (fixed pricing)
Outcome	High wastage, unstable farmer income	Minimal wastage, higher profitability

CONCLUSIONS/ RECOMMENDATIONS

The research revealed that while export markets achieve nearly zero wastage through cold-chain logistics and quality-assured processing, local markets suffer alarming



losses of up to 40% due to weak storage and inefficient supply chains. It shows that value chains working together, supported by appropriate post-harvest processes, can reduce food wastage significantly, increasing farmer revenues. The packhouse in Rajanganaya, where 50% of the produce meets export quality and the remaining is sold to local supermarkets or value-added, presents an implementable model of improvement throughout Sri Lanka. To translate these findings into practice, three suggestions are prominent. First, strategic investment in cold store facilities at strategic collection points would reduce post-harvest losses. Second, farmer cooperatives should strengthen negotiating against intermediaries while facilitating bulk transportation. Third, mobile processing programs would transform currently wasted bananas into chips, flour, or other value-added products, creating new sources of income. Such reforms would not only boost farmer prosperity but food security too, as more of the crop reaches the market. This research ultimately shows that the tools of change are already within the country's agricultural system but have not received proper guidelines for local market farmers.

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