

Logistics Systems Need to Scale Up Reduction of Produce Losses in the Latin America and Caribbean Region

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Abstract

In the Latin America and Caribbean (LAC) region 50% of the fruits and vegetables and 37% of root and tubers are lost before they reach consumers. Improving logistics systems and management is considered an efficient approach to reduce food losses across the supply chain. Failures in logistics operations including product handling, storage, transportation, and inappropriate infrastructure, are among the most common reasons for the high quantities of food losses. Based on related reports this paper describes general principles used to determine performance of logistics systems and highlights key limitations of logistics in the produce sector in the LAC region. A discussion is provided on interventions in logistics systems to scale up reduction of produce losses.

INTRODUCTION

Fruits and vegetables, and roots and tubers, are the food subsectors in which the highest losses are encountered worldwide. In the LAC region the majority of the produce losses occur before they reach consumers. The losses are estimated to range from 37% for root and tubers to 50% for fruit and vegetables (Gustavsson et al., 2011). Losses of horticultural food commodities impact the income of producers and handlers. The losses also augment the risk of food insecurity, especially considering that only few countries in LAC achieve the World Health Organization (WHO)'s recommended intake of fruits and vegetables (Asfaw, 2008).

In order to combat losses of horticultural commodities, and their impact on the well-being of the societies, efficient logistics systems need to be established to deliver the right product at the right time (Pullmanand and Zhaohui, 2012). Logistics are fundamental for horticultural products as their high perishability requires complex planning, including short-term decisions on transportation modes, handling, packaging and storage. However, integrated planning models in the food supply chain and in particular of fresh produce, are still lagging behind other manufacturing supply chains such as electronics and vehicles (Ahumada and Villalobos, 2009).

The purpose of this paper is to provide a description of the key factors affecting the logistics performance in the LAC region, with particular emphasis on logistics that affect produce losses in the supply chain. The analysis provides an overview of the performance of logistics operations in LAC and is followed by an outline of the main challenges identified by Rodriguez and Respetto (2013). Selected interventions are then briefly discussed.

LOGISTICS PERFORMANCE

Relevant Issues Related to the Produce Supply Chain

Trade globalization has become a challenge for logistics operations in the LAC produce industry. Essentially all LAC countries import to different degrees a portion of the produce they consume. The United States is both the main trading market for export products from LAC, and the largest hub for the re-shipping of consignments from and to

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other regions (e.g., pineapples shipped from Central America to the Caribbean normally enters a seaport in the USA). This often results in LAC product travelling long distances before arriving to their final destinations (Duran Lima and Lo Turco, 2010). Unless logistics operations are optimized, the long travelling distance augments the risk of low shelf life once produce arrives at the destination market.

Another relevant issue that has impacted logistics in the region is the transformation of retail markets. In local markets of LAC countries, large supermarket chains have been central to the recent food supply chain developments (Reardon et al., 2004). This may explain why Chile, the country with the most developed logistics system in the region (World Bank, 2012), is the country with the highest supermarket share of the retail food market in the region (Trail, 2006). It is interesting to note that, not only have the strict parameters established by supermarkets influenced the development of improved logistics to reduce losses during transit, but the high stringent quality standards have also posed a higher risk of losses deriving from rejections due to unacceptable quality (Lundqvist et al., 2008).

General Logistics Performance

The logistics performance of a country is expected to be related to the level of economic development. Based on the gross domestic product (GDP) per capita, the World Bank ranks LAC countries as lower and upper middle income economies. The Logistics Performance Index (LPI), an indicator used to determine the overall logistics performance of a country, gives a fair parameter of the “friendliness” of the logistics systems in LAC. High income OECD countries have an average LPI of 3.63 whereas the average for LAC is 2.70. Chile has the highest score (3.17) in the region, ranking 39 out of 160 countries globally. The difference in LPI scores within countries with similar GDP suggests that income is not the only factor that affects the development of efficient logistics systems. Policy and institutions are also considered as significant drivers of logistics development (World Bank, 2012). The concentration of population far from production areas and the topography of most LAC countries have been a major challenge impacting the overall logistics performance.

Logistics Costs

The cost of logistics operations is considered key for the profitability of businesses. Logistics costs and their share in the final price of products is a result of an interaction of different steps in the supply chain. In LAC, logistics costs represent between 18 and 32% of the value of commodities, compared with close to 9% in OECD countries. On a macro level, logistics costs as a share of the GDP in the LAC region are between 18% (Chile) and 26% (Colombia), which is significantly higher than the 9% share in OECD countries (Fig. 1; Kogan and Guash, 2006).

In LAC, logistics costs are highly sensitive to the size of the firm. An assessment performed by the Latin American Center for Logistics Innovation (CLI) revealed that logistics performance of SMEs is considerably inferior to the one of large industries. Logistics costs in SMEs average 42% of total sales, compared to between 17 to 18% for larger firms. The study also reveals that for small companies inventory management and warehousing make up the largest part of logistics costs accounting for almost one third of the sales price, for medium size companies this share is between 10 to 12%, whereas for large companies is only 7% (Fig. 2; Schwartz et al., 2009). Assessments of key stakeholders in the produce sector suggested that storage costs made up more than twice the cost of transportation across SMEs. Other important costs include packaging, other purchased materials and associated labor (Rantasila and Ojala, 2012). The increased logistics costs for SMEs are attributed to the low volume of products, which limits any potential benefit from economies of scale. Also SMEs have fewer capacities to organize the flow of products along the supply chain in accordance with the strict requirements of perishable food products.

MAIN CHALLENGES AND INTERVENTIONS

Below are pivotal areas where limitations in logistics operations exist in LAC and some key interventions that address produce losses.

Infrastructure

Logistics operations rely on appropriate infrastructure and LAC countries have notorious deficiencies in infrastructure. LAC countries have underdeveloped roads, particularly secondary and tertiary roads that have low national coverage level and poor maintenance. The road network in LAC is 156 km for each 1000 km², far lower than the global average of 241 km (Barbero, 2010). While investing in infrastructure (mainly roads and ports) is necessary, it is a costly and lengthy process that requires time to have an impact in the national food systems. Consequently there is also a need to develop mechanisms that can be useful to circumvent the infrastructural challenges. In this sense, forming alliances of producer associations would lead to economies of scale that foster innovative logistics and competitiveness. Coordination among actors to design appropriate collection and distribution centers can increase logistics efficiency by reducing the number of routes, transport distance and time for delivery (Gebresenbet and Bosona, 2012). Also, transportation of horticultural commodities should involve mechanisms to ensure safety and prevent spoilage, contamination and tampering. The implementation of standards for appropriate handling and transportation should be expanded across the region (Panozzo and Cortella, 2008).

Information and Communication Technology (ICTs)

In the modern day context, ICTs are indispensable in reducing costs. Moreover, fostering innovation in food systems is only achieved these days with the use of ICT. In LAC the use of ICTs in the fruits and vegetable sub-sector is marginal, and this is considered one of the major bottlenecks for competitiveness (Schwab, 2013) and growth of the produce industry in the region.

Cold Chain Capacity

Due to the characteristics of fruits and vegetables, an adequate cold chain capacity is one of the main components of logistics systems needed by the sector. However, cold chain infrastructure still continues to be a constraint for regional trade of perishables (Kirby and Brosa, 2011). The countries in LAC have a low cold chain capacity. The exception is Chile with more than four million cubic meters of cold chain capacity, which is equivalent to 4.3 persons per cubic meter of cold capacity. This is close to values in the United States and Germany, with 2.9 and 3.7, respectively (Fonseca and Njie, 2013).

Human Capital and Knowledge

Even under appropriate conditions such as modern infrastructure, there are often complaints and rejections in destination markets of LAC produce due to quality defects (Fonseca and Njie, 2014). Most of these rejections are due to inappropriate product handling that may include overexposure to extremely low temperatures and use of non-sanitized water as a result of untrained personnel handling fruits and vegetables along the supply chain. Lack of trained human capital is especially critical in two areas. First, logistics service providers lack sufficient knowledge on postharvest handling of horticultural food products. On the other hand, managers, and especially those in SMEs lack appropriate training in logistics concepts, which limits their abilities to design appropriate solutions to store and transport their products in an efficient manner (Rodriguez and Respetto, 2013).

Outsourcing Management

The decision whether to outsource and/or the determination of the amount of functions to outsource is influenced by characteristics of the product, network, processing and market, and the enterprise's main competences (Pullman and Shaohui, 2012). Third-

party logistics (3PL) service providers, who often have assets in the production side, perform specific activities such as packaging, warehousing and transportation (Pinna and Carrus, 2012) but also overall strategic and capacity planning for the producer (Gunasekaran and Ngai, 2003). In general terms it has been observed that the greater the share of 3PLs in national markets the lower is the overall logistics costs (Deloitte, 2010). However, due to the complexity of the produce industry (e.g., with most producing areas being distant from markets, the large number of smallholders and the “fragility” of the product), there is no consensus on criteria to determine logistics outsourcing and what should be the spectrum of the outsourced services. While 3PLs are an important part of the produce chain in OECD countries, 3PLs are only present in selected food supply chains in LAC. Besides 3PL, fourth-party logistics (4PL) and fifth-party logistics (5PL) service providers have also emerged in industrialized countries. The 4PLs do not own assets or have very limited ownership and instead perform the functions of chain managers completely integrating their clients’ logistics network (Pinna and Carrus, 2012). Moreover, 5PLs are the alternative service providers that organize electronic information of supply-chains, and are recently becoming important for aggregating the demands of the 3PLs (Deloitte, 2010).

Trade Facilitation and Policies

Efficiency with procedures such as processing trade-related documents and fulfilling clearance requirements by customs and other agencies are considered vital to expedite the flow of products. In LAC the time used for paper work accounts for more than 50-60% of total time to export and import in many countries. According to the Doing Business report (2013), to export in LAC 52% more documents are required than in OECD countries, which means 111% more time is spent in document processing in LAC than in OECD. In most LAC countries policies that regulate or impact logistics are diluted into many laws and policies (e.g., policies to promote export of non-traditional commodities; environmental protection regulations; laws to promote rural development, taxation of transportation means, etc.), but these are not all aligned toward improvement of logistics and some may even contradict each other and limit logistics developments. The latter suggest a macro inter-policy approach is warranted in order to create an ideal environment that enables logistics development and trade facilitation.

Business Model Approach to Logistics

Logistics management aims at transforming the supply chain into an integrated, efficient system. In the agri-food sector this means reducing costs without trade-offs in the product quality at the market point, which includes delivering fruits with the right degree of ripening. In LAC countries very little information is available on costs that logistics operations pass on to the consumers. For example costs associated with delays (e.g., during transportation, handling and packing of product) commonly mean increased labor, electricity and/or fuel expenses that either add to the final price paid by consumers or reduce the income of the actors in the supply chain. In particular, the high cost of electricity should lead to finding alternative energy systems to improve logistics efficiency. A business approach should also involve planning for optimizing travelling routes. Currently many reefer containers and smaller trucks in LAC are moved empty, which increases costs substantially. On the other hand, reverse logistics – inputs in opposite direction to the product flow – should be emphasized as great reductions are achieved in countries and industries that have successfully implemented this mechanism (Deloitte, 2010). Reverse product flow can generate returns through recovering materials (e.g., re-used packages), the problem is that in many food chains in LAC the forward logistics processes are far from perfect. When opting for a logistics-driven supply chain, defining the location of storage, distribution and processing units are crucial issues to be considered, but without losing sight on how the reverse logistics will be implemented.

Postharvest Management

The characteristics of horticultural commodities make business management in this industry complex due to the need of fast product handling and precise storage conditions, normally consisting of high relative humidity and low temperature (Broekmeulen, 1998). Very little is known at the producer level on the implications preharvest factors have on the postharvest quality of fresh produce. Packaging development is another important constraint. In many LAC countries corrugated board production is not carried out and plastic packages are expensive and/or developed without considering technical requirements for produce handling. Addressing the low availability of adequate packaging systems is of paramount importance as after cold storage, packaging is the most important technology to reduce losses of perishable food (Gebresenbet and Bosona, 2012). Overall, the lack of appropriate postharvest management in many produce supply chains in LAC is likely the result of an inadequate national scheme for outreach and technology transfer. In this regard, public extension services often do not include postharvest technology and agro-food processing as part of their services and private extension services in postharvest and logistics are inexistent in many countries.

Traceability and Measuring Performance

Traceability is important for the identification of produce and for carrying out corrective measures when quality issues arise. Given the importance of traceability for the entire industry (e.g., a product of low quality that cannot be well tracked can affect the perception toward other products of the geographical area or sector), private associations or alliances of producers and suppliers should facilitate the establishment of modern systems to track products and perform delivery. A suggested strategic perspective for development includes the investment in sector-wide infrastructure like electronic network for tracking and tracing in food systems (Fritz and Schiefer, 2011). ICT improvement should have a significant impact on traceability development in the near future.

FINAL REMARKS

The identified numerous weaknesses of the logistics systems in the food sector in LAC, provide opportunities that can be exploited to reduce food losses and raise incomes of both producers and handlers. A systematic approach involving actions of the government, agro-food sector and enterprises is needed as interventions to optimize logistics of produce must be holistic, especially given the perishability of the horticultural commodities.

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Figures

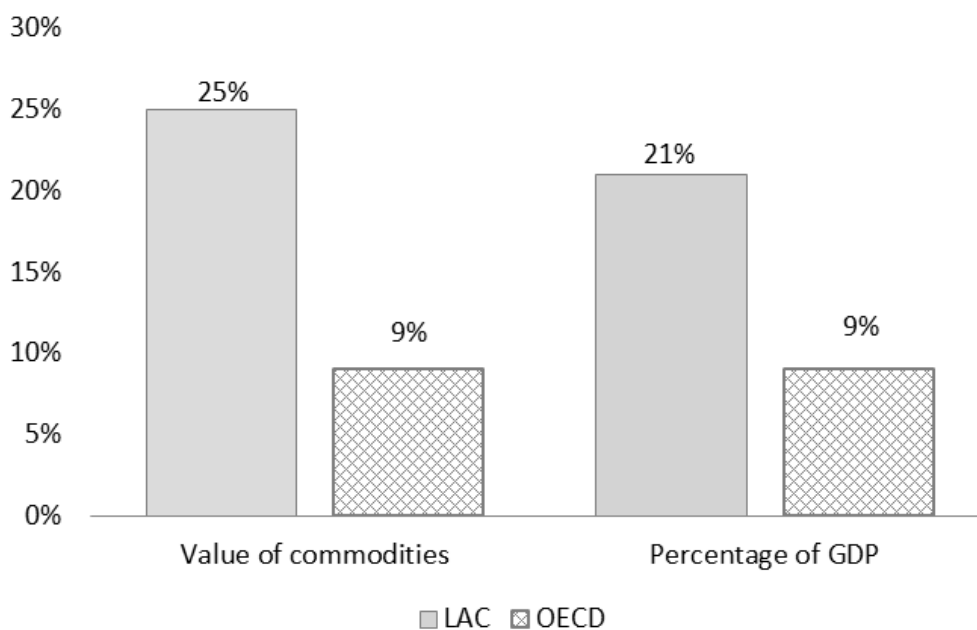


Fig. 1. Average logistics costs (%) relative to value of commodities and total GDP. Source: Kogan and Guash, 2006.

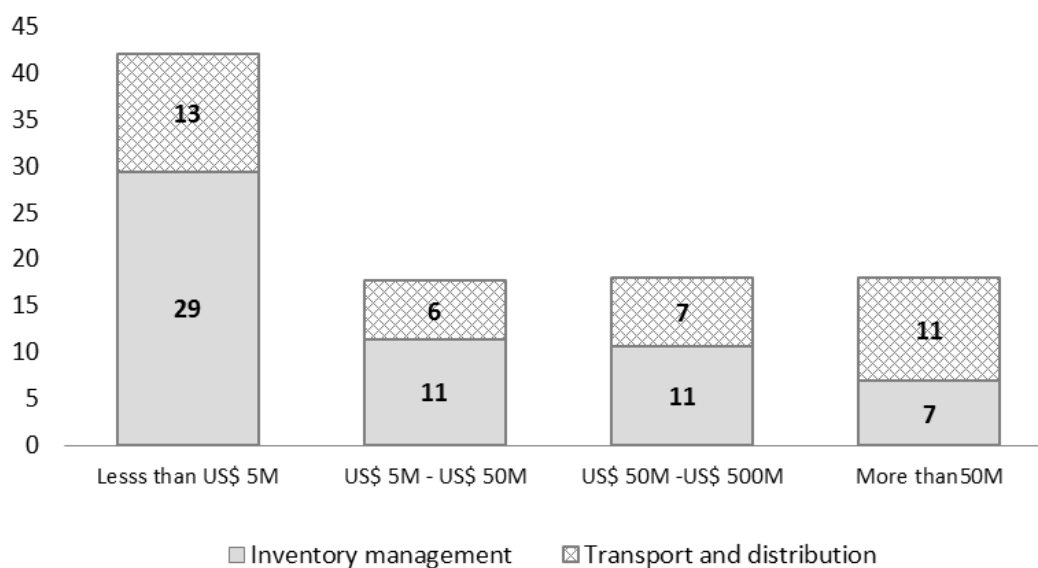


Fig. 2. Logistics costs in LAC as a percentage of sales relative to a firm's size. Source: Centro Logístico de Latinoamérica, Bogotá, Colombia. Benchmarking 2007: Estado de la Logística en América Latina. In: Schwartz et al., 2009.

