Chapter 22
Methodology for the Design of Traceability System in Food Assistance Supply Chains: Case Bienestarina, Colombia

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ABSTRACT

The food assistance programmes (FAP) has the mission to guarantee minimum nutrition requirements in a vulnerable population. Nevertheless, the small deliveries for a spread population, the social conditions, and the limited technological infrastructure could make it difficult to adequately aid supply. To solve these limitations, this chapter proposes a methodology for the design of traceability systems in FAP which allows increasing supply chain visibility, coordination between deliveries and social conditions, and therefore, possible impacts on public policy implications. A qualitative and quantitative comparison of the conventional frameworks is carried out and contrast with the needs of the programmes studied. Also, new criteria are also added to adapt the design to the technological infrastructure and the socio-demographic conditions of the territory. The methodological proposal is applied to the Bienestarina nutritional programme in Colombia, where the technologies and tools to subsequently design the traceability system are proposed.

DOI: 10.4018/978-1-7998-5354-1.ch022

INTRODUCTION

The Food Assistance Programmes (FAP) aims to reduce social inequities, address the specific needs of vulnerable populations and improve their living conditions. For example, a set of these programmes seeks to improve food security through direct transfers of products (Tiwari et al., 2016).

Some examples of direct transfer programmes can be found in Argentina such as the Remediar programme that supplies medicines to the needy population (Argentina, 2015), in Mexico where dairy products are supplied (Liconsa, 2015) and in the United States through The Emergency Food Assistance Programme (TEFAP) which provides food to the vulnerable population. Those programmes set up supply chains that link the supply, production, storage and transport of aid with final beneficiaries.

Remediar programme distributed 76.082 first-aid kits and 16.721.152 treatments in the first semester of 2018, reducing four times the retail price (Ministerio de la Salud Presidencia de la Nación, 2018). The government investment overcome 34 million to supply the demand, covered 70% of the population (Secretaria de promoción y programas sanitarios, 2013). The Liconsa programme coverage is similar, in 2017 the government invested 2.845 million pesos to server more than 6.370 million of beneficiaries, among them: children between 0 and 12 years, teenagers between 13 and 15 years, nursing mothers, elderly and disabled people (Secretaria de Desarrollo Social - SEDESOL, 2018). These numbers represent the huge impact generated by SAP in society.

Within the supply chain management, traceability systems focus on managing the flow of information throughout the chain, thus preventing potential loss to the product (Aung & Chang, 2014; Opara, 2002; Wilson & Clarke, 1998), measuring the environmental impacts (Wilson & Clarke, 1998) and guaranteeing the delivery to the final customer. Systems and procedures are used to access information in real time and measure the performance of the system (Comunidades Europeas, 2002).

The traceability systems design requires technical and social factors. Nevertheless, social factors are not explicit in literature. For instance, Ringsberg(2014) and Mattevi & Jones (2016) considered factors as information management, production, quality and logistics as critical elements. Bosona & Gebresenbet (2013) refer to more specific guidelines such as regulation, quality and safety, technology, efficiency, competitive advantage, corporate image, product characteristics and internationalization. Note, the authors did not include social factors.

In the other hand, within scientific literature there are numerous attempts to quantify the effects of implementing traceability systems as can be seen in the works of (Alfaro & Rábade, 2009; Dabbene, Gay, & Tortia, 2014; Mithas, Krishnan, & Fornell, 2016; Opara, 2002). However, those papers focus on the impacts of an already implemented or ready-to-use traceability system, and not on the conditions and design elements to take into account in the system development. Those facts occur because the traceability systems are mainly related to manufactured goods which distribution chains, parcel and pallet transport and inventory management.

The implementation of a traceability system involves all decisional system levels (see Figure 1). In the strategy level must evaluate the supply chain structure, including not only their taxonomy, operational means and modes available, also idiosyncratic features or common customs that can be changed in one geographical area than another. In the same way, tactical and operational levels are implicated in the traceability context, being the principal input to redefine the inventory policy, freight consolidation, stakeholder coordination, evaluate coverage, establish indicators, so on (Balcázar-Camacho, D. A et al., 2016; Castrellón-Torres, J. P. et al., 2015).