International Journal for Multidisciplinary Research (IJFMR)
E-ISSN: 2582-2160 ● Website: www.ijfmr.com ● Email: editor@ijfmr.com

The Failure To Implement Plastic Crates To Transport Fruits And Vegetables In Sri Lanka

Thewarapperuma, R.N[1], Premarathne, H[2], Premarathne, W[3]

[1,3]Department of Management and Finance, General Sir John Kotelawala Defence University, Sri Lanka
[2]Department of Social Sciences, General Sir John Kotelawala Defence University, Sri Lanka

ABSTRACT

Sri Lanka is an agricultural country. In most of the rural areas, the primary income is generated from vegetable and fruit cultivation. Vegetable cultivation has been subjected to harvest losses for many years. The study explores the factors affecting the rejection of the plastic crate system introduced by the government as a remedy to overcome post-harvest losses. For the qualitative study 5 academics, 2 agricultural specialists, 3 leading farmers, and 5 dealers in fruit and vegetable trading were selected using the judgmental sampling method. The interview method was used to gather data and the thematic approach was used as the analysis tool. The main factor affecting the rejection of plastic crates is the container storage problem. Inflexibility in reverse logistics, inflexibility in management, lack of options for damaged containers, etc. are the dominant factors for farmers. At the same time, the dealers, have different factors such as high costs in reverse logistics. Poor awareness has influenced the rejection of plastic crates without considering the benefits of usage. Therefore, the study identified that the lack of education of farmers had become the main reason for post-harvest losses and the rejection of plastic crates by the farmers. They do not agree to accept the financial benefits of reducing post-harvest loss. The dealers dominate the market neglecting the needs of the final recipients of the fruits and vegetable supply chain in Sri Lanka. Handling difficulties of crates, storage problems related to crates, and the high cost of returning crates to farmland need to be considered when reestablishing the system.

Keywords: Post-harvest losses, Plastic crates, Vegetable and fruit transportation, Dambulla Dedicated Economic Centre

INTRODUCTION

Vegetable cultivation in Sri Lanka can be divided into upcountry vegetables and low-country vegetables. The upcountry vegetable has a different cultivation system that tries to adopt European-originated vegetables like carrots, cabbage, and tomatoes, and the low-level country produces an indigenous farming product that exists from the ancient past. The cold and salubrious climatic prerequisites in the hill country temperate are perfect for plants such as carrot, leek, cabbage, cauliflower, salad leaves, beet, bean, bell pepper, and salad cucumber. The well-demarcated low country and dry moist areas are appropriate for a range of tropical fruits and greens ranging from chili, pink onion, pumpkin, bitter gourd, melon, ash banana types, queen pineapple, papaya, mango, lemon, and gherkins. Sri Lanka has a vast range of local weather and soil on which an extensive variety of fruit and vegetation can be grown.

It is a well-understood fact that reducing post-harvest losses of fruits and vegetables by proper packaging and transporting is beneficial to each stakeholder in the supply chain in Sri Lanka. The

infrastructure facility and use of necessary tools and equipment to handle fresh products are required to maintain temperature and relative humidity at an appropriate level to reduce post-harvest losses of fruits and vegetables. Plastic crates can be used to eliminate or minimize the damage within the supply chain and the total initial investment can be recovered within one and a half months (Chandana, 2007). However, when the plastic crate packing system was implemented in Sri Lanka, farmers and transporters rejected it without considering the benefits. Farmers and dealers were reluctant to use adequate packing methods considering it is an unnecessary cost to their production. They continue to use conventional packing materials without considering the benefits of using plastic crates. There are practical difficulties with plastic crate usage compared to traditional packings such as poly sacks used in vegetable supply chains (Hettige and Senanayake, 1992; Abeygunasekara, 2015). Post-harvest losses of vegetables are negligible in the supermarket vegetable supply chain. Farmers directly supply vegetables and fruits to the supermarket supply chain to get a better income than the farmers who supply their harvest through traditional supply chains. Therefore, this study aims to determine why stakeholders of conventional fruit and vegetable supply chains in Sri Lanka reject the globally accepted method of reusable plastic crates to transport fruits and vegetables to minimize wastage.

LITERATURE REVIEW

Studies have highlighted the importance of adopting a method to reduce the enormous problem that arises from perishable fruits and vegetable wastage due to inadequate packaging and transportation. Vigneault et al. (2009) indicated that returnable and reusable plastic containers are designed and developed to establish the durability of the containers and preserve the environment and food security. Further, Vigneault et al (2009) highlighted that the usage of plastic returnable crates is ideal for horticultural produce and other agricultural fruits and vegetables which are perishable and required to maintain the quality of products. Therefore, they highly recommended returnable plastic crates (RPC). RPCs can also be used to replace expensive single-use fiberboard cartons and locally made crates that are constructed from rough wooden planks or palm ribs. Many of these packages can be used only one or two times.

Institute of Postharvest Technology in Sri Lanka, introduced plastic crates to farmers, collectors, and wholesale traders to transport fruits and vegetables in 2011. The crates cost about USD 5, and the government provides a 50 percent subsidy to the buyers. In the case of mangoes and avocados, the use of plastic crates for handling and transportation resulted in a reduction of losses from 30 percent to 6 percent (Fernando, 2006). RPCs are produced to make them durable, easy to clean, and fit for holding their full quantity. Also, it will be reusable for a long time. IFCO-USA (nd) and Singh et al. (2006) highlighted that RPCs use 39 percent less energy to produce as compared to single-use containers. RPCs are designed to integrate partition openings that encourage seasoning, preservation, and air running (Vigneault et al., 2009). Customers report that they reuse RPCs 150 times or more before recycling those crates.

Jayathunge et al. (2011) studied the effects of different kinds of packages on vegetable handling and transport. Losses using the traditional packages (sacks) ranged from 10 to 30 percent for a variety of vegetables while losses when using improved crates were generally reduced to 5 percent or less. For green beans, post-harvest losses when handled in sacks were measured to average 22 percent, while the same crop handled during the same time over the same route affected only 4.6 percent losses when handled and transported in plastic crates. Jayathunge et al. (2011) highlighted that the weight of products

handled in each type of package is consistent with global norms where sacks are usually large and when filled can be very heavy while plastic crates are generally limited to a capacity of 20kg or less. The crop's selling price would be the same across all types of packages, but often the market price per kg will be slightly higher when physical damage is less. Even though improved reusable containers initially cost more per unit than traditional packages or fiberboard cartons, the use of nestable plastic crates results in higher profits (Rs. 6915.20 per load) due to a combination of reduced post-harvest losses and long-term reusability (longest container life span). From 2009 through 2011, the Sri Lankan government attempted to make the use of plastic crates compulsory for handling fruits and vegetables. The government issued Gazette (Extraordinary) No. 1728/5 on 17th October 2011 under Consumer Affairs Authority Act No 09 - 2003 to give directives to producers, transporters, distributors, and traders to use containers made of plastics, hard papers or wood when collecting and transporting of locally produced selected list of vegetables and fruits. However, the Gazette (Extraordinary) No. 1740/22 on 13th January 2012 removed some of the locally grown fruits and vegetables from the list. The return system for empty plastic crates was not fully established and the promised subsidies for the purchase of RPCs were not in place. After a series of public protests by vendors and produce traders, the policy was suspended.

RESEARCH METHODOLOGY

For the qualitative study, the researcher collected primary data by interviewing 15 respondents. For the qualitative study, 5 academics, 2 agricultural specialists, 3 leading farmers, and 5 dealers in fruit and vegetable trading representing Dambulla Dedicated Economic Centre were selected using the judgmental sampling method. The participants representing the targeted population were selected from the personal network and other professional network platforms. An attempt was made to diversify the participating individuals and organizations to increase the study's external validity and avoid the possible bias of selecting a homogeneous sample. A semi-structured questionnaire was utilized to collect data for the quantitative analysis. The collected data was analyzed using the Thematic Analysis Method. Furthermore, the study focused on knowledge gained through secondary data to investigate the findings further. Several themes were recognized from the findings of the qualitative analysis.

DATA ANALYSIS

Although the government introduced a better system to transport and manage vegetable and fruit harvest safely and properly by using plastic crates, there were several protests by the affected people in the country. The farmers believe that the traditional mode of packing vegetables and fruits using gunny bags is more suitable than the newly introduced modern plastic crates. The agricultural specialist observed that farmers have a reluctance to change. Most farmers are opposed to this new plastic craters system not with valid reason but influenced by others' advice which has no significant importance. Most of the farmers are not knowledgeable regarding the advantages and disadvantages of the new system, which carries more advantages to them with minimum disadvantages. Agricultural consultants blame the government for not properly informing the farmers of the potential advantages of the new system. Reluctant to change and lack of awareness are two main reasons that influence plastic crate usage negatively. The agricultural consultant indicated that the farmers in the country can be categorized into three broad categories: small-scale, medium-scale, and large-scale. In the country, 90 percent of the farmers are in the category of small-scale and medium-scale. Out of them, small-scale farmers who have less than 1 acre of land make their income through farming. These farmers are economically poor, and

their disposable income is very low. As a result of the low income, initial investment for the plastic crates is not economically viable to bear up by them. Unfortunately, as they cannot bear the initial investment for the plastic crates, they protest the new system though it has many advantages.

It was revealed that most of the farmers are reluctant to select plastic crates due to the amount of cost they must spend on packing, loading, and unloading stages. They highlighted the procedure of the crate system is a bit more inconvenient than what they have practiced traditionally. However, with the gunny bag system loading and unloading is not that difficult because the packaging and packing give the carrier flexibility to manage without any difficulty. Packing cost, loading difficulties, and unloading difficulties are three main reasons recognized as negative factors to the usage of plastic crates. Farmers highlighted that the present plastic crate system has so many problems that are not known by other people. However, officials are not practically engaged with the system. It is difficult to load plastic crates, and the loading speed is very slow. Timing in unloading is also an important matter in the case of perishable products like vegetables and fruits. What farmers believe is that the gunny bags used by them are easier to move from one hand to the other without great effort. This is more important for them as the harvest they sometimes collect from the lands away from the road and needs to carry them to the main road passing geotropic barriers. Further, as the gunny bags are flexible, they can move at any angle to keep it horizontally or vertically. However, nothing in the bags might get lost.

Vegetable dealers who have a wholesale point at Dambulla Dedicated Economic Centre indicated that like the traditional gunny bag system, the plastic crate system has a specific problem of overconsumption of capacity than the real weight that can be loaded in the vehicle. Vegetable dealers highlight that due to the higher consumption of vehicle capacity, the number of kilograms that can be loaded to the vehicle is less than the kilograms that can be lord using the traditional gunny bags system. One of the dealers indicated that the only way they can cover the extra expenses is by loading one or two additional packs in a load. After loading a lorry, if one or two packs are remaining, that need to be carried, usually they tightly press the content and load the remaining packs as well. However, this activity is not possible with plastic crates, and they must hire another vehicle or resale the quantity at a lower rate. Another important factor highlighted by the dealers is that the crates are practically impossible to load in small vehicles such as buddy trucks or three-wheelers, which the retailers usually carry their goods.

A group of farmers in the medium category believes that the plastic crate system is good for vegetables like tomatoes and chilies etc. However, most of the farmers in this category concluded that when the container is half full the balance cannot be filled with some other vegetable or simply the half container of this vegetable is in vain because vehicle drivers are hesitating to hire in the vehicle since their income drops down. When the materials are loaded onto the vehicle using plastic crates, on the return journey, the plastic crates also have to be transported using a private vehicle and it is a huge cost. However, this is not the case regarding the traditional system because there is no requirement for a return journey. After all, all the gunny bags can be put into one bag and it is not so heavy. Farmers also highlighted that the handling of plastic crates is not as simple or easy as the traditional gunny bags because empty plastic crates are too heavy to bring back to the farmland or house. Agricultural specialists indicated inflexibility in Reverse Logistics, inflexibility in managing plastic crates, storage problems, and higher cost in Reverse Logistics are considered bottleneck factors to the usage of plastic crates.

The following themes related to the main research objective were identified by the quantitative analysis: Reluctant To Change, Lack of Awareness, Instrumental Cost, Packing Cost, Loading Difficulties,

Unloading Difficulties, Poor Speed In Loading, Poor Speed In Unloading, Poor Speed In Moving, Congested Capacity in Vehicle, Limited Weight, Spare Capacity in Uncompleted Container, Inflexibility in Rivers Logistics, Inflexibility in Management, Container Storage Problem, Too Heavy in Reverse Logistics, Too Costly in Reverse Logistic, Poor Maintainability and Lack of Options for Damages Containers, Less Experience in Usage, Poor Marketing Channel Used, and the Respondents View on the effectiveness of plastic crates to control post-harvest losses.

CONCLUSION

The study was conducted to explore why supply chain actors reject plastic crates introduced to transport fruits and vegetables in Sri Lanka. Farmers identified reluctant to change, lack of awareness, instrumental cost, poor speed in loading, poor speed in unloading, poor speed in moving, congested vehicle capacity, limited weight, container storage problem, too heavy in reverse logistics, too costly in reverse logistics, and poor maintainability as the critical factors in rejecting plastic crates. Dealers identified loading difficulties and inflexibility in reverse logistics as the critical factors in rejecting plastic crates. Inflexibility in management is one of the dominant factors for farmers to reject plastic crates. The farmers need to bring their production a long way from farm gates to the collection point through underdeveloped access ways that are not suitable for transporting plastic crates. Because of this reason, although the crates are provided free of charge, farmers may not be able to use them due to transport difficulties. Further, inflexibility in reverse logistics and lack of options for damaged containers are also critical factors for farmers. Both farmers and dealers mentioned that the container storage problem is a critical factor for the usage of plastic crates.

REFERENCES

1. Abeygunasekara, S. (2015) An overview of the socio-economic impact of improper handling and transportation of vegetables in Sri Lanka, International Research Symposium on Engineering Advancements 2015 (RSEA 2015), SAITM, Malabe, Sri Lanka.
2. Chandana, D.P.M. (2007) Supply Chain Management of Fruit and Vegetable Industry in Sri Lanka, MBA Thesis, Department of Management of Technology, University of Moratuwa. Sri Lanka.
3. Fernando, M. (2006) Postharvest Management of Fruit and Vegetables in the Asia-Pacific Region. Tokyo: Asian Productivity Organization.
4. Hettige S.T. and Senannyake, S.M.P. (1992) Highland Vegetable Production and Marketing System, Commercial Small Farm Development Project Agricultural Cooperative Development International (ACDI) Colombo, Sri Lanka.
5. IFCO. (nd) Sustainable Packaging. Tampa, Florida, USA.
6. Jayathunge, K.G.L.R., Wasala, W.M.C.B., Rathnayake, H.M.A.P., Gunawardane, C.R., Samarakoon, H.C., Fernando, M.D., and Palipane, K.B. (2011) Evaluation of Different Types of Packages for Handling and Transportation of Vegetables. National Institute of Post Harvest Management, Ministry of Agriculture, Sri Lanka.
7. Singh, S.P., Chonhenchob, V. and Singh, J. (2006) Life cycle inventory and analysis of reusable plastic containers and display-ready corrugated containers used for packaging fresh fruits and vegetables. Packaging Technol. Sci., 19: 279–293.
8. Vigneault, C., Thompson, J., & Wu, S. (2009). Designing containers for handling fresh horticultural produce. Postharvest Technologies for Horticultural Crops, Vol. 2: 25-47.