

MULTIPLE DISRUPTIONS ON VEGETABLE SUPPLY CHAIN: A CASE OF RURAL TRANSPORT AND LOGISTICS

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ABSTRACT - Vegetable supply chains are vital for food, nutrition, and economic wellbeing of the rural communities of the central highlands of Sri Lanka. Rural transport and road networks are playing a significant role in connecting farmers to distinct markets. The performance of highly perishable agricultural produce depends on the nature and structure of the rural transport system. The study aimed to explore the role of rural transport and logistics on the vegetable supply chain, find out the supply chain disruptions derived from rural transport and logistics systems, and propose mitigation measures to manage the supply chain disruptions. Participatory approaches were used to explore the status of the rural transport and logistics systems while focus group discussions with vegetable supply chain actors of Boralanda, Bogahakumbura, Wangiyakumbura, Kepettipola, Welimada, and Nuwara Eliya provided the primary data requirements. Road networks connecting urban centers and cities are well established but road networks of rural mountain areas are underdeveloped and non-motorized transport modes are common. Postharvest losses are very high and farmers receive marginal returns. Rural road infrastructure will facilitate outside traders to collect the fresh produce from mountain areas and operations are not economically feasible. Quality of road network and available mode of transport influences vehicle operating costs, transit times, and other factors affecting the turn-around of services and therefore their profitability.

Keywords – logistics; rural; supply chain; transport; vegetable

1. INTRODUCTION

In Sri Lanka, rural areas are facing constant social and economic changes. A diverse range of rural transport modes and services can be found in the Asia and Pacific region. In rural agricultural areas of the country, non-motorized transport modes, such as walking, cycling, and riding animals, are still the predominant mode for first/last mile connectivity, while human and animal traction and agricultural machinery such as tractors are commonly used to carry agricultural produce. Without proper transport and logistics services, it will be quite difficult the movement of agricultural goods from rural areas to urban areas, especially into the markets and economic centers. Also, the movement of agricultural inputs into the rural areas will be quite inconvenient. Since the agricultural value chains in rural areas of the country are fragmented, it is important to have proper connectivity between micro and macro-level networks to develop and improve agricultural value chains (Nuskiya 2019). In upcountry vegetable cultivation, Nuwara Eliya is highly popular for vegetable cultivation such as carrots, potatoes, leeks, cabbage, and so on. The demand for the upcountry vegetable also rapidly increasing in the local market. Considering the Nuwara Eliya district, Under the topography and geographical features, Nuwara Eliya is a valley nestling among hills and mountains with a picturesque landscape. The temperate climate is highly supportive of upcountry vegetable cultivation. Since most of the farmer residences and cultivation fields are situated around those hilly areas, farmers have to face so many difficulties in transportation. The objectives of the study were to find out the nature and structure of the rural transport network and logistic supplies for the vegetable supply chain of rural mountain areas and to identify the problems, and issues, especially the postharvest losses, economic returns to supply chain actors, and propose a smart rural transport system to mitigate the problems.

2. MATERIALS AND METHOD

Participatory approaches were instrumental in identifying rural transport networks of the mountain areas. Key vegetables producing rural mountainous locations of Boralanda, Bogahakumbura, Wangiyakumbura, Keppeptipola, Welimada, and Nuwara Eliya were purposively selected for the study, and altogether 80 supply chain actors including farmers, collectors, and wholesalers were selected as the sample of the study. Farmlands were 1400m above mean sea level and belong to the upcountry wet zone. Climate and soil are ideally fit for high-value vegetable cultivation and farmers used generations-old rich traditions and experiences to grow vegetables (Nuskiya 2019). Vegetable farming is the main income generator for the regions while securing rural wellbeing. Transit walks, participatory mapping, and focus groups discussion with farmers and supply chain actors were key data collection tools. Participant observations of village markets and dedicated economic centers were useful to bridge the data gaps. Storytelling exercises were applied to collect data from individual farmers and wholesalers. In this method, the researcher initiates an informal discussion with the relevant party regarding the selected topic and allows them to express their experiences, knowledge, and ideas regarding the topic without any intervention. Throughout the discussion, the researcher should record all information expressed by the relevant party. Descriptive analysis along with qualitative techniques was applied for the analysis of data.

3. RESULTS AND DISCUSSION

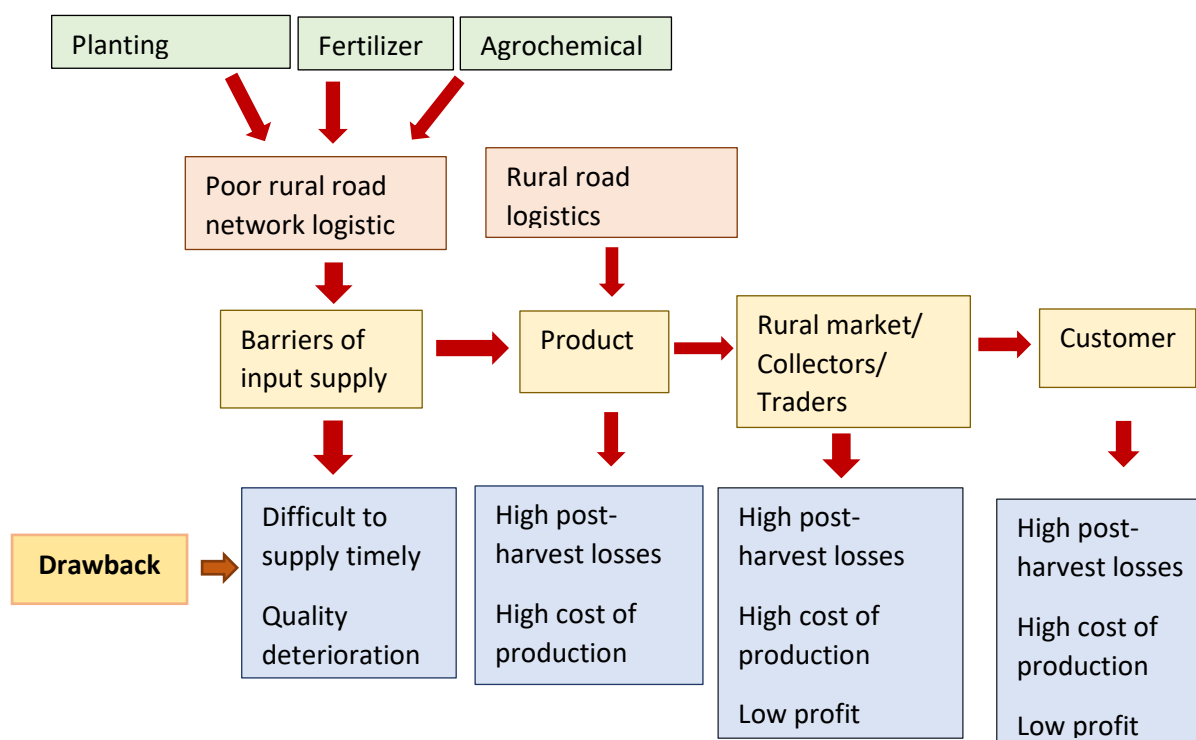


Figure 01: Supply chain disruptions

Since the available poor logistics farmers used to transport their goods by non-motorized transport methods such as walking, cycling, and riding animals. Some farmers use tractors or motor bicycles for transportation. Those are the most common transportation methods that are used to transport the input materials and also the harvest. Almost all the road systems in the rural areas are not well developed and farmers have to climb some mountains by carrying their goods to cultivation lands.

There are only a few key points that farmers are used to selling their products to the sellers. So, farmers have to bring their goods to one of those specific places to sell. Most of the farmers are far away from

those collecting points and they lack proper transport facilities such as carriages, road systems, and also vehicles to transport. This causes post-harvest losses, quality deteriorations, production surplus, and finally results in low marginal returns. Since farmers are unable to transport their products to main economic centers, they sell their products to collectors for lower prices. Collectors sell those products for higher prices and gain a high-profit margin. This creates a huge income gap between the two immediate nodes of the value chain. Most of the time there is no regular significant collector to sell their product and farmers used to sell any other collector who came forward to buy the products without considering the value of the products because of the incredibility of a buyer for their goods. So, farmers can not cover at least the cost of production.

Farmer hubs can be suggested as a more effective method to overcome the issue of the lack of regular buyers to buy products. Farmers who are closed to some particular area can be collected in one specific place and collectively transport their products to the economic center. The cost of transportation can be delegated among them collectively and they can transport their products safely by adapting to post-harvest management techniques and without quality deterioration. So, farmers can earn more profits by direct selling their products. Since the railway system is more convenient in the Nuwara Eliya district farmers can use the train to transport their goods to Colombo. This method was practiced from ancient times and now there is a low trend to use trains for transportation of agricultural goods. Once farmers used to transport their goods by train, they have to expend very low cost for train and they only need transportation facilities to transport from field to railway station. So, this method is more convenient for farmers to transport safely their goods to Colombo with low-cost margins. As a long-term solution for the current issue, the government should need to pay more attention to infrastructure development such as logistics, transportation, and building quality storage facilities to store agricultural goods of the farmer to reduce post-harvest losses and quality deterioration during transportation and storage. This will increase the overall profit of the farming and farmer involvement in cultivation.

4. CONCLUSION

Since the upcountry of Sri Lanka is a mountain region that is highly practicing vegetable cultivation, the vegetable supply chain is severely affected by low infrastructure facilities such as poor road systems and a lack of transport facilities. Non-motorized primary transportation modes which are most common in this rural region cause huge productivity loss in the field of agriculture. The government decisions on vegetable supply chains and storage facilities are also lacking new ideas for the improvement of the available logistic facilities. So, this leads to quality deteriorations, post-harvest losses, and finally low-profit margins. The ideal way to overcome this situation is to establish collecting centers such as farmer hubs near the farming areas which function collectively by farmers. Through farmer hubs, farmers can be accumulated in a few single places and arrange their own transportation collectively. Farmer hubs may increase productivity by reducing gaps in the marginal returns of the value chain actors. The Railway system also can be suggested as a more convenient way to transport goods to Colombo for low transportation costs. The application of ICT-based marketing methods is also a more effective way to higher productivity.

REFERENCES

1. Ayawardhana, M., & Warnakulasooriya, B. (2020). Impact of Problems associated with Supply Chain Management Practices of Wholesalers on their Business Performance in the Coconut Industry in Sri Lanka with special reference to Kurunegala District. *Vidyodaya Journal of Management*, 59-87.
2. DEA. (2021). about us: Department of Export Agriculture. Retrieved from Department of Export Agriculture: <http://www.dea.gov.lk/>.
3. Nuskiya, F. (2019). Up-country vegetable production and marketing: challenges and opportunities. *SEUSL Journal of Marketing*, 4, 21-31.