

AN OVERVIEW OF THE SOCIO-ECONOMIC IMPACT OF IMPROPER HANDELLING AND TRASPORTION OF VEGETABLES IN SRI LANKA

S.Abeygunasekara

Department of Mechanical, Faculty of Engineering, General Sir John Kotelawala Defence University (KDU), Sri Lanka. Email: abeygunasekarasampath@gmail.com

ABSTRACT

Vegetables play vital role in fulfilling the nutrition requirement of human body. 92.2% of Calories, 65.5% of Proteins and 82.3% of Fats are provided by vegetables. However, only the 42.9% of requirements are fulfilled at present due to various reasons. One of main reason that has been identified is damage due to improper transportation and handling from farm gate to end user. Generally poly-sack bags are used for transportation purposes and the waste range has been estimated to be between 30-40% of total products. The economic impact due to losses is around 20 billion rupees per annum. The average theoretical per capita consumption is 53.6kg according to available data. Due to the wastage at each stage it has dropped to 32.2kg per annum. Therefore, what is achieved is only 43.7% out of the requirements of vegetable consumption in Sri Lankan people. Plastic crates have been introduced as a solution to eliminate such transport waste but it has been rejected by farmers, vendors, porters and transporters. Because crates causes decrease 48% in the volume of transport and difficulty to handle than poly-sack bags. This study emphasizes the diesel price subsidy as Rs 55 per litter, combination of mixed mode of transportation, introduction of collapsible crates are solution for overcome the practical issues with crates usage of vegetable handling and transportation.

Key words: Improper handling of Vegetable, losses during transportation, post harvest losses, plastic crates

1. INTRODUCTION

Around one billion of the populations throughout the world are suffering from hunger and this has been confirmed by present statistics. Most of these people belong to the Asian and Pacific regions and this is quantitatively approximately 642 million [1]. The main reason for this situation is not the more lack of food but rather the failure to deliver the expected amounts to those in need due to enormous wastage either in the packing process or during transportation both. Vegetables wastes from farm gate to the end user contribute highly to this situation. Such wastage has been estimated by different investigators and they have concluded the range of waste to vary from 30% to 40% during various stages including transportation. Furthermore the financial impact on the national economy has been estimated to be around 20billion of rupees per annum. Himani reported that around 270,000 tonnes of vegetables and fruits are lost during post harvest operations in Sri Lanka[2]

However 75% of total post harvest loss is due to improper packaging such as tight packing and overloading. Generally poly-sack bags are used for packing vegetables for transportation in Sri Lanka. The compression damage occurs during

packing and stacking. The Government has made an effort to introduce plastic crates as a solution of this issue in order to eliminate loss during transportation. The Treasury has granted a sum of Rs. 103 million to promote the use of plastic containers [3]. The usage of proper packing system under transportation was enforced by Article 10 of the Consumer Affairs Authority Act. Furthermore, the Ministry of Cooperatives and Internal Trade has issued a gazette notification directing the waste minimization under transportation. In this regard a special Gazette was issued on October 2011, mentioning several vegetable items. But it has been rejected by farmers, vendors, porters and transporters. Then the government has decided to reduce the number of vegetable items that need to be transported in crates. However, bitter gourd, capsicum, knolkhol, lettuce, tomatoes, and carrots should be packed in crates, If anyone violated this regulations such individuals will be found guilty and will be fined up to Rs 10,000 for each offence. The fine on an institution is up to Rs 100,000.

According to the investigations of Chandana(2007) plastic crates are causes for the minimization or elimination of damage[4]. The initial investment can be cover within one and half months (Payback period). In addition, investigation has estimated the additional cost

increase as 50 cents per kilogram if they use plastic crates.



Figure 1: Vegetable Packing in poly-sacks

2. METHODOLOGY

In this study the basic information was collected from field observations at Manning market and other major exchange points in Sri Lanka. In this research has met the authority of trade association in Manning market and gathered more practical information. Furthermore farmers, porters, transporters and management of leading dedicated economic centers of the country were interviewed. Calculation are based on existing literature, statics of Central Bank reports, Hector Kobbekaduwa Research Institute data, Census and Statics Department information, and publications an institute of the Post Harvest Technology. Furthermore comments of various journalists involved in reporting this issue were collected.

Table 01: Collected data from Key Exchange

Items	Range of data
Transport bags quantity per lorry load(average size)	140-180
Cargo Cabbin	200-300
Quantity of a bag	35-40kg
Total transport quantity per journey	5500-6000kg
Average load range of plastic crate	27-30kg
Number of crates per lorry load	
Fuel consumption(Average Lorry)	7-10km/L
Fuel Consumption(Cargo Cabin)	7km/L

2.1. Per Capita Consumption

Total production (Due to Central Bank Report)	1,091,491MT
Population	20,328,000
Theoretical average per capita consumption is	53.7kg per person per annum
Overall waste percentage at each step	40%(Existing literature and data from IPHT)
Actual per capita consumption	32.2 kg
Required quantity	75kg
Consumption percentage	42.9%
Gap in consumption	57%

2.2. Transport Cost

Transport bags quantity per lorry-	160
Average load of bag	37.5 kg
Total transport volume per journey	6000kg
Average load range of plastic crate	28.5kg
Number of crates per lorry load	-100-120(Field observations)
Load capacity	3135kg
Reduction percentage	48%
Transport cost under tradition method	1.8Rs/T
Transport cost with crates	3.5Rs/T
Propose fuel price for same transport cost with crates	55Rs/L
Diesel Price at present	95Rs/L

2.3 Nutrition Values(Department of Census and Statistics)

Total calories availability per day	2691.1
Contribution of vegetables	2483.1
Percentage	92.2%

Total protiens requirements Per day	69.4
Contribution of vegetables	45.5
Percentage	65.5%

Total Fats requirements Per day	51.6
Contribution of vegetables	42.5
Percentage	82.3%

3. DISCUSSION AND RECOMMENDATIONS

A poly-sack can hold about 40 kg of vegetables while according to farmers and traders a plastic crate can hold only 27-30 kg. Generally a lorry can accommodate 3,000 kg of vegetables along with plastic crates. But the same lorry can carry around 6,000 kg of vegetables packed in poly-sack bags. On the other hand, poly sacks are sealed but crates are not safe during transportation because of the possibility of pilfering during

transport. Another difficulty is the road conditions. Most of the distances from farm gate to exchange points are bumpy roads. Transportation in crates downhill is not safe due to slippery or uneven tracks. It has been found that it is most difficult to handle crates in the area around the central hills. Even if the crates are provided free of charge still, transporting would be a difficult task. Sometimes people use animals or bicycles to transport their harvest. Several poly-sack bags could be strapped onto a bicycle but this is difficult in the instance of several crates. Farmers and family members walk long distances from their farm gate to the road. Carrying a poly-sack bag on the back of individuals, but carrying two or three plastic crates will be painful. Such a kind of activity is difficult with solid crates. Another difficulty that should be mentioned is the considerable space occupied on the return journey and the result is addition of extra transport cost. The price of plastic crates is between Rs 450-Rs 1100, however a poly-sack can be purchased for Rs 20-Rs30. Porters (natami) are against crates because poly sacks are easy to carry, but handling of crate is difficult and is a painful task. On the other hand the quantity of vegetables in a crate is small and at the same time it is difficult to handle many crates like poly-sack bags. Furthermore, sacks are easy to carry and discharge the load. But crates are not so easy to unload. The existing labour force is not a degnate for loading and unloading. The solution is introducing a fork lift or convey belt for loading and unloading purposes .Furthermore two and four-wheel carts can be introducing to the porters.The existing storage space of Manning market and dedicated economic centers are limited .without developing warehouse facilities where it may be difficult to enforce the law of plastic crates.

However, the traditional transportation system follows the damage minimization procedures. Here cushioning material such as gliricidia ,Kohoba or banana leafs in between vegetable layers is used. It is causes minimization of damage too the considerable level during transportation. But it is not an acceptable level of control overall wastage. Most of the investigations consider these cushioning materials as a waste quantity because garbage collectors do not separate vegetable waste from cushioning materials. Since a, highest portion of dumping includes cushioning materials such as gliricidia leafs, banana leaf, coconut leafs, , kohomba leaf, bamboo etc. Another method is precautionary that more texture products are loaded as the top layer of the lorry and wooden crates are used for

packing tomatoes. However, internationally ASTM D4169-08 has been recommended for vegetables and fruits transportation.

At present the exchange centers, vegetables are categorized as a grade 1, 2 and 3.The grade 1 is sent to five star hotels, supermarket and other specific places. Grades 2 are also exhibit quality level and sent it to retail outlets. However grade 3 is considered damage but not badly deteriorated. This grades vegetables are sent to small scale restaurants, hostels, vegetable fairs etc. Therefore, grade 3 level is not considered as a waste. As a result the direct losses at leading exchange points such as Manning market or dedicated economic centers is possible to be less than the reported value of existing literature. Therefore the measured waste at such exchanges may be around 5-10%. But it is the yield during the rainy season. However huge quantum of waste has been reported at Dambulla dedicated economic center than at other places .Because some vegetable prices decrease at the harvesting period result was the decrease in the price level .In such conditions farmers dump their products at the premises of economic center.

3.1. Suggestions to elimination of PHW during transportation

1. Use of cushioning material between vegetable layers while transportation
2. White-painted roof fixing as a radiation shield (8 to 10 cm above the main roof)
3. Fitting of Louvers to ensure a positive air flow through load
4. Loading aids such as forklift, conveyers used at the loading and unloading points
5. Package load in rivers order(last on, first off)
6. Shielding from direct sunlight (Sunlight causes the temperature raise, accelerating decomposition).
7. Promoting corrugated packaging (Bio degradable material)

3.2. Suggestions to promote plastic crates through proper mechanism

1. Setting up depots at the exchange centers and possible places to stock crates to available different sizes
2. Introduce collapsible plastic or steel crates to replace solid crates.
4. Subsidized price of crates (At least 50 percent).
6. Introduction of a different colour code for each major exchange points

7. Introducing a proper return mechanism for crates
8. Starting as a pilot projects at selected regions
9. Gradually extended this method to the whole exchange points.
10. Introduction of different price mechanism with crates handling vegetables
11. Introduce collapsible crates.
12. Fuel subsidy

4. CONCLUSION

The total Sri Lankan production of vegetable does not fulfill the nutrition requirement of the entire population of the country. The average theoretical per capita consumption is 53.6kg according to available data. Due to the wastage at each stage it has dropped to 32.2kg per annum. Therefore, what is achieved is only 43.7% out of the requirements of vegetable consumption in Sri Lankan people. Crates causes decrease 48% in the volume of transport and difficulty to handle than poly-sack bags. This study conclude the diesel price subsidy as Rs 55 per litter, combination of mixed mode of transportation, introduction of collapsible crates are solution for overcome the practical issues with crates usage of vegetable handling and transportation. However plastic crates are one of best proven solutions to minimize the harvesting losses during transportation and handling. This is not a final and unique solution. Before the introduction of crates attention should be paid to the grievances of farmers, vendors, vegetable collectors, wholesale traders, retailers, transport agents and porters(Natami). Specially the requirement of small scale farmers must be considered.

REFERENCES

- [1] D. Yatawara, “*Corrugated packaging for veggies - ideal solution*”, Sunday Observer 25 December 2011.
- [2] R. Kangaraarachchi, “*Plastic crates to cut post harvest losses*”, Daily News, 31 March 2011.
- [3] H. Samarakoon, “*Post harvest packaging to rescue and value to the fresh produce supply chain*”, AGM of Institute of Supply and Materials Management, 2011
- [4] D. P. M. Chandana, “*Supply chain management of fruit and vegetable industry in Sri Lanka*”