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Curbing Post Harvest Losses: The Plight of Onion Farmers in Nigeria

Balaraba Abubakar Sule

Introduction

Small scale farmers in Nigeria are faced with various challenges; from feeding an expanding population to meeting rising demands for high quality produce. Post-harvest losses pose a threat to their ability to meet these challenges. Storage and transport facilities are factors affecting not only the agricultural sector but the Nigerian economy due to their effect on post-harvest losses. This is because post-harvest losses do not only represent a waste of food but also a waste of human effort, farm inputs, livelihood, investments and scarce resources (WRI, 1998). Post-harvest practices in Nigeria are mostly comprised of traditional techniques practiced by farmers, processors and traders resulting in considerable losses of physical and nutritional qualities of harvested crops (Oni and Obiakor, 2002). Estimates from the Food and Agricultural Organization puts global food loss and wastages at 32 percent while in Sub Saharan Africa, post-harvest loss is estimated to be 37 percent (Kaminski and Christiaensen, 2014). Post-harvest losses are more acute with vegetable crops due to their perishable nature and seasonality. Post-harvest losses of fruits and vegetables are estimated at 5-20% in developed countries and 20-50% in developing countries (Mashav, 2010). Nigeria is a leading producer of onions in Africa (FAOSTART 2013). However, it is estimated that Nigeria loses as much as 50% of its onion harvest due to postharvest losses (World Vegetable Centre (WVC), 2018).

Market Glut and Post-Harvest Losses

In addition to post-harvest losses, an effect of inadequate processing and storage facilities is market glut. Glut refers to a market situation where the supply of a commodity exceeds demand usually resulting in a substantial fall in its price (Crawford, 1997).

Key Findings

1. Improvement in storage facilities and transportation services is essential to reducing market glut and post-harvest losses.
2. Knowledge gap on essential post-harvest practices by farmers have been identified to accentuate losses.
3. The *Rudu* storage structure requires simple adjustments in its design to improve its efficiency.



Traditional jute bag used in storing onions in Nigeria

Source:

https://www.nairaland.com/attachments/3372797_img20160203102714.jpeg08c6ae4a247bbb8c3d8d6a15f1ea5c0a

In agriculture, and especially in developing countries, supply of agricultural produce often exceeds demand in the immediate post-harvest period. With few good storage facilities available, farmers are unable to store their produce for later markets and therefore have no option but to dispose them at very low prices. Transportation and storage facilities play a major role in reducing glut and post-harvest losses. Mechanical damage due to impact bruising, compression and vibration during transportation, and poor transport conditions (including bad roads), account for a good part of the post-harvest losses of fruits and vegetables in Nigeria (Aworh, 2010). An inadequate transport system makes it more difficult for the farmer to sell products within the required time limits and in markets with the most attractive prices. The consequences go beyond individual losses of money; they impact production and the entire national economy (FAO, 2012).

Commercial onion production in Nigeria is mainly carried out in the Northern part of the country. It is a major source of farmer income in these areas. It generates job opportunities for craftsmen and weavers who produce the jute bags and baskets used during harvest. Because onions are generally cultivated during the dry season, its production provides employment opportunities to rural people not engaged directly in dry season farming. It also provides jobs for local transporters who convey onions from the farm gate to the market and then to various parts of Nigeria (Illo et. al., 2016). Gaps in knowledge on how to properly cure and grade bulbs for marketing and how to manage stored produce have been identified to accentuate post-harvest losses. Consequently, this brief reviews the strategies open to the small-scale rural farmers on how to minimize post-harvest losses leading to increased income.

Strategies to Reduce Post-Harvest Losses in Onion Production

According to Kiaya, (2014), post-harvest loss refers to the degradation in both quantity and quality of food produced from harvest to consumption. Below are strategies that, if carefully implemented, will help reduce post-harvest losses experienced by Nigerian onion farmers.

Choice of Cultivar: According to Paltrinieri (2017), the basic requirement for successful storage of dry bulb onions starts right from the choice of cultivar. Most Nigerian farmers cultivate local varieties, inadvertently transferring undesirable traits to successive crops such as low soluble solid content. Cultivars intended for long-term storage should have a long dormant period and form strong outer skin when fully cured. The brown and red-skinned cultivars are best in this respect (Paltrinieri, 2017).

Harvesting: Fruits and vegetables should be harvested as carefully as possible to minimize mechanical damage (bruises, scratches and punctures) and should be carried out during the cool part of day i.e. early morning or late evening (Harvey, 1978). Onions are best harvested when the weather is dry; harvesting after a rainfall, or when the humidity is high increases susceptibility to post-harvest disease (Agblor and Waterer, 2001). Bulbs intended for storage should not be harvested at an immature stage as this causes the plant to develop a thick neck, which is prone to disease in storage.

Curing: This refers to the drying of the neck and about two to three layers of the outer skin. Curing decreases the incidence of neck rot, reduces water loss during storage, prevents microbial infection, and is desirable for development of good scale color. Under ideal situations, onions must be cured soon after harvest by placing them in a drying room at 20-30°C and 70% relative humidity for 12 to 24 hours. Where this is not possible, curing can be carried out in the field (under dry conditions and protected from direct sunlight) for at least two to three weeks or until the top necks are completely dry and the outer skin becomes slightly crisp. To prolong storage life, onions must be stored immediately after curing (Agblor and Waterer, 2001).

Sorting: This important activity must be carried out before storage. Only onions with high initial quality can be stored successfully. Damaged produce should be sorted out to prevent well matured and undamaged bulbs from being infected (Byczynski, 1997) Without proper grading and sorting prior to storage, up to half of the onions stored are likely to decay or shrivel (World Vegetable Centre (WVC), 2018).

Storage: Before storage, onions should be packaged inside a material that allows proper air circulation such as a mesh or jute bag, basket or in a crate. The container can then be stored in a structure that is dry and well ventilated. Bulbs must be stored in darkness to further increase their storage life. There are two temperature ranges in which onions store well, between 0 - 4°C and 25 - 31° C. The temperature range between 20 - 25° C is very dangerous for the onion because within this range, bacteria and fungi that cause disease to the bulbs are most active. The optimum temperature for long-term storage (about 12 months) of onions is 0°C with 65-70% relative humidity (Agblor and Waterer, 2001). For countries with hot tropical climates like Nigeria, the temperature range of 25-31°C is recommended. Considering the farmers' lack of access to environmentally controlled storage facilities in Nigeria, the best alternative is a cool ventilated structure

whose interior is totally screened from sunlight. The traditional straw structure locally referred to as “*Rudu*” provides this alternative. With adjustments in its design to enhance proper ventilation, it can store onions for up to six months (WVC, 2018). All storage structures must be carefully monitored to promptly remove decaying and moldy onions (Muhammad et. al., 2012). Sprouting and the growth of bacteria can be minimized in the *rudu* by stacking at most 3 levels to allow sufficient aeration of the bulbs at the base.



The traditional “*Rudu*” used in storing onions alongside the improved structure that allows for better aeration.

Source: <https://avrdc.org/building-an-improved-onion-storage-facility-in-sokoto/>

Conclusion

Minimizing post-harvest losses could be more sustainable than increasing production to compensate for these losses in the short run. The problem food loss after harvest takes on greater importance as world food demand grows. Cutting postharvest losses could add a sizable quantity to global food supply, reducing the need to intensify production in the future. Lack of general knowledge of proper post-harvest handling processes have been identified among farmers (Muhammad et. al., 2012, Paltrinieri, 2017). For example, reducing mechanical damage during harvesting, grading and packaging greatly decreases the likelihood of post-harvest losses due to pathogens. This simple step could improve overall quality and food safety, translating to higher profits to growers, marketers and even processors (Muhammad et al., 2012).

Policy implication

Interventions in form of trainings in post-harvest loss reduction should be an important component of the efforts to reduce food insecurity in Nigeria. The inefficiency of the existing marketing channels, as

evidenced from high post-harvest losses, is largely due to the backdrop of the available market resources, both physical and financial. Rural road networks need improvement having recognized that mechanical damage to produce from impact and bruising due to poor transport conditions (including bad roads), account for a good part of the post-harvest losses of fruits and vegetables in Nigeria (Aworh, 2010).

Onion production is an economic activity that affects the livelihood of the rural communities and not the farmers alone. Interventions in facilities for proper postharvest practices and value addition should be an integral component of strategies to improve agricultural productivity and livelihood of the rural people.

References

1. Agblor, S. and Waterer, D. (2001). Onions - Post-Harvest Handling and Storage Sciences, University of Saskatchewan. Canada-Saskatchewan Irrigation Diversification Centre.
2. Aworh, O. C.(2010). Food Technology and National Development: A Global Perspective. Ibadan University Press
3. Byczynski, L. (1997), “Growing for Market”, Handbook of crop storage, Vol. 1 No, pp. 4-5.
4. Crawford, I. M. (1997). Agricultural and Food Marketing Management Marketing and Agribusiness Texts Food and Agriculture Organization of the United Nations, Rome.
5. FAOSTAT (2013). FAOSTAT Database Results. <http://www.faostat.org>
6. Harvey, J. M. (1978), “Reduction of losses in fresh market fruits and vegetables”, Annual review of phytopathology, Vol. 16 No. 1, pp. 321-341.
7. Illo A. I., Kaka, Y., Hassan U., Umar S. and Bamidele, A. A. (2016). Marketing of Onion in Aliero Central Market, Aliero Local Government Area of Kebbi State. IOSR Journal Of Humanities And Social Science (IOSR-JHSS) Volume 21, Issue 1, PP 42-49.
8. Kaminski, Jonathan; Christiaensen, Luc. 2014. Post-harvest loss in Sub-Saharan Africa - what do farmers say? Policy Research working paper ; no. WPS 6831. Washington, DC: World Bank Group
9. Kiaya, V. (2014). Post-Harvest Losses and Strategies to Reduce Them. Technical paper □ Scientific & Technical Department. Action Contre la Faim (ACF), ACF International
10. Mashav (2010). “Postharvest losses of fruits and vegetables”, available at: <http://www.mashav.mfa.gov.il/mfm/web/main/document.asp?documentID=42327> (accessed March, 2012)

11. Muhammad, R. H., Hionu, G. C. and Olayemi, F. F. (2012). Assessment of the Post-Harvest Knowledge of Fruits and Vegetable Farmers in Garun Mallam L.G.A of Kano, Nigeria International Journal of Development and Sustainability. Volume 1 Number 2: Pages 510-515
12. Olayemi, F. F., Adegbola, J. A., Bamishaye, E. I. and Awagu, F. (2012) Assessment of Post-harvest Losses of Some Selected Crops in Eight Local Government Areas of Rivers State, Nigeria, Asian Journal of Rural Development 2(1) 13-23
13. Oni, K. C. and Obiakor (2002). Postharvest Food Loss Prevention: The role of the National Centre for Agricultural Mechanization (NCAM) Illorin. FGN/UNDP first country Cooperation (ccf-1) Framework Proceedings of National Seminar for Cooperating Agencies under the CC-1 Framework on Post-harvest Food Loss Prevention, April 18-19, Ibadan, pp1-10
14. Paltrinieri G. (2017) Handling of Fresh Fruits, Vegetables and Root Crops-a training manual for Grenada TCP/GRN/2901 Agricultural Marketing Improvement
15. World Vegetable Centre (WVC) (2018). Increasing production and reducing postharvest losses of onion in Nigeria. <https://avrdc.org/increasing-production-and-reducing-postharvest-losses-of-onion-in-nigeria/>
16. WRI (1998). Disappearing food; how big are post-harvest losses. World Resources Institute, Washington, DC., USA. <http://www.wri.org/publication/content/8386>

About the Author

Balaraba Abubakar Sule is a PhD candidate at Federal University of Technology Minna, Niger State, Nigeria

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