



Factors Influencing Post-harvest Losses among Vegetable Farmers in Mbaitoli Local Government Area in Imo State

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Author's contribution

The sole author designed, analysed, interpreted and prepared the manuscript.

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ABSTRACT

The study analyzed factors influencing post harvest losses among vegetables farmers in Mbaitoli Local Government Area in Imo state, Nigeria. Specifically the study ascertained the kind of vegetables produced; determined the quantity of output production of vegetables; determined the causes of post harvest losses among vegetable farmers; examined the factors affecting post harvest losses of vegetable; ascertained the effect of post harvest losses among vegetable farmers and identify possible strategies that can reduce losses among vegetable farmers. Multi-stage random sampling procedure was used in the selection of ninety eight (98) respondents and a set of structured questionnaire was administered on them to obtain information. Data collected were analyzed using descriptive (frequency, percentages and chart) and inferential (multiple regression) statistics. Result showed that majority (51%) of the farmers cultivated leafy vegetables and the average quantity of vegetable produced was 142.35 kg. Farmers identified major causes of post harvest losses as pest (94.9%), disease (81.6%), lack of storage facility (80.6%) and poor handling of vegetable (71.4%). The major factors affecting post harvest losses were improper handling (87.8%), lack of credit facility (86.7%) and the possible strategies to reduce post harvest were use of improved processing and preservation method (91.8%), access to appropriate technology

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(88.8%), adequate post harvest handling (87.8%). The study recommends that, the extension agents through the aids of federal government, should train rural, urban and sub-urban farmers on post harvest, processing and marketing technology.

Keywords: Vegetables; vegetable production; post harvest losses; strategies.

1. INTRODUCTION

Vegetables are universally known, widely consumed and one of the most important sources of minerals and vitamins in human diet in the world. Vegetable can be define as the edible plant organs of crops, other than fruits of shrubs and perennial trees which are harvested and consumed in a fresh condition [1]. Vegetables are essential parts of human diets but are perishable in nature and they are edible plant parts which include stems, stalks, roots, tubers, bulbs, leaves, flowers and fruits, generally consumed raw or cooked with main dish [2]. Vegetables are parts of plants which are consumed as food, they refer to all edible plant matter, including flowers, fruits, stems, leaves, roots and seeds [3]. Vegetables were identified by [4] as onions, tomatoes, okra, melon, pumpkin, pepper, amaranthus, carrots etc. Fruits and vegetable in the daily diet have been strongly associated with reduced risk for some forms of cancer, heart disease, stroke and other chronic diseases [5]. The physiological form of fruits and vegetables make deterioration easy on transit and storage especially under conditions of high temperature and humidity resulting in heavy losses of these crops [6]. Therefore the production of vegetables requires attention to all production operations, including insects, diseases and weed control even at post harvest stage.

Post harvest loss can be defined as the degradation in both quantity and quality of a food production from harvest to consumption. Quality losses include those that affect the nutrient/caloric composition, the acceptability, and the edibility of a given product. These losses are generally more common in developed countries [7]. Quantity losses refer to those that result in the loss of the amount of a product. Loss of quantity of vegetables is more common in developing countries [8]. The production of fresh vegetables has its own complexity due to such perishable nature of the produce. Their perishability and hugeness makes them difficult to manage easily during postharvest period unlike that of dry grains [9]. Most of the perishable crops are produced by small scale farmers those

who have limited knowledge and are financially poor. The causes of food losses and waste in developing countries are mainly connected to financial, managerial and technical limitations in harvesting techniques, storage and cooling facilities in difficult climatic conditions, infrastructure, packaging and marketing systems. Physical and quality losses are mainly due to poor temperature management, use of poor quality packages, rough handling, and a general lack of education regarding the needs for maintaining quality and safety of perishables at the producer, wholesaler, and retailer levels [10]. Food loss and waste reduction is equally important to that of intensive and extensive farming to secure food for a nation [11]. Losses cause less food to be available and therefore contribute to food insecurity. Post harvest losses constitute a threat to household food and nutrition security as it leads to reduction in both quality and quantity of household food production [12]. It is therefore, important that the post harvest losses should be given much attention. It is to this effect that the study examined the following objectives to: ascertain the kind of vegetable produced in the study area; determine the quantity of output production of vegetables in the study area; ascertain the causes of post-harvest losses among vegetable farmers; ascertain the extent of post harvest losses among vegetable farmers in the study area; examine the factors affecting post-harvest losses of vegetable in the study area; identify possible strategies that can reduce losses among vegetable farmers in the study area.

2. METHODOLOGY

The study was carried out in Mbaitoli Local Government Area (LGA) of Imo State Nigeria; and is headquartered in Nworieubi and falls under Owerri agricultural zone as classified by Imo State Agricultural Development Programme (Imo ADP, 2009). Mbaitoli has 9 autonomous communities, which include Mbieri, Orodo, Ogwa, Umunoha, Ubomiri, Ifakala, Afara, Ogbaku, and Ezianya-Obiato. It has an area of 204km² and a population of 237, 555 [13]. The population comprised all vegetable farmers in Mbaitoli L.G.A of Imo State. Random sampling

technique was adopted in the selection of respondents. Five (5) communities were randomly selected from the nine (9) communities in the study area that engages in the storing and selling of vegetables. However, twenty one (20) respondents were randomly selected from each of the communities selected which gave a total sample size of one hundred (100) respondents for the study. The data required for the study were collected from primary source. The Primary data were collected through the use of structured questionnaire which were administered with oral interview in places where the respondents could neither write nor read. However, only ninety eight (98) useful questionnaires were used for this study. The objectives were realized using descriptive statistics namely percentages, frequencies, mean and chart.

3. RESULTS AND DISCUSSION

3.1 Kind of Vegetable Produced

Fig. 1 shows that the majority (51.0%) of the vegetable farmers grow leafy vegetable such as water leaf, curry leaves, pumpkin and bitter leaf. Also, 20.4% of the respondents grow root vegetables (ginger, sweet potato and chilli pepper) while 14.3% of the vegetable farmers grow seed vegetables (melon) and 14.3% of the vegetable farmers grow fruity vegetables (okro, tomatoes, cucumber, garden egg and chili pepper). This result indicates that the respondents in the study area were growing mainly leafy vegetables. There is market at any time for leafy vegetables for cooking of varieties of soup. However, Ibeawuchi [4] identified major vegetables cultivated in Nigeria as tomatoes, okro, melon, pepper, amaranthus, carrots, among others.

3.2 Quantity of Vegetable Production

The result in Table 1 shows that the majority (32.6%) of the respondents produced between 1 kg – 50 kg of vegetables, this implies that most vegetable farmers are subsistence farmers, they produce vegetable at small scale. Also, 26.5% of the vegetable farmers produced between 101 – 150 kg of vegetables, 12.2% produced between 51- 100 kg also 12.2% of the farmers produced above 250 kg of vegetables, again 10.2% produced 151- 200 kg and also. This implies that the quantity of vegetables produced in the study area was small and shows that the vegetable farmers produced on small scale. However, the study revealed that the average quantity of

vegetable production was 142.4 kg among the farmers.

Table 1. Quantity of vegetable produced

Quantity produced (kg)	Frequency	Percentage
1-50	32	32.7
51-100	18	18.4
101-150	26	26.5
151-200	10	10.2
Above 250	12	12.2
Total	98	100.0

Mean: 142.4kg Source: Field Survey data, 2019

3.3 Causes of Post Harvest Losses among Vegetable Farmers

Table 2 shows that majority (94.9%) of the vegetable farmers identified pest infestation as the major cause of post harvest losses. Others identified diseases outbreak (81.6%), lack of storage facilities (80.6%), poor handling (71.4%), much harsh weather condition (84.7%), inadequate extension service (62.2%), improper packaging and marketing system (62.2%), microbial action (67.3%) and poor policies (59.2%) as causes of post harvest losses in vegetable production. This implies that the responses indicated by the respondents causes post harvest loss of vegetables. The finding collaborates with the study of [14] who identified harvesting method, state of crop at harvest and processing before storage as the major causes of post harvest losses in poorly developed agricultural economy. The finding also shares the view [11] that greater portions of the amount of post harvest loss is due to various factors such as poor infrastructure, low levels of technology and low investment in the food production systems, pest, inadequate policies, storage, climate and other factors.

3.4 Effect of Post Harvest Losses on Vegetable Farmers

Table 3 shows that majority of the vegetable farmers identified the effect of post harvest losses of vegetables as reduction in quantity produced (91.8%), low income (86.7%), poor nutrition (81.6%) death of plant (50.0%), poverty (53.1%) while few (29.6%) identified unemployment as effect of post harvest losses of vegetable. This result implies that post harvest losses of vegetables result in reduction of vegetable quantity that could have increase farmers income and these thereby leads to

poverty. The finding is in line with the studies of [11] and [3] that post harvest losses cause less food to be available, loss of economic value of food produced and therefore contribute to food insecurity. Also, the finding is in line with the [15] that food losses and waste have impact on hunger and poverty alleviation nutrition, income generation and economic growth. The vegetable farmers in the study area were small scale farmers, reduction in the quantity of vegetable produced may expose them to poverty since the sales from the vegetable was low.

3.5 Factors Affecting Post Harvest Loss among Vegetable Farmers

The result in Table 4 shows that majority of the vegetable farmers identified factors affecting post harvest losses of vegetables as inadequate credit facilities as (86.7%), improper handling

especially storage (87.8%), inadequate marketing facilities (79.6%), poor shelf life (62.2%), inadequate good knowledge of packaging (58.2%), inadequate extension services (66.3%), effect of climate change (85.7%), high cause of labour (58.2%), poor technologies (69.4%) and menace of pest and diseases (89.8%). This implies that the numerous factors indicated by the respondents affect post harvest losses of vegetables. The findings are in line with [16] who agreed that a lot of crop produced are lost due to bruises during transportation and storage. The finding also share view with [10] that physical and quality losses are mainly due to poor temperature mgt use of poor quality packages, rough handling and a general lack of education regarding to the needs for maintaining quality and safety of perishables at the producer wholesaler and retailer levels. Furthermore, the finding is in line

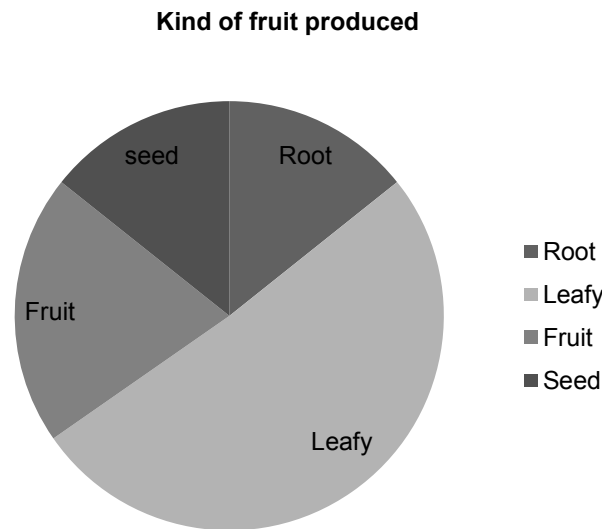


Fig. 1. Kind of vegetable produced

Table 2. Causes of post harvest losses among vegetable farmers

Causes	*Frequency	Percentage
Pest infestation	93	94.9
Disease Out break	80	81.6
Lack of Storage Facilities	79	80.6
Poor Handling	70	71.4
Much Harsh Weather Condition	83	84.7
Inadequate Extension Service	61	62.2
Improper Packaging and Marketing system	61	62.2
Microbial Action	66	67.3
Poor policies	58	59.2

Source: Field Survey Data, 2019; *Multiple Responses Recorded

Table 3. Effect of post harvest loss of vegetable

Extent of post harvest loss	Frequency	Percentage
Reduction in Quantity	90	91.8
Low Income	85	86.7
Poor Nutrition	80	81.6
Death of Plants	49	50.0
Unemployment	29	29.6
Poverty	52	53.1

Sources: Field Survey Data, 2019; Multiple Responses Recorded

Table 4. Factors affecting post harvest losses among vegetable farmers

Factors	*Frequency	Percentage
Inadequate credit facilities	85	86.7
Improper handling especially storage	86	87.8
Inadequate marketing facilities	78	79.6
Poor shelf life	61	62.2
Inadequate good transportation system	66	67.3
Lack of good knowledge of packaging	57	58.2
Inadequate extension services	65	66.3
Effect of climate change	84	85.7
High cost of labour	57	58.2
Poor technologies	68	69.4
Menace of pest and diseases	88	89.8

Sources: Field Survey Data, 2019; *Multiple Responses Recorded

with [17] that temperature in both extremes is the main causative agent in affecting the post harvest period of horticultural perishables. Thus, amount of temperature in the horticultural produce during harvesting handling, transport and marketing is much higher than those recommended for quality maintenance of the produce due to continuous and high rate of respiration.

3.6 Strategies to Reduce Post Harvest Loss among Vegetable Farmers

The result in Table 5 shows that majority of the vegetable farmers identified strategies that can reduce post harvest loss of vegetables as provision of credit facilities by government (68.4%), adequate post harvest handling (87.8%), provision of good marketing outlet (82.7%), use of improved processing and preservation methods (91.8%), good infrastructural support system (81.6%), access to quality information on packaging (74.5%), provision of extension services (73.5%), use of varieties/tolerance to climate change (80.6%), use of farm combines/family labour (79.6%),

access to appropriate technologies (88.8%), use of pest/diseases resistance varieties (71.4%). This result implies that the vegetable farmers the major strategy that can reduce post harvest loss of vegetable is farmers the use of improved processing and preservation methods by the farmers and this can be achieved by vegetable farmers having access to appropriate technologies. Post harvest losses can be prevented by reducing the moisture content and proper packaging of vegetables during transportation of the vegetables due to their perishability. This corroborates the findings of [18] that provision of market for sales of vegetable until reduce the leaf, cucumber and others that are highly perishable. The finding is also in line with the study of [19] that vegetables need to be properly stored in terms of processing vegetable like tomatoes if processed into tomatoes paste if processing industries are available. The finding is in collaboration with the study of [4] who said that it is through extension service that agric innovations, agro-inputs and climate change information are dissemination to farmers.

Table 5. Strategies to reduce post harvest losses on vegetable

Strategies	*Frequency	Percentage	Rank
Provision of credit facilities by government	67	68.4	11 th
Adequate post harvest handling	86	87.8	3 rd
Provision of good marketing outlet	81	82.7	4 th
Use of improved processing and preservation methods	90	91.8	1 st
Good infrastructural support system	80	81.6	5 th
Access to quality information on packaging	73	74.5	8 th
Provision of extension services	72	73.5	9 th
Use of improved varieties / tolerance to climate change	79	80.6	6 th
Use of farm combines / family labour	78	79.6	7 th
Access to appropriate technologies	87	88.8	2 nd
Use of pest and disease resistant varieties	70	71.4	10 th

Sources: Field Survey Data, 2019; *Multiple Responses Recorded

4. CONCLUSION AND RECOMMENDATION

The study analyzed post harvest losses among vegetable farmers, the farmers in the study area experienced post harvest losses. The major causes of post harvest losses were due to pest infestation, diseases outbreak, lack of storage facilities, poor handling, harsh weather condition, inadequate extension service, improper packaging and marketing system and poor policies. Post harvest losses of vegetable pose serious threat to farmers because they have serious effect on them. The reduction in quality and quantity produced by the vegetable farmers made farmers to have low income, increase their hunger and malnutrition in farming household, all these thereby threaten their food security. Therefore, this study recommends that the agricultural engineers should intensify their effort in constructing machines that can help in harvesting the vegetables and constructing more storage facilities; the government should develop infrastructural support base for post harvest management that will facilitate safety, quality retention and reduce handling cost of losses; the extension agents should train the vegetable farmers on post harvest, processing and marketing technology.

CONSENT

As per international standard or university standard, respondents' written consent has been collected and preserved by the author(s).

COMPETING INTERESTS

Author has declared that no competing interests exist.

REFERENCES

1. Mbah P. Vegetable production: Alvan Ikoku Federal College of Education Owerri. 2003;1-4.
2. Vainio H, Bianchini F. Fruits and vegetables. Handbook for Cancer Prevention, the International Agency for Research on Cancer (IARC). Lyon, France: IARC Press. 2003;8.
3. Egwuonwu HA, Onyeaka BA. Utilization of organic farming practices among vegetable farmers in Owerri West L.G.A. of Imo State. International Journal of Agriculture and Rural Development. 2020;23(1):4871-4876.
4. Ibeawuchi II, Okoli NA, Alagba RA, Ofor MO, Emma-Pkafor LC, Peter-Onoh CA, Obiefuna JC. Fruits and vegetable crops in Nigeria. The gains, challenges and the way forward. Journal of Biology, Agric. Health Center. 2015;5(2):194-195.
5. Tomas-Barberan FA, Espin JC. Phenolic compounds and related enzymes as determinants of quality in fruits and vegetables. J. Sci. Food Agric. 2001;81: 853-876.
6. Idah PA, Ajiegiri ESA, Yisa MG. Fruits and vegetables handling and transportation in Nigeria. Au Journal of Transportation. 2007;10:175-183.
7. Kader AA. Postharvest biology and technology: An overview. In A. A. Kader (Ed.), Postharvest Technology of Horticultural Crops. University of California, Division of Agriculture and Natural Resources, Special Publication. 2002;3311:39-47.
8. Kitinaja L, Gorny JR. Post harvest technologies for small scale horticultural farmers and marketers: Economic

- opportunistic, quality and food safety. University of California Post Harvest Horticultural Series. 2010;21.
9. Gebru H, Belew D. Extent, causes and reduction strategies of postharvest losses of fresh fruits and vegetables. *A Review Journal of Biology, Agriculture and Healthcare*. 2015;5(5).
 10. Kitinoja L, Alhassan HA, Saran S, Roy SK. Identification of appropriate postharvest technologies for improving market access and incomes for small horticultural farmers in Sub-Saharan Africa and South Asia. Invited Paper in Three Parts for the IHC Postharvest Symposium Lisbon, August 23. *Acta Hort* (In Press). 2010;597.
 11. Gustavsson J, Cederberg C, Sonesson U, Vanotterdijk R, Meybeck A. Global food losses and food waste extent, causes and prevention. *FAO Report for INTERPACK*, FAO, Rome. 2011;38.
 12. Egwuonwu HA. Post-harvest management practices among rice farmers in Imo State Nigeria. *European Journal of Biology and Biotechnology*. 2020;1(4).
 13. Nigerian Population Commission (NPC). Nigerian Federal Government Initiative of individual head count. *Spread, State by State*; 2006.
 14. Adegboye RO. Land, agriculture and food security in Nigeria. 3rd Faculty Lecture, University of Ilorin, Nigeria; 2004.
 15. World Bank. *Missing food: The case of postharvest grain losses in Sub-Saharan Africa*. Washington, DC: The World Bank; 2011.
 16. Ekwunwe PA, Orewa SI, Emokara CO. E-sources use efficiency in yam production in Delta and Kogi States in Nigeria. *Asian Journal of Agric. Resources*. 2018;2:61-69.
 17. Kitinoja L, Al Hassan HA. Identification of appropriate postharvest technologies for improving market access and incomes for small horticultural farmers in Sub-Saharan Africa and South Asia. Part 1: Postharvest Losses and Quality Assessments. *Acta Hort (IHC 2010)*. 2012;934:31-40.
 18. Makhura T. Overcoming transaction costs barriers to market participation of small holder farmers in the Northern Province of South Africa. Unpublished PhD Dissertation, University of Pretoria Africa. 2001;48-49.
 19. Yenusi OT, Oguntade MI. Training needs of women vegetable farmers in Akinyele Local Government Area of Oyo State, Nigeria. *Tropical Agricultural Research and Extension*. 2014;17(1):38-44.

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