

VENDORS' PERCEPTION OF FACTORS INFLUENCING POSTHARVEST LOSSES AND MANAGEMENT OF FRESH VEGETABLE STORAGE AT THE TANO NORTH MUNICIPAL

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ABSTRACT

The study aimed to assess the vendors' perception of factors influencing postharvest losses and management of fresh vegetable storage in the Tano North Municipal of Ghana. The study used a purposive sampling technique to sample five markets from the Municipality and a convenience sampling technique to sample 100 vegetable vendors. A semi-structured questionnaire was used to collect data from vegetable vendors. Using a statistical tool for social sciences (SPSS), the data was edited, coded, and input into the computer to give a visual representation of the data, the data was presented in tables. The grounds and environmental service section of Tano North Municipal in Ghana's Ahafo Region granted permission to perform the study. The study revealed that lack of ready market, lack of transport, poor storage facilities, lack of training, heat, inappropriate application of chemicals, high prices tagged on vegetables by farmers' and bad nature of roads had substantial effects on fresh vegetable losses in the Municipality. It was also revealed that vegetable vendors store their fresh vegetables in cupboards and airy places. However, it is recommended that the Assembly should make provisions for good storage facilities at various markets to enhance the proper storage of fresh vegetables to minimise vegetable losses.

Keywords: Postharvest losses, Vendors perception, fresh vegetables, proper storage, Tano Municipality

INTRODUCTION

Vegetables are an essential food component of human diets and are largely preferred in their fresh state (Drechel et al., 2010). In several African cities, about 50-90% of fresh vegetables are supplied from urban and peri-urban production systems (Cofie et al., 2003). In Ghana, the growing population and demand for fresh vegetables by consumers have stimulated vegetable production in urban and peri-urban areas too (Probst et al., 2010). The production and marketing

of vegetables in Ghana provide alternative employment for many people (Obuobie et al., 2006). Which makes a great impact on livelihoods and food security? It is estimated by Cornish et al. (2001) that, more than 12,000 smallholder farmers are involved in vegetable farming during the dry seasons in and around Kumasi. Globally, there have been remarkable advancements in food production (FAO, 2011), however, post-harvest losses are still estimated at between 20 and 100% (Wilson, 2013) with postharvest losses of perishable crops in Ghana estimated to be ranging between 30 and 80% (Kitinoja and AlHassan, 2012). These losses are often due to poor post-harvest management systems as well as a lack of appropriate processing and marketing facilities. The worrying trend of vegetable losses in Ghana often gradually wears away great gains made in production. Generally, vegetables are transported from farm to urban markets for onward distribution across their value chain. However, the limited availability of refrigerated transport and cool storage systems makes vegetable distribution cumbersome (Cofie et al., 2003). Poor handling contributes to postharvest losses using certain common practices or failure in adopting known useful practices that could reduce losses and help maintain produce quality and safety. Most of these improper practices and conditions cannot be labeled technical problems as they cannot be solved by initiating new research (Kitinoja and Kasmire, 2002). Horticultural produce is alive and has to stay alive long after harvest, once harvested and separated from its sources of water and nourishment, it must inevitably reach senescence (Jobling, 2002; Siddiqui and Dhua, 2010). The role of postharvest handling is to delay that death for as long as possible to extend shelf life and reduce loss. Often, postharvest losses take time to develop and the specific cause of quality problems may not be fully understood by produce handlers along the chain (Kader, 2002).

Storage and Transport of Vegetables

Local produce, often characterized by seasonal production, its small volume, and short transport distance, could require fewer storage facilities and technology. In this case, the lead time between harvesting and customer sale could be limited to less than a day. It is important to know that effective distribution of the produce is more important than its preservation in storage. Storage, on the other hand, is a tactic for maximizing profits. The produce can be held temporarily to overcome fluctuations in supply and demand (Lopez Camelo, 2004). Transport to roadside stands and product display at roadside stands or farmers' markets can often result in produce being exposed to direct sunlight, warm or even high temperatures, and low relative humidity levels. Rapid water loss under this condition can cause fruits and vegetables to deteriorate (Suslow, 1997). By providing postharvest cooling before and during transport and a shading structure during display, the produce will last longer.

Loss of Freshness in Produce of Vegetables

The keeping and the preparation of fresh produce after harvest affect its nutritional value in several ways, for example, Dry matter content (the energy supply) is reduced with time as the food reserves within the produce are depleted while biological activities continue. Vitamin C content decreases with time after harvest, and little may remain after two or three days. The enhancement of produce shelf life and the maintenance of quality will require careful manipulation of the storage environment or conditions (Maalekuu, 2008). Many growers know

how to increase yields but do not pay sufficient attention to the quality of the produce, leading to low market value. Many handlers unknowingly contribute to postharvest losses by using common practices or by not using certain practices known to reduce losses and help maintain produce quality and safety. Each example above is considered an improper practice since it has definite negative effects on fresh produce, leading either to increased waste and losses, quicker quality deterioration, or food safety problems (Kitinoja and Kashmire, 2002). Most of these improper practices and conditions cannot be labeled “technical problems,” and they cannot be solved by initiating new research projects or simply by extending existing well-proven technical information. Often, postharvest losses take time to develop, and the specific cause of quality problems may not be fully understood by produce handlers along the chain. Other times, the handler may deliberately choose not to use a practice known to protect produce because of its cost or because consumers perceive the practice as undesirable. On occasion, a lack of reliable supplies, market information, or other infrastructural problems may make changes in handling impractical. Postharvest losses and changes in quality affect both the volume and perceived value of produce as it moves from the field to its final destination market, and any changes in practices will also have an effect. Part of any potential technical solution, therefore, is a consideration of the socioeconomic, cultural, and institutional constraints facing growers, handlers, and marketers when they attempt to make changes in the way they handle and market horticultural crops (Kitinoja and Kashmire, 2002).

Postharvest Loss of Vegetables

Quality deterioration results in partial or total loss of fresh produce. It is predisposed by several interacting factors, which may be preharvest, harvest, and/or postharvest origins, such as poor crop variety, unfavourable climate, inadequate cultural practices, lack of harvesting techniques, improper handling, and poor storage conditions. Non-technological factors also contribute to the postharvest loss, such as lack of capable human resources, lack of knowledge about technical and scientific technologies, inefficient commercialization and marketing systems, there is a lack of logistical support and an enabling policy for the use and administration of human, economic, technological, and scientific resources. Postharvest losses of vegetables vary with commodity, location, growing season, and other factors such as standards of quality and consumer preferences, and purchasing power, which differ greatly among countries and across cultures (Kader and Rolle, 2004). Losses of fresh fruits and vegetables after harvest can reach extremely high levels, depending on the species, harvest procedures, storage time, marketing conditions, and so on. Losses are particularly high in underdeveloped countries (almost 50%) and most of them are due to pathogen attacks (Wilson and Wisniewski, 1989).

METHODOLOGY

The research employed both qualitative and quantitative methods. A descriptive design was used to conduct a study on vegetable vendors in Tano North Municipal to determine vendors' perceptions of factors influencing postharvest losses and management of fresh vegetable storage, with the goal of accurately and systematically describing a population situation or phenomenon. The study took place in the Tano North District of Ghana's Brong Ahafo Region. Tano North District is one of the 22 administrative districts that make up Ghana's Brong Ahafo Region. It was formed in 2004 from the Tano North District, with Duayaw-Nkwanta as its administrative capital. In the north-east and southwest, it borders the Ashanti Region's Offinso and Ahafo-

Ano Districts. The District's population is growing at a pace of 2.4 percent per year. The District is located in a semi-equatorial zone with two (2) rainy seasons (major and minor). Agriculture is the most common occupation in the District, accounting for around 64.4 percent of the overall workforce. Fresh vegetable merchants from Tano North Municipal made up the study's population. The study employed both purposive and convenience sampling techniques. In the Tano North Municipality, five markets were purposefully chosen: Torchiere, Afrisipa, Yamfo, Bomaa, and DuayawNkwanta. Because there was no sampling frame for vegetable sellers, the markets were chosen based on the presence of a significant number of vegetable vendors. Respondents were included based on their availability and willingness to participate. For this reason, a total of 100 vegetable vendors were chosen for the study, 20 from each market, who were conveniently available and assessable. The data was collected from the respondents using a semi-structured questionnaire. Using a statistical tool for social science, the data was edited, coded, and input into the computer (SPSS). To give a visual representation of the data, the data was presented in tables. The grounds and environmental service section of Tano North Municipal in Ghana's Ahafo Region granted permission to perform the study.

RESULTS AND DISCUSSIONS

Demographic Characteristics of Respondents

The results of the respondents' socio-demographic characteristics are presented in this section (vegetable vendors). The information received from the surveys was presented, analyzed, and discussed to provide context for discussing the findings in light of the study's goals and aims. Respondents were asked to provide information about their gender, age group, educational level, and marital status on a questionnaire. Table 1 summarizes the outcomes collected. Table 1 shows that 92 % of respondents were females, whereas 8% were males, based on the gender distribution of respondents. This indicates that the vegetable selling business is controlled by women, thereby favoring them; also, females are more likely to follow appropriate hygiene practices due to their hygienic household management. This contrasts well with Drechel et al., 2006 & Cofie et al., 2005, who found that women in Ghana and Burkina Faso dominated vegetable marketing and had improved their hygienic handling of them. The age of the respondents has a big impact on whether they adopt or reject hygienic methods and how they handle fresh veggies (Karanja et al., 2010) In terms of the age distribution of respondents, the table shows that those between the ages of 26 and 30 years old made up 22%, 44% were within 21-25 years and 34% were within 31 years and above, therefore, respondents within 21-30 years were very active and are like to practice hygiene in handling vegetables.

The educational level of the respondents as presented indicate that 55% of the respondents were basic school leavers, 31% had secondary education, 8% with no formal education and 6% had tertiary education. However, the majority of the respondents 55% were basic school leavers which are likely to affect their hygienic practices. The table shows that 67% of the respondents were married, while 33% were single. Because married respondents are more likely to notice higher sanitary practices during vegetable selling because it is always observed in their varied houses, married respondents are more likely to observe higher hygienic practices during vegetable vending.

Table 1: Demography of respondents

Variables	Frequency (f)	Percentage (%)
Gender		
Male	8	8%
Female	92	92%
Total	100	100%
Age		
26 – 30 years	22	22%
21 – 25	44	44%
31 years and above	34	34%
Total	100	100%
Educational Level		
Basic School	55	55%
Secondary School	21	21%
No formal Education	8	8%
Tertiary Education	6	6%
Total	100	100%
Marital Status		
Married	67	67%
Single	33	33%
Total	100	100%

Source: field survey, 2020

Means of Storage of fresh Vegetables by Vendors

Proper and safe storage of vegetables is fundamental in keeping them healthy (Drechel et al., 2006). Concerning vendors storing vegetables under the tables at the market, 61% strongly agreed, with 1.73 as the mean. Meaning most of the vendor's produce was stored under the table at the market, therefore, affecting their hygienic practices in handling vegetables. Indeed, studies have shown that the generally unkempt environment at the various markets in which vegetables were kept could expose them to all sorts of pathogenic carriers including cockroaches, houseflies, mice, and rats (Kosoy et al., 2015; Ahamadu et al., 2016) in the same vein, 59% with 2.76 as mean of the respondents agreed that the storage environment can affect the quality of vegetables, this is in line with other studies which shown that generally unkempt environment in which vegetables were kept can expose them to all sort of pathogenic carriers. Concerning using unfit boxes and containers to store vegetables shows more than half 52% strongly agreed, 27% agreed, 11% neither agreed nor disagreed and 10% strongly disagreed with the mean of 1.89. This indicated the respondent’s low level of hygiene in terms of storage containers and boxes which is more likely to affect their practices in terms of hygiene. This study support Amoah et al 2014, who observed that there were few clean storage containers and boxes for vegetable storage, however, vendors have to store their vegetables in any available containers or boxes regardless of their hygienic condition. Findings of unsold vegetables stored were prone to damage by rodents revealed 50% strongly agreed, 31% agreed and 19% disagreed, with 1.80 as

the mean. This implies that 50% of the respondents were ignorant about the effect of storing the remains of their produce at the market after-sales. This is supported by Amoah et al (2011), who stated that poor storage, poor environment, and personal hygienic practices potentially open vegetables to further contamination. When respondents were asked whether the quality of vegetables can be compromised when stored in an unhygienic environment, 59% agreed, 21% strongly agreed, 15% neither agreed nor disagreed, 4% disagreed and 1% strongly disagreed, with 2.05 as the mean. This implies respondents were a bit cautious about things that can affect the quality of vegetables during storage and is confirmed by a study conducted by Amoah et al (2016), who observed that one of the main sources of vegetable contamination is market-related handling practices among vegetable sellers, particularly where provisions of better sanitary standard such as better storage place is lacking. Findings from if vegetable vendors should handle vegetables gently before, during, and after-sales revealed 70% strongly agreed, 2% agreed, 18% neither agreed nor disagreed and 10% disagreed, with 1.68 as the mean. This is an indication that most vendors highly understood the acceptable way of handling vegetables at every stage during the marketing and are most likely to practice which will improve their hygienic ways of handling vegetables, however, this contradicts a study by Kutto et al (2011) who indicated that postharvest and retail handling of vegetables were the main cause of pathogenic contamination of fresh vegetables and vendors are ignorant about it. Findings on whether vegetables were stored in open wooden boxes and kiosks revealed, that 53% strongly agreed, 30% neither agreed nor disagreed and 17% disagreed, with 2.11 as the mean. This is an indication that more than half of the respondents had nothing against storing vegetables in open wooden boxes and kiosks which might have negative implications on their hygienic practices, this is supported by Abass et al (2017) who stated that some vegetable vendors store their produce in open wooden boxes and kiosk without considering their hygienic effect on consumers. Respondents were further asked if vegetable vendors should be given education on how to store vegetables before, during, and after-sales, 64% strongly agreed, 16% agreed and 20% disagreed, with a mean of 1.56. This implies that respondents understood the essence of proper storage of their produce much more and are likely to store their vegetables well due to their in-depth interest in gaining education on proper storage of vegetables. This is not in line with Ahamadu et al (2016) who observed that most vegetable vendors are not interested in educating themselves on how to handle their produce at various markets. With regards to means of storing fresh vegetables by vendors, it was revealed from the mean of means, thus 2.06 that fresh vegetables were not stored very well. However, there should be the provision of good storage facilities at our various markets, and supervision of sanitary inspectors should be enhanced for proper storage of our fresh vegetables by vendors.

Table 2: Means of Vegetable storage

VARIABLES	SA		A		NAD		D		SD		Mean \bar{x}	Total
	f	%	f	%	f	%	f	%	f	%		
Vegetables are stored in an open wooden boxes and kiosk	53	53.0	0	0	30	30.0	17	17.0	0	0	2.11	100
Storage environment can affect quality of vegetables	0	0	59	59.0	11	11.0	25	25.0	5	5.0	2.76	100
Unsold vegetables stored are prone to damage by rodents	50	50.0	31	31.0	0	0	19	19.0	0	0	1.80	100
Containers and boxes used to store unsold vegetables are dirty and unfit for vegetables	52	52.0	27	27.0	11	11.0	0	0	10	10.0	1.89	100
Most unsold vegetables got rotten due to poor storage	61	61.0	15	15.0	19	19.0	0	0	5	5.0	1.73	100
Most unsold vegetables are kept under the table in the market	61	61.0	12	12.0	20	20.0	7	7.0	0	0	1.73	100
Vegetables should be handle gently before, during and after sales	70	70.0	2	2.0	18	18.0	10	10.0	0	0	1.68	100
Vegetable vendors should remove injured and damaged unsold vegetables before storage	18	18.0	22	22.0	51	51.0	9	9.0	0	0	2.51	100
The quality of vegetables can be compromised when stored in unhygienic environment	21	21.0	59	59.0	15	15.0	4	4.0	1	1.0	2.05	100
Some vendors stored their vegetables in the open in order to keep them fresh	16	16.0	24	24.0	17	17.0	41	41.0	2	2.0	2.89	100
Vegetable vendors should be given education on how to store vegetables before, during and after sales	64	64.0	16	16.0	0	0	20	20.0	0	0	1.56	100

SA = Strongly Agreed, A= Agreed, NAD= Neither Agreed Nor Disagreed, D= disagreed, SD= Strongly Disagree

Factors Influencing Postharvest Losses of fresh Vegetables

The researchers looked at the elements that influence fresh vegetable postharvest losses in Tano Municipal. It is seen that lack of ready market, lack of transport, poor storage facilities, lack of training, heat, inappropriate application of chemicals, high prices tagged on vegetables by farmers’ and bad nature of roads had substantial effects on fresh vegetable losses in the Municipality, as shown in Table 3. 55% of the respondents strongly agreed that lack of ready market contributes to fresh vegetable losses while 28% also agreed to the statement; 20% of the respondents neither agreed nor disagreed to the statement. This could be because farmers after harvesting their produce suffer a lot to get ready for market. Regarding transportation, 83% of the respondents strongly agreed that they do not get a means of transportation to transport their produce to the market, 10% agreed with this statement while 7% were not sure. It is seen from the findings that lack of transport is the most contributing factor to vegetable losses. Respondents asserted that farmers find it difficult to get their produce transported from the farm to the market due to unavailability of transport and in the end, leave their produce at the mercy of sun, rain, and birds.

Concerning the poor storage facilities for fresh vegetables, 90% of the respondents strongly agreed that poor storage facilities are the greatest contributing factor to vegetable losses, 6% of the respondents also agreed that vegetable losses could be attributed to poor storage facilities while 4% were neither agreed nor disagreed to the statement. The findings revealed that the greatest contributing factor to vegetable losses is poor storage facilities. In a question on whether

the bad nature of roads could be a contributing factor to vegetable losses, 80% of the respondents strongly disagreed, 10% strongly agreed, 2% agreed and 8% of respondents neither agreed nor disagreed to the question. The findings show that the bad nature of roads is not the main contributing factor to vegetable losses. On whether heat contributes to vegetable losses, 70% of the respondents strongly agreed that heat contributes to vegetable losses, 15% agreed while 15% also were not sure. It is proven from the findings that heat contributes to vegetable losses.

On whether inappropriate application of chemicals could lead to vegetable losses, 14% of the respondents strongly disagreed, 22% agreed, 15% did not agree nor disagree and 48% strongly disagreed with the statement. It was observed that even though the majority of the respondents have said that inappropriate application of chemicals does not contribute to vegetable losses, in some ways, it does. On whether High prices tagged on vegetables by farmers contribute to postharvest losses of vegetables, 55% of the respondents strongly agreed that it is a contributing factor because farmers price their products high which vendors are unable to buy, at the end left to rot due to their perishability in nature. Vendors emphasised that training is another major factor contributing to vegetable losses. 72% of the respondents said that when farmers' are trained in agriculture, they get in-depth knowledge and understanding to translate the theory into practice. 20% of the respondents agreed while 8% disagreed with the statement.

These findings agree with Issahaku (2012), who stated that postharvest loss is caused by insufficient infrastructures such as poor roads, storage facilities, and limited access to credit facilities. Yeboah (2011), in his research, found out that the poor state of the roads in the Brong Ahafo Region makes transporting tomatoes from supply locations to sales terminals difficult, time-consuming, and expensive for tomato producers. 76 percent of farmers and traders in the area agreed with this. Kader (1984) also opined that the time spent transporting fresh tomatoes from the farm gate to market areas can result in losses. Adarkwa (2011) stated that improper harvesting procedures and management lead to postharvest losses of vegetables.

Table 3: Factors influencing Postharvest Losses of fresh vegetables

VARIABLES	SA		A		NAD		D		SD		Mean \bar{x}	Total
	f	%	f	%	f	%	f	%	f	%		
Lack of ready market	52	52.0	28	28.0	20	20.0	0	0	0	0	1.68	100
Lack of transport	83	83.0	10	10.0	7	7.0	0	0	0	0	1.24	100
Poor storage facilities	90	90.0	6	6.0	4	4.0	0	0	0	0	1.14	100
Bad nature of roads	10	10.0	2	2.0	8	8.0	0	0	80	80.0	4.36	100
Heat	70	70.0	15	15.0	0	0	15	15.0	0	0	1.60	100
Inappropriate application of chemicals	14	14.0	22	22.0	15	15.0	48	48.0	1	1.0	3.00	100
High prices tagged on vegetables by farmers'	55	55.0	15	15.0	0	0	30	30.0	0	0	2.05	100
Lack of training	72	72.0	20	20.0	0	0	8	8.0	0	0	1.36	100

SA = Strongly Agreed, A= Agreed, NAD= Neither Agreed Nor Disagreed, D= disagreed, SD= Strongly Disagree

Conclusion

The study assessed the vendors' perceptions of factors influencing postharvest losses and management of fresh vegetable storage in the Tano North Municipal. The study concludes that lack of ready market, lack of transport, poor storage facilities, lack of training, heat, inappropriate application of chemicals, high prices tagged on vegetables by farmers' and bad nature of roads had substantial effects on fresh vegetable losses in the Municipality. It was also revealed that vegetable vendors store their fresh vegetables in cupboards and airy places. However, it is recommended that the Assembly should make provisions for good storage facilities at various markets to enhance the proper storage of fresh vegetables by vendors

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