

Appraisal of Marketing of Hot Pepper and the Effect of Post- Harvest profit Losses to Farmers in Two Local Government Areas of Yobe State, Nigeria.

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Abstract

The survey assessed the appraisal of marketing of red pepper (*Capsicum chinense*) in two (2) Local Government Areas namely Geidam, Yunusari areas i.e. Balle-Gallabba and Mozayun, Geidam, Yobe State. The primary data used for the investigation were obtained through the use of questionnaire. Investigative Survey Research Approach (ISRA) and descriptive statistics were employed in the analysis of the data. The results obtained revealed that most of the tomatoes, ball and hot pepper farmers experience losses of 10-30 % during harvesting and transportation stages. Based on these findings, it was recommended that farmers in these areas require proper and extensive training on how to reduce their losses especially through proper pre-harvesting and post-harvesting practices like primary processing in times of glut and the introduction of some important easy-to-use technologies that will reduce if not eliminate fruits and vegetables wastages in the areas.

Key words; postharvest, pepper, losses, assessment and farmers

Introduction

Red Pepper is the largest produced vegetable and is widely use in all our traditional cuisines and culinary preparations not only in Yobe state, Nigeria but all around the world. Red pepper constitutes an important kitchen item for daily use. It is a fact that Nigeria is blessed with rich farmlands and subsequent good harvest each year. The country is one of the leading producer of pepper, plantain, onions, okra and other vegetables that ware grown in its diverse agro-ecological zones that range from humid in the south to sub-humid in the middle belt and semi-arid/arid zone in the north yet, producers are lost at an alarming rate of 30-50% yearly by poor pre and post-

harvest practices (Charles 2009). However, there is need to store and preserve these farm produce to forestall the seemingly global food epidemics. It has also been pointed out that to achieve self-sufficiency in foods, there is an urgent need to match all efforts at increasing crop production with equal if not greater efforts of post-harvest technology to save the crops that are produced from deterioration and wastages (Olayemi et.,al 2010, Adeniyi, 1977, Agboola, 1980). Especially Hot pepper (*Capsicum chinense*) are important commodity for the preparation of many local dishes in Nigeria. It plays a major role in providing vitamins and minerals for humans (Smith, 1994) and also serve as raw materials for our industries. The production of bulk of the fresh pepper fruits in Nigeria especially aroma of variety is in the Northern part of the country whereas the consumption and utilization are done all over the country. They are either used fresh or processed into paste, puree, ketchup etc. Unfortunately, the fruit is seasonal but highly perishable and deteriorate few days after harvest, losing almost all their required quality attributes and some could likely result to total waste. Although post- harvest loss estimate figure for fruits and vegetables are difficult to substantiate especially in developing countries like Nigeria, it is however estimated that losses as high as about 40 – 50% of hot pepper are lost at post-harvest stage every year (Okunoya, 1996). The losses which most often are not caused by insect pests but by microbial infection, physiological breakdown due to natural ripening processes and environmental conditions such as heat, drought. Furthermore, improper postharvest sanitation, poor storage and packaging practices and mechanical damage during harvesting, handling and transportation resulting from vibration by undulation and irregularities on the road mechanical can enhance wastages (Olayemi et.al Jones 1991, Idah et. al., 2007). It is distressing to note that much is being devoted to planting crop, so much resources spent on irrigation, fertilizer application and crop protection measures only to be wasted in few days after harvest, therefore this survey was conducted in order to source for information (extent of such losses, mode of transporting it to retailers, the type of technologies used and what the farmers do with their produce in times of glut) on the post-harvest challenges they face. (Olayemi, F.F. et, al.2021).

Objective of the study

The general objective of the research is to ascertain red pepper crop production in Geidam LGA, Yobe state of Nigeria and how it plays a significant role in the overall supply and demand

situation considering its role in improving the economic wellbeing and means of livelihood of the host communities. And, the secondary objectives of the study are;

1. To short list all the prevalent production and marketing constraints of red pepper.
2. To provide feedback to researchers and extension workers.
3. To look in to the various effort(s) made if any by the Government (i.e. Federal, State &Local Governments) and Quasi-government agencies in red pepper production, storage, distribution and marketing
4. To study current red pepper marketing channels used by the farmers in order to find out the constraints/problems of its marketers in the market.
5. To study the level of post-harvest losses of red pepper in between production and marketing to the end users.

Research question

In pursuance of the above stated objectives, the study raised and answered a number of questions which are;

1. What are the list of the prevalent production and marketing constraints of red pepper?
2. How can feedback be provided to researchers and extension workers?
3. What are the various effort(s) made if any by the Government (i.e. Federal, State &Local Governments) and Quasi-government agencies in red pepper production, storage, distribution and marketing?
4. What are the current red pepper marketing channels used by the farmers in order to find out the constraints/problems of its marketers in the market?
5. What is the level of post-harvest losses of red pepper in between production and marketing to the end users?

Methodology

The survey was conducted in two (2) Local Government Areas namely, Geidam, Yunusari, Yobe State, Nigeria. Yobe State is in the sub-saharan along the river Yobe, where vegetation is very close to the boundaries of Niger (Fejokwu, 1992) A total of one hundred and twenty-five (125) farmers which were randomly selected with the help of extension workers of FADAMA

and Irrigation Programme staffs were interviewed altogether in the two Local governments; they are specifically in hot and bell pepper farming with so many years of experience. The survey was conducted using Investigation Survey Research Approach (ISRA) (Olayemi et. al., anzodo 1986 as quoted in Chukwu (1994).

Information was collected using structured questionnaire which sought for the following information: harvest time, loss during harvest, mode of transportation and packaging systems. The study also took some personal observation to get salient information that would help identify problems faced by the farmers. Statistical Analysis and the tools of analysis used for this study is descriptive statistics. These involve the use of simple percentages.

Literature review

Long pepper is grown widely during the wet and dry seasons. However, yields are much higher during the dry season because of fewer incidences of pests and diseases. Prices of red pepper tend to oxalate during the dry season before harvest begins, due largely to the inability of the farmers to store the highly perishable crop. Dry season production of pepper is on the increase due to the provision of more irrigation facilities all over the country, although Red pepper has been grown in Nigeria for a long time, the yield is still low compared to other regions of the world. The reason for this is because, improved production practices based on research findings have not been made available to the generality of farmers (NAERLS-ABU,2014).

As an item of world trade, red pepper ranks third in importance after tomatoes and onion among the vegetables. In 1987, the total world export production amounted to over 2.0 million metric tons and worth over 299 million US dollars. World production of red pepper has increased steadily from about 10 million metric tons produced on an area of nearly 0.8 million hectare in 1969 to over 20 million metric tons produced on an area of above 1.8 million hectares in 1987. These figures represent and percent increases in total production and at as respectively(NAERLS-ABU,2014).

The 1962-1968 development plan was Nigeria's first national plan. Among several objectives, it emphasized the introduction of more modern agricultural methods through farm settlements, co-operative (nucleus) plantations, supply of improved farm implements (e.g. hydraulic hand

presses for oil palm processing) and a greatly expanded agricultural extension service. Some of the specialized development schemes initiated or implemented during this period included: (i) Farm Settlement Schemes; and (ii) National Accelerated Food Production Programmed (NAFPP), launched in 1972. There were also a number of agricultural development intervention experiments, notably (i) Operation Feed the Nation, launched in 1976; (ii) River Basin and Rural Development Authorities, established in 1976; (vii) Green Revolution Program inaugurated in 1980; and (viii) The World Bank-funded Agricultural Development Projects.

While each of the above programs sought to improve food production, the ADPs represented the first major practical demonstration of the integrated approach to agricultural development in Nigeria. The experiment which started with World Bank funding, with projects at Funtua (1974), Gusau (1974) and Gombe (1974), blossomed into Ayangba (1977), Lafia (1977), Bida (1979), Ilorin (1980), Ekiti-Akoko (1981) and Oyo-North (1982) agricultural development projects. Following successful negotiations for multi-state agricultural development projects with the World Bank, each state of the country, and the federal capital, Abuja, now has one ADP. The years since the early 1960s have also witnessed the establishment of several agricultural research institutes and their extension research liaison services. Some of the major institutions are:

Agricultural Extension and Research stock production and fisheries production in Nigeria Liaison Service (AERLS) at the Ahmadu Bello University, Zaria in recent years. Established in 1963; (ii) The International Institute of Tropical Agriculture (IITA), at Ibadan and; (iii) International Livestock Centre for Africa (ILCA) (A.D. Since Independence, 2014).

Red pepper is the world's second important vegetable ranking after tomatoes. It is the most common spice type which is produced for both commercial and consumption purposes due to its great role in flavoring, food coloring and source of vitamins and minerals. It is also an important cash crop for households and 68% production is for commercial purpose in Amhara region of Ethiopia.

Vegetable production and marketing is becoming the most common activity in the agricultural sector of the country following high emphases given for the development of irrigation system by the Ethiopian government to small-scale commercial farmers. According to Haji (2008), the major share (1.4 million tons) of vegetable and fruits is consumed locally and only 4.5% of the

total production is exported to international market. Similarly, Ethiopian vegetable and fruit products are mainly traded to the regional markets, but 90% of exported output was exported to neighboring countries like Djibouti and Somalia (EHDA 2012). Moreover, export earnings (value) of vegetable and fruit has increased from 31.7 million dollars (base year of GTP) to 45.7 million dollars in the year 2013/2014 (MoA 2014). Vegetable production has a significant role in reducing poverty through generating income, improving the nutrition status of the people and employment generation. According to Lumpkin et al. (2005), vegetable production is a labor-intensive task and generates high employment opportunities for different classes of households. However, in most of the developing countries including Ethiopia, production of horticultural product is seasonal in nature and price is inversely related to the amount of supply. This implies that during the peak season, prices decline and vice versa. The situation is worsened by the perishability of the products and poor storage facilities. Thus, 25% of the product is damaged along the marketing channel before reaching the final consumers (Emana and Gebremedhin 2007).

Pepper is an important vegetable and spice crop which was originated in Mexico and Central America regions and subsequently spread into Africa and Asia. It is the world's most important type of spice which provides nutritional value to consumers, particularly vitamin A and E, flavoring and coloring food (Boseland and Votava 2000). In Nigeria, red pepper is an important spice and vegetable crop which is mainly produced by smallholder farmers in Amhara, SNNPRS and Oromia regions (EEPA 2008). Similarly, the share of Amhara region in the total production of red pepper in the country constitutes 65%, next to Southern Nations, Nationalities, and Peoples' Region (SNNPRS), which produces about 30% of the total production in the country. Moreover, an average 75% of pepper production is for commercial purpose in the region (CSA 2008). Furthermore, the main processed product of red pepper, oleoresin, is exported to different countries and the spiced ground is supplied to Ethiopian local markets. Oleoresin that is used for food coloring is extracted from red pepper for export purpose. The deep red-colored cultivars have a very high processing demand in Ethiopian local market (EEPA 2008). Pepper is also the most common food which is added in most Ethiopian traditional meals (Roukens and Tamrat 2005). Therefore, agricultural market plays a significant role to deliver such products to consumers at right time with right price (Dessie et al, 2019).

Agricultural marketing is the main driving force for economic development and has a guiding and stimulating impact on production and distribution of agricultural produce. However, the Ethiopian agricultural output markets are characterized by poor infra- structure, small numbers of trader, lack of credit access, high handling and marketing costs, imperfect market information between buyers and sellers and weak bargaining power of farmers (Haji 2008). Similarly, in the absence of advanced marketing system, smallholder farmers are forced to sell and supply a large volume of agricultural product to the market at low prices (Thakur et al. 1997). Therefore, the poor agricultural marketing system, disease and unstable price of pepper discourage farmers to produce more agricultural products including red pepper. Similarly, the major factors that affect marketable supply of red pepper were market distance, quantity of pepper produced, frequency of contacts with extension agents and access to market information (Mussema 2006). Despite the significance of pepper in Ethiopian economy and the current income-generating capacity of pepper for the small- holder producers as compared to its magnificent potential in the country, it has not been given due attention. Moreover, red pepper in Amhara.

pepper is highly consumed not only in regular dishes but in other ceremonial events. In Geidam region, there is a high potential of red pepper production but the storage facilities, transportation, linkages with traders, quality controlling mechanisms, market information and price settings are weak and need to be further investigated (BoA 2017).

Results and discussion

Table 1: Selected characteristics of respondents

Variables	Frequency	Percentage (%)
GENDER		
Male	125	100
Female	0	0.00
	125	100
AGE GROUP		
20 to 30 years	10	8
31 to 40 years	30	24
41 to 50 years	54	43.2
51 years and above	29	23.0
	125	100.00
EDUCATIONAL STATUS		

None	80	64
Primary	25	20
Secondary	10	8
Tertiary	10	8
	125	100.00
FARM SIZE		
1 to 2 hectares	0	0.00
3 to 5 hectares	25	20
6 to 8 hectares	45	36
9 hectares and above	55	44
	125	100.00
BAGS PRODUCED/HEAD/SEASON		
1 to 9 bags	0	0.00
10 to 20 bags	20	16
21 to 40 bags	50	40
41 bags and above	55	44
	125	100.00
FARMERS TURN-OVER		
₦200,000 to ₦ 400,000	110	88
₦410,000 to ₦ 600,000	12	9.6
₦610,000 to ₦1,000,000	3	2.4
₦1.100.000 and above	0	0.00
	125	100.00
PROBLEMS ENCOUNTERED IN RED (LONG) PEPPER PRODUCTION		
Farm/Land	10	
Workers/Laborers	25	
Pesticide/Insecticide/Herbicide	90	
	125	100.00
MARKETING CHALLENGES ENCOUNTERED		
Transportation		40
Distribution channel	50	36
Storage facility	45	24
Agents/Buyers issues	30	25
	125	100.00
INTERVENTION FROM GOVERMENT OR QUASI-GOVERNMENT		
Yes	35	10.26
No	90	72
	125	100.00
TYPES OF INTERVENTION RECEIVED		
Chemicals: Insecticides, Herbicides, Pesticides etc.	33	12.50
Fertilizers	70	45.84
Water pumps	22	41.67
	125	100.00

FARMERS MARKETING STRATEGY BEEN ADOPTED		
Selling of 10 bags each month	12	9.6
Selling of 20 bags each month	5	3.2
Selling of ¼ of Product	8	6.4
Selling of 1/3 of Product	10	8
Selling of 1/2 of Product	20	16
Selling of all Product instantly	40	32
Selling of the Product in good price	25	20
Indifferent	5	4
	125	100.00
TYPES OF STORAGE FACILITY IN USED		
Traditional	81	64.8
Modern	10	8
Both	34	27.2
	125	100.00
RED PEPPER BEEN SPOILED AFTER POST-HARVERT TREATMENT		
1 to 10%	32	25.6
11 to 20%	81	64.8
21 to 30%	12	9.6
31 to 40%	0	0.00
41% and above	0	0.00
	125	100.00

Source; Author`s field survey (2020)

Discussion

Table-1 reveals that all of the respondents 125(100%) are males and that entails that red pepper production is predominantly men`s world, and which mean that women need to be encourage and venture into it.

Most of the respondents fell between 41 to 50years of age of which 54(43.2%), followed by 31years to40 (24%) and those of age 51 and above years are (23.2%) of the respondents, that`s to say in summation the age bracket between the 41 to 50years is 43.2% and which signifies the presence of an active population which saves as a morale booster to the entire red pepper crop production and marketing.

The educational status was classified as those with none formal education, those with elementary/primary education, those with secondary education and those with any kind of tertiary education and were the result reveals that (60.25%) are with no any such formal education what so ever, then 52(41.60%) arethose with primary education and 31(24.80%) are those with secondary education and lastly only 10(8%) of the respondents acquires some form of

tertiary education training, which entails majority of the farmers are none formally educated or are illiterates and that would automatically retard production process as a result of their low mobility, awareness and exposure.

The farm size was term as the area of jurisdiction in which the individual farmers do cultivate their red pepper, and here 54(33.20%) of the respondents do cultivate between 6 to 8hectres of land and followed by 61(48.80%) of the respondents that cultivate between 9hectres and above, while those that utilized between 3 to 5hectres are 42(33.60%) of the respondents and none of respondents cultivates between 1 to2hectres of land. Therefore the result indicates that 103(82.02%) cultivates significantly moderately large area of land for this purpose.

The production level which entails the number of red pepper bags produced per head per season is of utmost important in the economic advancement of the individual farmers and the whole community by extension. The above table also reveals that those produced between 21 to 40 bags of red pepper per head per season are 54(43.59%) of the respondents which is closely followed by those farmers that produced between 52 bags and more constitutes 53(42.74%) and none of the respondents produces less than 10bags of red pepper per head per season. Therefore 108(86.33%) of the respondents produced between 21bags of red pepper and above which signifies a production potential for the farmers.

The farmers income from the proceeds of red pepper are categorized as those that have between ₦200,000 to ₦300,000; those between ₦310,000 to ₦400,000; those between ₦410,000 to ₦500,000; and those of ₦510,000 and above as the total turn-over from the red pepper proceeds at the four (4) cultivation sites of Belle, Gallaba, Kalgeri, Mozogun, Western Bank and Eastern Bank of river Yobe in Geidam and Yunusari LGA of Yobe state. The table reveals that none of the farmers or respondents has the turn-over of ₦1000,000 and above and also in the same vein 117(94.02%) of the respondents are of the turn-over of between ₦200,000 to ₦400,000 per season and this entails a very low turn-over going by the farm size and number of bags of red pepper produced.

Most of the problems encountered by the farmers in red pepper production are pesticides, insecticides, herbicides, water pumps etc. which are also refer as farm inputs or requirements, are inadequate or totally absent and were 107 (86.09%) of the respondents are dwelling with these problems; while the problems of Land/Farm 11(8.97%) of the respondents and Workers

problems are 26(4.25%) of the respondents and this entails financial incapacitation on the side of the farmers and would automatically retard yield and marketing process.

The marketing challenges being experience by the respondents are categorized in this study as: Transportation, Distribution, Storage facility, and the Agents/Buyers predicaments. Most of the severe marketing challenges been suffered are the transportation problem, were 61(76.25%) of the respondents witnessed it, and closely followed by storage facilities inadequacy, were 34(42.50%) of the respondents suffers. The Agent(s)/Buyer(s) problems that which culminates 30(37.50%) of the respondents and none of the respondents are of the problems of distribution channel what so ever. Therefore, the transportation and storage facility problems which are capital intensive are beyond the reach of a poor farmers and marketers to deal with. Therefore, many of them have no any option but to disposed all or almost all of their onion crops immediately after harvesting or buying without timing and waiting for the favorable price. The fire brigade approach in selling-off leads to poor turn-over and therefore saved as a disincentive to actively participates in the next and next cropping season.

The intervention received by the red pepper producers and marketers from the government at all the three (3) levels, quasi-government agencies or aid related organizations is a discouraging one, because among the 125(100%) respondents only 24(12.83%) of the respondents have benefited one kind of intervention or the other like, the insecticides, pesticides, herbicides, fertilizers, water pumps etc. from above mentioned agencies. The intervention to assist the poor farmers/marketers in this aspect, which is a matter of urgent importance and need to vigorously pursue greatly by all and sundry, in other to boost onion production in the four (4) sites, Geidam, Yunusari, and Yobe state by extension.

Among the assistance been rendered to the farmers are those provided with chemicals are 13(16.25%) of the 24 respondents which is the least and those with water pumps are 10(12.25%)of the 24 respondents benefited from the intervention, and the one with the highest intervention from 24 respondents are those benefited from fertilizers which are 11(13.75%) of the 24 intervention respondents.

Marketing strategies adopted by these farmers are: selling of all their produce immediately after harvesting are 69(30.64%) of the respondents, then followed by those only selling their produce when only they deem it satisfactorily with the market price and they were 41(N17.52%) of the respondents, then followed concurrently those selling of ten (10) bags each month and those

selling half ($\frac{1}{2}$) of all their total produce are 32(13.68%) each, and in summation 64(27.36%) of the 125 respondents. Followed at far those disposing only one quarter ($\frac{1}{4}$) of their produced were 11(4.70%) of the respondents. Those that are indifferent among the seven (7) options of market strategies were 10(4.27%) of the respondents and those taking one third ($\frac{1}{3}$) of their produce to the market, and only leaving rest until the market price appreciated to their level of satisfaction were 10(4.27%) of the respondents, and lastly, those that only and only take 20bags each month all through were 9(3.85%) of the respondents. Critically, looking at the marketing strategies been adopted by the red pepper farmers in Geidam and Yunusari LGA of Yobe state is an uncalled one because they almost disposed-off their produce to the market immediately after harvesting where its entails that those selling all their produce immediately after harvesting 89(38.03%), those selling half ($\frac{1}{2}$) of their total products were 32(13.68%) and those selling one thirds ($\frac{1}{3}$) of their products instantly were 10(4.27%) of the respondents and in summation those taking substantial part their onion crop to the market those taking half and those one thirds of their produces are 70(55.98%) of the total 125 of the respondents. Looking at the facts and figures reveals by the table-1 is worrisome which depicted that 55.98% of the respondents are not hesitating what so ever to disposed-off their produce to the market immediately after harvesting and this ultimately jeopardized their standard of living and their continuation in red pepper production/marketing and all these was seriously been affected due to lack of or inadequate modern storage facilities to reckon with. Referring to the Table-1, would make us to understand that 53(65.81%) of the respondents are only using self-traditional storage means and 24(29.49%) of the respondents are utilizing the modern means of storage and only 10(8.12%) of the respondents are utilizing both the traditional and modern means of storage. Looking in Toto with the storage means of the farmers there is also another effect which is the multiplier effects that affects the percentage of the storage onion crops after a period or duration of storage were 181(77.35%) of the respondents suffers between 11% to 20% of the post storage losses, followed by 42(17.95%) of the respondents that suffers between 1% to 10% post-harvest losses and 11(4.70%) of the respondents suffers 21% to 30% of the post storage losses.

The essence of on-farm structure/facilities like a fruit shed is to reduce field heat i.e. pre-cooling. Pre-cooling (end point =12.50C/550F) is the first step in good temperature management. The field heat of a freshly harvested crop—heat the product holds from the sun and ambient temperature—is usually high and should be removed as quickly as possible before transporting,

processing, or storage (Janet and Richard, 2000). Stored food reserves are lost with this heat which means less food value, loss of flavor, loss of salable weight, and more rapid deterioration (Wilson et. al. 1995). Most vegetables require low temperatures and high humidity, two factors that don't come together easily (Janet and Richard, 2000). The optimum relative humidity is between 90.95%, high relative humidity is essential to minimize poor harvest quality and prevent water loss (desiccation). Extended periods of higher humidity or condensation may encourage the growth of stem-scar and surface mold on tomatoes (Trevor and Marita, 1996). Their level of loss during harvest as indicated in Table 3 revealed a huge loss of about 18% of hot pepper. This high percentage can be reduced by adopting primary processing method. Primary processing is the conversion of an unstable perishable produce into stable long lasting one like the dehydrating of bell and hot pepper paste, puree, pepper etc. Vegetables destined for processing and storage should be as free as possible from skin breaks, bruises, spots, rots, decay, and other forms of deterioration (Mary, 1997). Bruises and other mechanical damage not only affect appearance but provide entrance to decay organisms as well (Janet and Richard 2000). Though there are several packaging containers used for packing fresh produce for long distance. It was observed from this survey that baskets, jute bags and sack bags with mango leaves are the most common containers used for transportation as indicated in Table 4. The baskets are categorized according to their sizes which also serve as pricing unit in the marketing of the produce.

On the whole, none of the handlers and farmers uses the plastics crate which was designed by Food and Agriculture Organization (FAO) and Nigerian Stored Product Research Institute (NSPRI) to prevent physical damage to produce and is easy to handle as packaging containers. hot pepper had about 10% loss during transportation as indicated in Table 3. Table V indicates that the main mode of transportation is by road and this involves the use of open and closed lorry (including buses), 62% of them

The results of the responses as to how the farmers have been in the farming business of fresh produce shows 25%, 12.5%, 50%, 12.5% of them have been handling the produce for over 30, 20, 10 and less than 10 years respectively as indicated in Table 1, the farmers level of experience shows that they are vast in the system and so the information obtained from them is largely a true reflections of the farming system. Again, poor management and inadequate knowledge of good farming practices have been known to affect post-harvest quality of fruits and vegetables

especially tomatoes with high moisture content adversely (Agboola, 1980). The stage of harvest is shown in Table 2 where 75% of respondents harvest their produce when fully ripe. Quality cannot be improved after harvest, only maintained, therefore it is important to harvest fruits and vegetables at the proper stage and at peak quality (Wilson et. al., 1995). Harvest produce when they are mature green because they can tolerate rough handling better than the ripe ones and can stay longer during storage. Hot pepper and tomatoes are mostly harvested by hand, so care should be taken to avoid mechanical damage which can be an entry point of microorganisms and insects. Mechanical damage also increases loss of moisture content (Wilson et. al.

1995). The rate of moisture loss may be increased by as much as 400% by a single bad bruise on tomatoes, pepper; they become shriveled after losing only a small percentage of their original weight due to water loss. Water loss represents salable weight loss and reduced profits. (Wilson et. al., 1995).

Table 3 shows the time of harvest in which 25% of the farmers harvest anytime of the day especially when there is a buyer, 45.8% harvest in the morning so that it can be transported to the market for sale, 16.7% in the afternoon and 12.5% in the evening. Harvest should be completed during the coolest time of the day (at about 200 C) which is usually in the early morning or evening and should be kept shaded in the field to remove field heat (Mary, 1997).

Table 4 shows that 90% of the farmers keep their produce under tree shade until buyers from another town or city come to pick them, 10% have little farm structures like a small hut for keeping their produce. The essence of on-farm structure/facilities like a fruit shed is to reduce field heat i.e. pre-cooling. Pre-cooling (end point =12.50C/550F) is the first step in good temperature management. The field heat of a freshly harvested crop—heat the product holds from the sun and ambient temperature—is usually high and should be removed as quickly as possible before transporting, processing, or storage (Janet and Richard, 2000). Stored food reserves are lost with this heat which means less food value, loss of flavor, loss of salable weight, and more rapid deterioration (Wilson et. al. 1995). Most vegetables require low temperatures and high humidity, two factors that don't come together easily (Janet and Richard, 2000). The optimum relative humidity is between 90.95%, high relative humidity is essential to minimize poor harvest quality and prevent water loss (desiccation). Extended periods of higher humidity or condensation may encourage the growth of stem-scar and surface mold on tomatoes (Trevor and

Marita, 1996). Their level of loss during harvest as indicated in Table 3 revealed a huge loss of about 18% of hot pepper. This high percentage can be reduced by adopting primary processing method. Primary processing is the conversion of an unstable perishable produce into stable long lasting one like the dehydrating of bell and hot pepper paste, puree pepper etc. Vegetables destined for processing and storage should be as free as possible from skin breaks, bruises, spots, rots, decay, and other forms of deterioration (Mary, 1997). Bruises and other mechanical damage not only affect appearance but provide entrance to decay organisms as well (Janet and Richard 2000). Though there are several packaging containers used for packing fresh produce for long distance. It was observed from this survey that baskets, jute bags and sack bags with mango leaves are the most common containers used for transportation as indicated in Table 4. The baskets are categorized according to their sizes which also serve as pricing unit in the marketing of the produce.

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use open lorry either for long or short distances. Most of the mechanical damage to fresh tomatoes and peppers results from the vibrations and impacts received by the produce (Singh and Singh 1992), these vibrations are as a result of the irregularities of the road surfaces which are transmitted through the suspension systems of the vehicles to the produce. Also, the use of good packaging material that will not restrict ventilation, will not allow the produce to rest directly on each other and will be easy to carry should be adopted for use (Mary, 1997).

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CONCLUSION

Based on the results and observations made during the survey, it seems the current farming system of hot pepper is inadequate. The farmers lack some fundamental knowledge and facts about post-harvest handling practices. It also revealed that the level of young people with less than 10 years of farming experience is low indicating that farming is being replaced by white man's collar job. This survey revealed some of the problems the farmers face, such as lack of suitable packaging containers, farm structure and so on.

Therefore, the following recommendations are made:

1. Provision of extension services on post- harvest to the farmers by extension agent of ADP with relevance research inputs.
2. Adopt technologies of some research institutes that will benefit them
3. Provision of farm structures and materials relevant to post-harvest handling and their adoption.
4. Encourage youths to farm by making resources available.

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