

Postharvest systems of selected vegetables in the upper east and west regions of Ghana

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ABSTRACT:

Every Ghanaian household uses eggplant, okra, onion, pepper and tomato as well as other leafy vegetables. Its widespread usage had led to wide cultivation using different soil types. Pockets of spoilage predominate during favourable seasons. Postharvest losses up to about 50% have been documented for some of these perishables. Interventions in the postharvest subsector were in the past oriented towards isolated technical solutions with subsequent dissemination. In this survey using a structured questionnaire, the whole set of operations within the chain from production to consumption was studied for the two upper regions of Ghana. Production was basically during the dry season when there was no major farming active for the main staples. Tomato and onions had high premium thus were the main vegetables grown. Cultivation was done near dams, waterbeds or dugout for source of irrigation. The drudgery involved in cultivation restricted production to lower acreage and basically men.

Keywords:

postharvest system, perishables, vegetables, upper regions, Ghana.

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INTRODUCTION

Vegetable crops are very important nutritionally for contributing vitamins, roughage and flavour in human diets. They serve to thicken soups and increase the bulk of stews (Abbiw, 1997). Vegetable crops especially eggplant, okra; onion, pepper, tomato and leafy vegetable are practically used in every Ghanaian household and thus, playing an important role in the farming systems. Most peasant and small-scale farmers produce one or more type of vegetable within their farming system. This, especially for the peasant farmer, is basically consumed domestically whilst the excess is sold. Meanwhile, there are small to medium scale farms where vegetables are produced commercially.

The widespread cultivation coupled with its high perishability, bad road network, and lack of efficient and reliable transportation system leads to pockets of spoilage especially during the harvest season. This leads to huge economic losses for some of the farmers. It is estimated that postharvest losses of perishable crops in Ghana range between 30-80% (Kitinoja *et al.*, in press). Pre-harvest factors significantly affect the levels of post-harvest losses of perishable crops (FAO, 1977; Wills *et al.*, 1981; Coursey, 1983).

Physical and quality losses of vegetables 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 (Kitinoja *et al.*, 2011; Kitinoja *et al.*, in press). These losses in turn lead to loss of market value, concerns about food safety, and lower incomes for growers.

In order to resolve the extensive postharvest losses in several of these vegetables, it is important to understand the farming practices that might be responsible for such losses. The objective of this study therefore was to obtain information on the postharvest problems associated with the cultivation of major vegetables by examining the current farming practices that might have contributed to them.

MATERIALS AND METHODS

Survey areas

The survey was conducted in some selected major vegetable growing areas spanning six districts in the Upper East and West Regions. The selected areas were Bolgatanga, Kassena-Nanakana and Bawku East in the Upper East Region and Lawra, Wa and Jirapa-Lambusie districts in the Upper West

Region. In total, one hundred and twenty farmers were interviewed.

Questionnaire design

A questionnaire, designed using a mixture of open and close questions was used for the survey. Some of the variables considered in the design included demographic characteristics of the farmers such as age, gender, number of years in farming, and educational background. The questionnaire also explored production and postharvest issues such as size of farm, land tenure system, sources of labour, irrigation water and seeds, fertilizer and pesticide type and availability, time of harvest, sorting packaging and marketing. Problems of processing and storage were also looked at (Casley and Lury, 1981).

Questionnaire Administration

The questionnaire was first pretested in the Ga West district, data obtained were analysed and based on the results, modifications were made to the questionnaire. The modified questionnaire was administered to the farmers in the selected areas (Ellis *et al.*, 1998).

Data analysis

Statistical analysis was carried out on the data obtained from the survey using the PASW Statistics version 18 (SPSS Inc., Chicago, IL., USA). Descriptive statistics were used to describe the data and cross tabulation with Chi-square test of independence used for testing associations between some variables.

RESULTS AND DISCUSSION

The vegetation of the Upper East region is mainly Sudan and Guinea savanna, whilst that of Upper West region is largely Guinea savanna agroecological zone. These vegetation types cover 54% and 3% of Ghana respectively for Guinea and Sudan savanna (Seini and Nyanteng, 2003). The results of the study are shown in Figs. 1-7. Vegetables in the two Upper regions are grown basically by men. Among the vegetable farmers 96.3% of them were men, with only 3.7% being female farmers. This was basically due to drudgery involved in the fetching of water from the dams, ponds and dugouts as a source of irrigation. Vegetables are mainly cultivated after the main farming season when the rainfall pattern is erratic. These agroecological zones, together with the Coastal savanna in the south, receive the least mean annual rainfall in Ghana. The Guinea savanna zone records a mean annual rainfall of 1,100 mm while the Sudan savanna receives 800



mm of rainfall annually (Seini and Nyanteng, 2003).

The minimum age of respondents was twenty years whereas the oldest was seventy years. However, 47% of the vegetable farmers were within the active age for farming i.e. 21-50 years as shown in Fig. 1. The bulk of the respondents (68.5%) were illiterate whilst the highest level of education was at senior secondary school for 9.1% (Fig. 2). The land tenure system being operated in Upper East

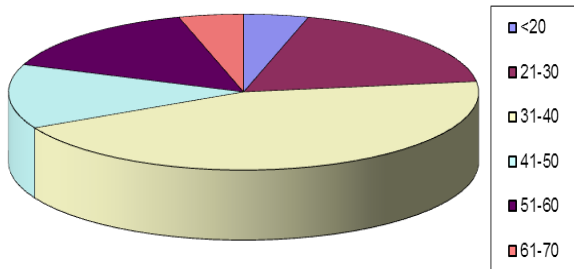


Fig. 1: Distribution of age group of vegetable farmers of Upper East and Upper West regions of Ghana

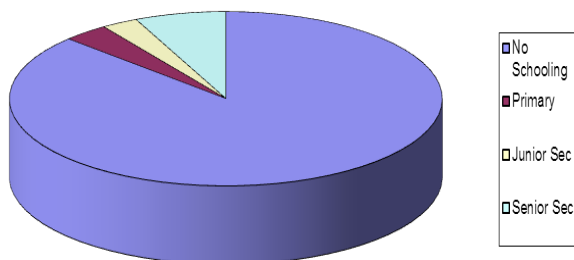


Fig. 2: Distribution of educational level of vegetable farmers in the Upper regions of Ghana

and Upper West regions is 73% and 100% farmer-owned respectively (Fig. 3) although land availability was 52% and 79% in the Upper East and Upper West region respectively. In the Upper East region due to the Tono and Veve dams commercial cultivation of tomato and okra occurs, although 27% of land used was rented or leasehold. Family labour (100%) was used in the Upper West region but it was readily available (76%), however, in the Upper East region 76% of labour used was from the family whilst 24% was pooled and hired labour. These were completely available when needed (100%) (Fig. 4).

In the two Upper regions, the cultivation of the main vegetables were tomato, onion, pepper, okra

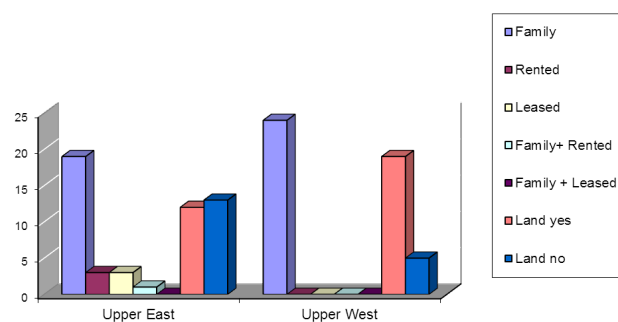


Fig 3 Distribution of Land tenure and availability of vegetable cultivation in the Upper regions of Ghana

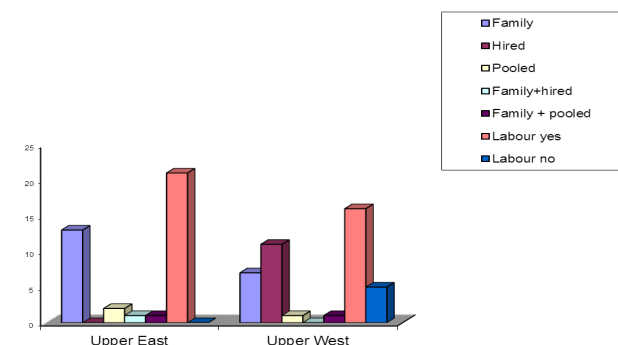


Fig. 4: Distribution of labour type and availability for vegetable cultivation in the Upper regions of Ghana

and eggplant at 32%, 25.6%, 24%, 13.3% and 8.5% respectively (Fig. 5). Leafy vegetables grown in the regions varied from district to district and centre to centre. The farmers used own collection (37%), certified seed sellers (32%), friends (13.9%), market (7.7%), extension officers (7.7%) and others (1.5%) as a source of planting material (Fig. 6).

The results of the study also showed that

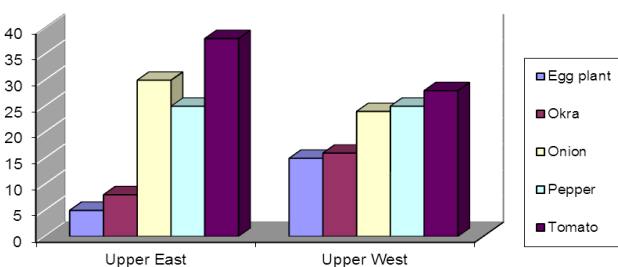


Fig. 5: Type of main vegetables cultivated in Upper regions of Ghana

different kinds of agro-chemicals are used in the cultivation of these vegetables. These ranged from

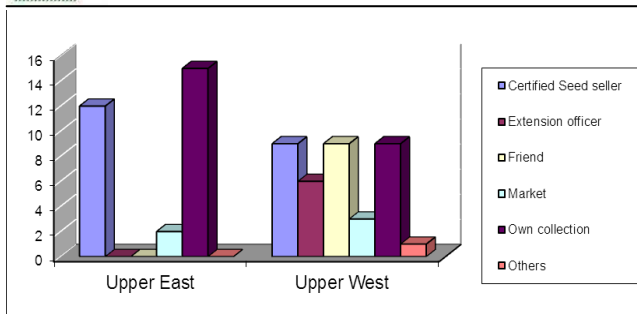


Fig. 6 Source of vegetable seeds for cultivation in the Upper regions of Ghana

the conventional fertilisers comprising mainly of NPK 15:15:15 (46%), sulphate of ammonia (38%), and organic manure as cow dung (16%). In the tomato growing areas, other chemicals such as Uden (Propoxur), Karate (Lambda cyhalothrin), Dithane M-45 (Mancozeb), etc. were used. Application of fertilizer is on an average of two times per growing period but could be more depending on the farmer. Farmers, for various reasons, used agro-chemicals. However, the basic reasons were to increase yield or prevent insect and disease infestation. High abuse of agro-chemical was observed with the tomato-producing farmers.

Seventy percent (70%) of the farmers harvested their vegetables in the mornings. This is due to the fact that the buyers usually arrived in the evenings or dawn. But is instructive to note that temperatures are low in the mornings, as high temperature increases rate of enzymatic catalysis and biochemical breakdown of compounds in the vegetables (Yoshida *et al.*, 1984; Beaudry *et al.*, 1992; Exama *et al.*, 1993), hence handling vegetables in the mornings help to keep the harvested product fresh. Onions were harvested at any time when ready since they were always left on the field to cure. The only postharvest activity of the vegetables under consideration was to sort out the badly damaged ones before packaging. Tomato fruits (98%) were packaged in boxes (Ellis *et al.*, 1998), whilst onion, eggplant and pepper were packed in jute bags. At times, pepper and egg plants were also packed in poly-sacks. However, okra fruits were always packed in baskets. In certain places especially from the farm-gate to the marketing centres, vegetables could be packed in raffia baskets (Quaye *et al.*, 2009). The only postharvest problem the farmers had was ready market with guaranteed price for their produce especially during the glut season where they made economic losses.

The farmers did not keep proper record, thus it was difficult to determine yields, production cost and the profits realised. Invariably labour was not costly since was provided by the families and pools. The use of organic matter as cow dung (16%) was also not costly. The study estimated the average total cost of vegetable production per acre (\$/acre) in the Upper West regions as 39.84, 41.04 and 96.24 for Lawra, Wa and Jirapa-Lambusie districts respectively. The total cost of vegetable production per acre for Upper East region was \$151.87, \$162.53 and \$48.93 for Bolgatanga, Kassena-Nankana and Bawku East districts respectively (Fig. 7). It was observed that the farmers using tractor services for ploughing and pumps to irrigate their farms contributed high production cost to tools as compared to those using machetes, hoes, buckets and skins. However, the plot productivity was higher for those who had higher average total cost since they also invested in fertilizers and chemical insecticides.

Chi-square test of some variables in the survey data shows that the experience of the farmer significantly ($P < 0.01$) influenced their mode of sale of the produce and the problems encountered at

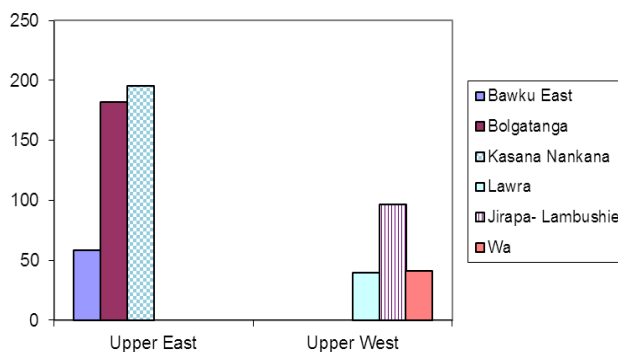


Fig. 7: Production cost (\$/acre) in selected districts of the Upper regions of Ghana

harvest ($P < 0.05$).

CONCLUSION

The results obtained from the study showed that the prime objective of the farmers is to easily dispose of produce with subsequent premier guarantee prices. Processing or storage of the vegetables is not of high priority to farmers but the farmers used indigenous low level technology to preserve their vegetable especially peppers and okra. However, with tomato production, the farmers were prepared to add value to the produce upon



setting up of cottage industries by the district assemblies. It must be cautioned that not all varieties of vegetables, especially tomato, could technically be used and be financially feasible.

Informed opinion now suggests increased emphasis on conservation of resources after harvest, rather than endeavouring to further boost up crop production, as this would appear to offer a better return for the available labour, energy and capital resources, it is important therefore, to critically study the distribution chain of the major vegetables especially tomato, eggplant and okra.

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