

**Post-harvest handling and perception of
loss among fresh tomato retailers at five
marketing centres in Accra, Ghana**

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Summary

This is a report on a survey to assess how fresh tomatoes are handled and stored by retailers at five of the main marketing centres in Accra. The report related the perception of the losses in the fruits as well as their profitability among the tomato retailers to the present post-harvest handling and storage practices used at the marketing centres. The survey revealed that nearly 95 % of respondents would welcome any means of improving the handling and storage of tomatoes at the marketing centres. However analysis of the relationship between their net profit / loss and the amount they would have to spend on such improvements revealed that the present handling and storage practice do not influence the level of losses. A number of suggestions have been made that could help improve the post-harvest handling of fresh tomatoes by the retailers and farmers.

Key Words: Retailers, tomatoes, markets, handling and storage practices, economic losses

Table of Contents

| | |
|---|----|
| SUMMARY | 1 |
| TABLE OF CONTENTS | 2 |
| INTRODUCTION | 3 |
| METHODOLOGY | 5 |
| 2.1 <i>Questionnaire Development</i> | 5 |
| 2.2 <i>Estimation of Non-Marketable Tomato</i> | 6 |
| RESULTS AND DISCUSSION | 7 |
| 3.1 <i>Biodata, Background and Scale of Operations</i> | 7 |
| 3.2 <i>Tomato Varieties Sold at the Marketing Centres in Accra</i> | 7 |
| 3.3 <i>Handling and Storage Practices</i> | 8 |
| 3.4 <i>Analysis of Economic Losses</i> | 13 |
| REFERENCES..... | 19 |
| <i>Questionnaire on Tomato Handling and Storage at Marketing Centres in Accra</i> | 20 |

Introduction

The tomato fruit is one of the most commercially important fruits in Ghana because of its rich source of vitamins A and C. Though records indicate that annual production of tomato is reasonably high (Ghana Agricultural Outlook, 1988), there is a perennial shortfall in the supply of the fruits. This has been attributed to poor handling, storage and distribution of tomato by farmers and retailers (Eyeson *et al.*, 1979). A tomato glut during and immediately after the two harvest periods (August to October and January to March) is a common occurrence. Attempts to solve the problem of seasonal glut by commercial processing has unfortunately not been successful. Three tomato processing factories, Pwalugu, Wenchi and Nsawam Canneries, set up in the country in the past have failed to effectively utilise the excess tomato available at the end of the season. A number of reasons account for this. Prominent among them is surprisingly the market. The factories faced stiff competition from imported and well-known brands of processed tomato products. Since most Ghanaians use un-processed tomato on a large scale, improving the post-harvest handling and storage practices during marketing of fresh tomatoes is still important. That way the economic viability of the tomato industry will be sustained. However any improvement schemes must be such that it would be embraced by the tomato farmer and retailer. This means the scheme to improve the post-harvest handling and storage of tomatoes must be technologically and socio-economically acceptable to the tomato farmer and retailer. A preliminary study is therefore needed to establish what is acceptable as loss to the farmer and retailer before implementing any improvement schemes. Harris & Lindblad (1978) has pointed that post-harvest loss is usually a subjective phenomenon. What one may consider as a loss may not be a loss to another person. Thus, it is likely that a tomato farmer and/or retailer's perception as regards losses in tomatoes will

influence the extent she is prepared to welcome any improvements in the post-harvest handling and storage for tomatoes. The objective of this study were:

- i. To determine the losses incurred by tomato retailers during the marketing of tomatoes.
- ii. To assess whether the present handling and storage practices used in the marketing of fresh tomatoes in Accra were influenced by the level of losses the retailers were prepared to tolerate.

2.1 Questionnaire Development

The study was undertaken between January, 1988 and December, 1989 at the main five wholesale markets in Accra: 31st December, Makola, Kaneshie, Tema Station and Salaga (Offroad). The leaders of the tomato retailers' associations of the five markets were initially contacted and the rationale behind the project explained to them. Subsequently, the markets were visited periodically in alternate days for a month to observe and discuss with the retailers the operations and losses in the handling of tomatoes. A questionnaire was then drawn up for the survey.

The survey was undertaken between January to March, 1988 and repeated in May to August, 1989 and repeated once again from September, 1989 to February, 1990.

Two questionnaires were used (see Appendix 1). One was on the handling and storage practices for fresh tomatoes and the second on the sale of tomatoes. The answers given to the questionnaires were confirmed by personal observation by the research team.

At each market and during each survey period, twenty tomato retailers were chosen as respondents to the questionnaire. The main criterion used for the selection of retailers was that they must have been a tomato retailer for at least two years. The answers given by the respondents were corroborated by personal observation by the survey team.

Methodology

Two methods were used in this study. The first was an assessment of the post-harvest handling and storage practices used in the marketing centres using questionnaire. The second method was the estimation of the percentages of non-marketable tomatoes.

2.1 Questionnaire Development

The study was undertaken between January, 1988 and December, 1989 at the main five marketing centres in Accra: 31st December, Makola, Kaneshie, Tema-Station and Salaga. Officials and leaders of the tomato retailers' associations of the five markets were initially contracted and the rationale behind the project explained to them. Subsequently, the markets were visited regularly in alternate days for a month to observe and discuss with the retailers the operations involved in the handling of tomatoes. A questionnaire was then drawn up for the survey.

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2.2 Estimation of Non-Marketable Tomato

2.2.1 Method, Background and Scale of Operations

The estimation of non-marketable tomatoes was based on the analysis of the physical defects using the methods of Musa & Thompson (1976). 30 kg of fresh tomato (equivalent to one medium-sized basket) was bought every two-week from the same retailer in each of the five marketing centres. Approximately, 20 kg of the tomato was randomly selected and sorted immediately into five groups comprising: Undamaged (representing the control), Physiologically damaged, Pathologically damaged, Mechanically damaged and Non-marketable portion. These various categories were expressed as a percentage of the initial weight.

2.2.2 Tomato Varieties Sold at the Marketing Centres in Accra

The survey revealed that the most popular varieties of tomatoes sold at the five marketing centres were Piroball (locally referred to as *Wagawaga*), Heinz (*Cherrytomato*) and Roma (*Cherrytomato*). Most varieties used at best, these tomatoes could remain in good marketable condition for 4-5 days. According to the retailers, the Piroball variety had the shortest shelf-life. The ripening stages of most tomatoes sold were between the reddish-yellow to table-red colour. At this stage of ripening, the shelf life is indeed short. However, if properly handled and stored, the fruits could be in marketable condition for at least a week. From the survey, it was evident that a number of factors contributed to the rather short shelf-life. Table 2 gives a summary of the causes identified. The lack of ice buckets and storage facilities for storing fruits left at the end the day as well as poor washing and cleaning were found to be major factors contributing to the rather short shelf life. Improving the shelf-life improve the shelf-life of the tomatoes.

Results and Discussion

3.1 Biodata, Background and Scale of Operations

A total of 95 respondents, from the 5 marketing centres, were interviewed by the authors. All respondents were women who have been selling tomato for the past two years or more. Table 1 gives the average number of crates of tomato sold by respondents from the various marketing centres.

3.2 Tomato Varieties Sold at the Marketing Centres in Accra

The survey revealed that the most popular varieties of tomatoes sold at the five markets in Accra were Fireball (locally referred to as *Wosowoso*), Heinz (*Akumadan*) and Roma (*Nerving*) varieties. Most retailers said at best, their tomatoes could remain in good marketable condition for only three days. According to the retailers, the Fireball variety had the shortest shelf-life. The ripening stage of most tomatoes sold were between the reddish-yellow to table-red colour. At this stage of the ripening, the shelf-life is indeed short. However, if properly handled and stored, the fruits could be in marketable condition for at least a week. From the survey, it was evident that a number of factors contributed to the rather short shelf-life. Table 2 gives a summary of the causes identified. The lack of techniques and storage facilities for storing fruits left at the end the day as well as poor sorting and cleaning were found to be major factors contributing to the rather short shelf-life. To improve the shelf-life of the tomatoes, the following factors should be considered:

Table 1 Number of crates of tomato sold each week at the five marketing centres, expressed as a percentage of respondents (each crates weighs 62 kg)

| Name of Market | Number of Crates of Tomato sold each week (as percentage of number of respondent at each market) |
|----------------|---|
| 31st December | 9 |
| Makola | 8 |
| Kaneshie | 5 |
| Tema -Station | 3 |
| Salaga | 3 |

3.3 Handling and Storage Practices

3.3.1 Sorting and Cleaning

Table 2 shows that sorting and cleaning were best done at the 31st December market, 78% of the retailers said on receipt of the crates of tomatoes they undertook first to sort good quality tomatoes from the poor ones. Next, the fully ripped and relatively softer ones were separated from the half-ripped and harder ones. Each lot of good tomatoes was well cleaned by a dry and clean cloth. The fully ripped ones were then arranged on a flat circular displaying board for sale. The poor quality tomato was usually divided into either two or three parts depending on the state of deterioration. For example, those with few cuts and bruises were also cleaned and arranged at different parts of the displaying board. Those which happened to have lots of cuts (mechanical) and with the juice oozing out (pathological) were usually washed and sold cheaply. At the other markets especially the Kaneshie Market Complex, the practice was slightly different. About 65 % of the retailers said they sorted out the good quality tomatoes from the poor ones. A further 10 % took the trouble to clean water onto the tomato to wash away any adhering dirt,

after they had been arranged on the displaying board. This practice was unhealthy since it made the tomato much more vulnerable to microbial attack. In addition, the sprinkling of water onto the fruit promoted cracking of its skin (physiological damage).

The retailers appeared not to be motivated to present the fruits in excellent conditions given the fact that most buyers appear not to be so bothered about the quality of the tomato. Thus, there is premium to be gained in proper sorting and cleaning. Retailers at the other centres explained that they buy their fruits from the leaders of the tomato retailers of the markets where some amount of prior sorting had been done. However in most cases it was evident that this prior sorting had not been done properly. With the aim of maximising the profit, poor-quality tomatoes were usually mixed with the good ones. A crate full of tomatoes usually had good-quality fruits arranged in the first two to three layers, then in the mid section would be a collection of poor ones.

3.3.2 Storage facilities for tomatoes at the markets

In the survey, it was evident that there were no purpose-made storage facilities at any of the markets for the storage of tomatoes or indeed any other perishable crop. A store which had facilities for temperature reduction as well as adequate ventilation can help to improve upon the keeping qualities of any perishable produce. For tomatoes a store as simple as one cooled to a temperature regime about 10 to 15 °C, relative humidity of about 80 to 85 % and adequate ventilation will be the best to hold the fruits in good conditions overnight at the marketing centres. The reduced temperature coupled with air circulation will help remove most of the respiratory heat as well as the heat the tomato acquired during the day because of its exposure to the sun during the daytime. The high humidity will help to ensure that the rate of loss of water from the fruits were reduced to a minimum.

The best means of achieving the optimum storage discussed above will be by providing refrigerated facilities. However such facilities cannot be justified economically. Moreover there may be many problems with maintenance. It is therefore necessary to look for other methods of storing the fruits. Perhaps a more appropriate technique would be the use of what has been referred to as the "ice-less" refrigerator. This works on the principles of evaporative cooling. In the survey, the present practice of storing the fruits remaining at the end of the day was such that it rather accelerated the deterioration of the fruits. Surprisingly, this problem appeared not to be worrying most of the retailers. Table 1 reveals that about 45 % of those interviewed were not providing good storage for fruits remaining could help increase the number of days in which the fruits will remain in good marketable condition.

3.3.3 Containers Used and Handling Procedures during off-loading

Any container to be used for handling such perishable fruits such as tomatoes must be able to fulfil a number of important functions. These include:

- To contain the produce; usually keeping a number of them together and thus enabling handling during transportation from the farm-gate to the marketing centres.
- To protect the produce as much as possible against hazards during transportation, like adverse weather and bruising on impact.

To achieve second condition, the principle of immobilising the fruits within the container has been recommended (Procter & Tindahl, 1983) to prevent transit injury problems. The most popular container, for tomato transportation, found during the survey was a rectangular wooden crate measuring 600 mm long, 400 mm wide and 400 mm deep. It was constructed out of soft wood,

with wall of about 20 to 25 mm thick. Usually the crate had one or two small lateral openings of about 50 mm.

The crate which, on the average could hold about 50 kg of medium-sized tomatoes had the advantage of being able to be stacked on top of each other.

It was observed that in some cases no padding was put at the base (or in between) to help reduce the compressive force experienced during transportation. If this always done it help reduce the extent of crushing that the bottom layers of tomatoes experienced during transportation from the farm-gate to the marketing centres.

It also appeared that the size of the crate was rather too big. Some did not have the holes or slits openings at the base to allow any fluid collecting in the crate to run out. The crates were usually filled to the very top, and since the packed crates were assembled on top of each other, considerable damage was caused to the tomatoes at the bottom layers. This was the in addition to the poor ventilation accelerated spoilage.

The practice involved in off-loading tomatoes from trucks at the marketing centres was found to be very poor. Instead of carefully of lifting the crates each at a time, what was happened was that one of the driver's assistant would mount onto the truck and off-load by gently throwing the crates one at a time to a second assistant standing beside the truck. The rather careless handling aggravated compression and abrasion which all go the damage the fruits. Whilst doing this there were usually spillage of some fruits on the ground. These were collected, some unwashed into wheelbarrows and taken to the sheds where they were kept. It was quite obvious that such improper handling practices not only increased mechanical damage but also allowed dirt to get into the fruits which facilitated microbial attack. When pointed out to retailers that their careless handling added to the problem of loss, 58 % agreed with this. However, 45 % of the respondents

explained that they did not entirely lose because fruits with minor cuts were still marketable, though at a reduced price.

3.3.4 General Sanitation

If the level of post-harvest losses in fresh tomatoes during marketing could be reduced to appreciable extent, a lot had to be done about the state of sanitation at the markets. From the points of assembly of the crates of tomatoes immediately after off-loading to the actual selling points within the market complexes, sanitary conditions were found to be in very poor state. It was common to find used, unwashed crates lying very close to crates of fresh tomatoes in some places, especially in the Tema Station Market. Table 1 indicates that most retailers do not appreciate that good sanitary conditions could help reduce their losses. Again perhaps, the fact that most buyers appear not to complain about the insanitary conditions could be one factor not motivating the retailers and market officials to improve upon the sanitation around them.

Table 2 Percentages of respondents agreeing to the cause of losses during the sale of tomato

| | Cause | Frequency % | Estimated Loss |
|-------|--|-------------|----------------|
| i. | Type of cultivar (eg soft skin) | 10 | 12 |
| ii. | Bad nature of roads | 20 | 7 |
| iii. | Poor sorting at fram-gate | 80 | 24 |
| iv. | Cuts due to design of crates | 75 | 6 |
| v. | Lack of good storage facillites | 55 | 17 |
| vi. | Rough handling of crates during off-loading | 40 | 11 |
| vii. | Poor sorting and cleaning at the market | 15 | 2 |
| viii. | General sanitation in and around the market. | 10 | 2 |
| Ix. | Position of stall in the market | 10 | 4 |
| x. | Theft | 25 | 3 |

Table 3 Percentages of respondents who sort and clean before selling

| Name of market | Sorting Only | Sorting and Cleaning |
|----------------|--------------|----------------------|
| 31st December | 5 | 75 |
| Makola | 10 | 65 |
| Kaneshie | 45 | 15 |
| Tema -Station | 17 | 10 |
| Salaga | 28 | 5 |

3.4 Analysis of Economic Losses

3.4.1 Losses of Tomatoes at the retail level at all five Marketing Centres

The mean loss, in monetary terms, of tomatoes handled per week was 30.5 % with a standard deviation of 11.96. The high variability of 11.96 may be due to methods used by the individual retailers in the handling and storage of the tomatoes. The study showed in most cases bruised tomatoes which would normally have been counted as losses are actually sold at reduced prices. These are sold at about 50 % reduction of the actual selling price of the unbruised tomatoes. The percentage loss per week would have gone higher if they had discarded the bruised tomatoes.

The range for the losses was between as low as 8.2 % and as high as 57.0 %. This disparity can be attributed to the type of tomatoes handled and the handling practices used by the retailers.

3.4.2 Effect of variety on the extent of losses

The retailers claimed that the tomato variety "*Techmantia*" keeps better than the "*Ga amoo*", though the latter is more abundant than the former.

Table 4 Percent distribution of various types of damaged tomatoes at the five markets in Accra

| Nature of Damage | Marketing Centre | Weight (kg) | Percentage (%) |
|---------------------|------------------|-------------|----------------|
| Undamaged (Control) | 3DM | 9.11 | 45.55 a |
| | NAM | 8.03 | 40.15 a |
| | KAM | 8.87 | 44.35 a |
| | TSM | 6.78 | 33.91 b |
| | SAM | 5.53 | 27.65 b |
| Physiological | 3DM | 2.6 | 11.81 d |
| | NAM | 4.12 | 20.6 c |
| | KAM | 2.18 | 13.83 d |
| | TSM | 5.04 | 25.2 b |
| | SAM | 4.09 | 20.45 c |
| Mechanical | 3DM | 3.02 | 15.1 e |
| | NAM | 4.05 | 20.45 c |
| | KAM | 1.78 | 8.9 f |
| | TSM | 4.45 | 14.61 e |
| | SAM | 4.05 | 20.25 c |
| Pathological | 3DM | 5.51 | 27.55 b |
| | NAM | 2.01 | 10.05 f |
| | KAM | 4.66 | 23.3 h |
| | TSM | 2.12 | 10.6 d |
| | SAM | 2.55 | 12.75 d |
| Unmarketable | 3DM | - | 0 |
| | NAM | 1.6 | 8.0 f |
| | KAM | 2.51 | 12.55 d |
| | TSM | 1.61 | 8.05 f |
| | SAM | 3.78 | 18.9 c |

Markets: 3DM = 31st December ; MAM= Makola; KAM = Kaneshie; TSM = Tema- Station and SAM = Salaga

* Values shown are the means of 3 replicates

+ Means within each column with different letters are different significantly (P < 0.05).

3.4.3 Effect of losses on the returns of the respondents

It was observed from the survey that the percentage losses had a great effect on the profitability of the tomato trade. Of the 95 retailers interviewed, only 22 made profit. The rest made losses which ranged from between C110.00 to as high as C 8250, depending on the volume of sales (Table 5). All the retailers interviewed were of the view that the losses had effect on the profit margins and about 95.24 % of the retailers were interested in any means that would help improve the handling and storage of the tomatoes they sell at the marketing centres.

3.4.4 Relationship between net profit/ loss and amount money offered per crate for tomato to be stored

From the above it can be inferred that the retailers are willing to welcome any move that will help reduce the losses they been incurring. When asked to suggest charges that could offered for storing each crate of tomato over-night, the range was as low as C 50 to C1000., the average charge was calculated as C273 (Table 5).

It was found out that there was no relationship between the net profit/loss and the amount offered per crate of tomatoes to be stored (Fig. 1). The implication of this is that the handling and storage practices used in their business are not influenced by the level of losses. This is contrary to the expectation that the higher the losses, the higher the amount of many of the retailers would be willing to pay per crate for storage. This deviation from normalcy can be attributed to the fact that the retailers do not keep records of their business transactions to let them know the level of profits and the losses they are making. For instance from Table 5 , a retailer who made a net loss of C 55 was willing to offer as much as C 1100 per crate for storage as compared to a retailer who mad a net loss of C 900 only willing to offer C 100 per crate.

Table 5 Relationship between amount of respondents (tomato retailers at the Kaneshie Market Complex) were willing to pay and the net profit/ loss in 1990

| Respondent No | Amount willing to be paid for storage of one crate of tomato (C) | Net Profit per week (C) | Net Profit /Loss per crate (C) |
|---------------|--|-------------------------|--------------------------------|
| 1 | 1100 | -110 | -55 |
| 2 | 1100 | 100 | 50 |
| 3 | 1000 | -1750 | -350 |
| 4 | - | -8250 | -1175 |
| 5 | - | -211.34 | -84 |
| 6 | 200 | -625.00 | -312 |
| 7 | 80 | -1600 | -533.3 |
| 8 | 100 | -900 | -900 |
| 9 | 50 | -1250 | -227 |
| 10 | 50 | -675 | -337 |
| 11 | 50 | -350 | -175 |
| 12 | 100 | -2500 | -416.7 |
| 13 | 50 | -250 | -50 |
| 14 | 100 | 975 | 325 |
| 15 | 100 | -1871.25 | -623.8 |
| 16 | 100 | -625 | -208.3 |
| 17 | 200 | 300 | 75 |
| 18 | 200 | -350 | -175 |
| 19 | 100 | 344 | 172 |
| 20 | - | -1428 | -408 |
| 21 | - | 775 | 193.8 |

Table 6 Showing the profitability of tomato sold by selected respondents in a week

| Retailer | No. of Crates Sold | Selling Price (C'000) | Cost Price (C'000) | Total Cost (C'000) | Expected Revenue (C'000) | Expected Profit (C'000) | Actual Profit/Loss |
|----------|--------------------|-----------------------|--------------------|--------------------|--------------------------|-------------------------|--------------------|
| 1 | 2.0 | 3.7 | 3.2 | 6.4 | 7.4 | 1.0 | -0.11 |
| 2 | 2.0 | 4.4 | 3.8 | 7.6 | 8.8 | 1.2 | 0.1 |
| 3 | 5.0 | 4.0 | 3.5 | 17.5 | 20.0 | 2.5 | -1.75 |
| 4 | 7.0 | 6.7 | 6.0 | 42.0 | 46.9 | 4.9 | 8.25 |
| 5 | 2.5 | 7.0 | 6.0 | 15.0 | 17.5 | 2.5 | -0.211 |
| 6 | 2.0 | 6.5 | 6.0 | 12.0 | 13.0 | 1.0 | 0.625 |
| 7 | 3.0 | 6.8 | 6.2 | 18.6 | 20.4 | 1.8 | -1.6 |
| 8 | 1.0 | 4.8 | 4.5 | 4.5 | 4.8 | 0.3 | -0.9 |
| 9 | 5.5 | 2.9 | 2.6 | 14.3 | 15.9 | 1.65 | -1.25 |
| 10 | 2.0 | 2.75 | 2.4 | 4.8 | 5.5 | 0.7 | -0.675 |
| 11 | 2.0 | 3.0 | 2.8 | 5.6 | 6.0 | 0.4 | -0.35 |
| 12 | 6.0 | 6.7 | 6.0 | 36.0 | 40.2 | 4.2 | -2.5 |
| 13 | 5.0 | 7.0 | 6.0 | 30.0 | 35.0 | 5.0 | -0.25 |
| 14 | 3.0 | 9.0 | 8.3 | 24.9 | 27.0 | 2.1 | 0.975 |
| 15 | 3.0 | 6.15 | 5.8 | 17.4 | 18.4 | 1.05 | -1.871 |
| 16 | 3.0 | 7.25 | 6.25 | 18.75 | 21.75 | 3.0 | -0.625 |
| 17 | 4.5 | 5.5 | 5.0 | 22.5 | 24.75 | 2.25 | 0.3 |
| 18 | 2.0 | 4.5 | 4.0 | 8.0 | 9.0 | 1.0 | -0.35 |
| 19 | 1.0 | 6.0 | 5.5 | 5.5 | 6.0 | 0.5 | 0.344 |
| 20 | 3.5 | 8.1 | 7.5 | 26.25 | 28.35 | 2.1 | -1.458 |
| 21 | 4.0 | 4.45 | 3.7 | 14.8 | 17.8 | 3.0 | 0.775 |

Conclusions

This study has revealed that most tomato traders in Accra are aware of and use simple techniques for improving the keeping qualities of fresh tomatoes. The overall losses incurred by traders are rather low because the traders manage either to sell their tomatoes at the reduced price or process them into puree for chop bar keepers.

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Appendix 1

Questionnaire on Tomato Handling and Storage at Marketing Centres in Accra

(An assessment of the post-harvest operations involved in the marketing of fresh tomatoes in Accra markets)

A. Background

1. Name of Retailer
2. Market Complex:
 - i. 31st December
 - ii. Makola
 - iii. Kaneshie
 - iv. Tema Station
 - v. Salaga
3. How do you obtain your supplies? Do you obtain your supplies
 - i. Direct from only one farmer
 - ii. Through a local agent at the village
 - iii. Through a tomato queen at the village
 - iv. Through a tomato queen at the market
 - v. Through a tomato queen from another market
 - vi. Other (specify)
4. Do you specialise in any one type of cultivar?
 - i. Yes
 - (a) Ada or Accra type only
 - (b) Navorongo type
 - (c) Akumadan or Technimantia type
5. Where do you get the bulk of your tomato/pepper/ onion/okro/garden eggs from?
(If a trader is selling more than one vegetable let her/him specify source of supply for each).....
6. What cultivars (applicable to tomato only) do you usually sell?

- i. Techimantia ii. Akumandan iii. Power iv. Rasta
- v. Nerving vi. Don't know

7. In what condition do you usually receive the tomato?
 i. Fully ripe ii. Half-ripe iii. Sound iv. Some with bruises
8. If bruised/with cuts/ shrivelled, about what percentage (using parts by baskets or crates)?

9. From which part of the crate/basket do you normally find the bruised tomato?
 (NB. If the vegetable is not tomato, but say pepper, re-phrase the question to take care of the type of packaging).

10. Do you usually receive the crate/basket stuffed with any material?
 i. Yes ii. No
 If yes, what type of material?
 i. Straw ii. Racks iii. Boards/Cardboards v. Other(specify)
11. Do you sort and/or grade the tomato?
 i. Yes, sort only ii. Yes, grade only iii. Yes, both
12. If yes, on what basis?
 i. Soundness ii. Size iii. Other (specify).....
13. Do you give any treatment before displaying for sales?
 i. Yes ii. No
14. If yes, describe the treatment.....

.....

15. (Look round the surroundings of the trader, if you notice the collection of rubbish dump ask

her whether she thinks that these could influence the rate of spoilage of the tomato/pepper/onion/garden eggs/okro).

.....

16. How do you keep your tomato fresh?

- i. Occasionally, I sprinkle water on it.
- ii. I wash and clean with dry cloth.
- iii. I only display a few, whilst keeping the bulk in a basket under the shade.
- iv. I do not take particular steps to keep them fresh because
 - (a) the rate of turnover of my wares is high
 - (b) I don't have any method to keep the fruits fresh

17. Do you attempt to sort out spoilt tomato from the good ones?

- i. Yes
- ii. No

18. What do you do with the spoilt tomato?

- i. Spoilt tomato is kept well apart from the good ones (i.e. in a different basket)
- ii. Spoilt tomato is separated from the good ones in the same basket/crate
- iii. Used for home consumption
- iv. Reduced to clear

19. If reduced to clear, what is the usual percentage reduction in price?

20. Do you carry out any search activity in order to increase or expand your trade/profit?

- i. Yes
- ii. No

21. If yes, how do you go about it?
- i. By consulting the market queen ii. Through friends
 iii. Parents iv. Other (specify)
22. If no, why?.....
23. Do you pay any market tolls?
- i. Yes, how much? ii. No, why?
24. What is the farm-gate price for each crate/basket of tomato (or other vegetable)?

25. On the average, how many crates/baskets of tomato (or other vegetable) can you sell in
- i. a day ii. a week
26. How much do you realise on a crate/basket?.....
27. What is the highest selling price?
28. What is the lowest selling price?
29. How much do you finance your business?
- i. Own ii. Parents/Family iii. Market Queen
 iv. Co-operative v. "Susu" vi. Bank vii. Other (specify)
30. Do you sell other commodities apart from tomato?
- i. Yes ii. No
31. If yes, what other commodities?

