Survey of yam trading practices and loss assessment in Techiman Market (NRI report no. R6505)

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SURVEY OF YAM TRADING PRACTICES AND LOSS ASSESSMENT IN TECHIMAN MARKET

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Abbreviations

ADB	Agricultural Development Bank
ASIP	Agricultural Services Investment Programme
DFID	Department for International Development
GFDC	Ghana Food Distribution Corporation
GPRTU	Ghana Private Road Transport Union
GTZ	Deutsche Gesellschaft für Technische Zusammenarbeit
IFAD	International Fund for Agricultural Development
MoFA	Ministry of Food and Agriculture
NRI	Natural Resources Institute
PPMED	Policy Planning Monitoring and Evaluation Department
RNRRS	Renewable Natural Resources Research Strategy
ROCE	Return on Capital Employed

Definitions Used

The report refers to a *heap* of yam tubers on the farm, which consists of 110 tubers. On bringing the tubers to the market, one tuber per heap of 110 is given to the Yam Association, and therefore a *heap* of 109 yam tubers in the market is one wholesale unit. A *pile* of yam tubers in the market is one retail unit and consists of between 1 and 4 tubers.

Exchange Rate

In the beginning of November 1996 the exchange rate was 2 800 Cedis to the UK Pound Sterling.

ACKNOWLEDGEMENTS

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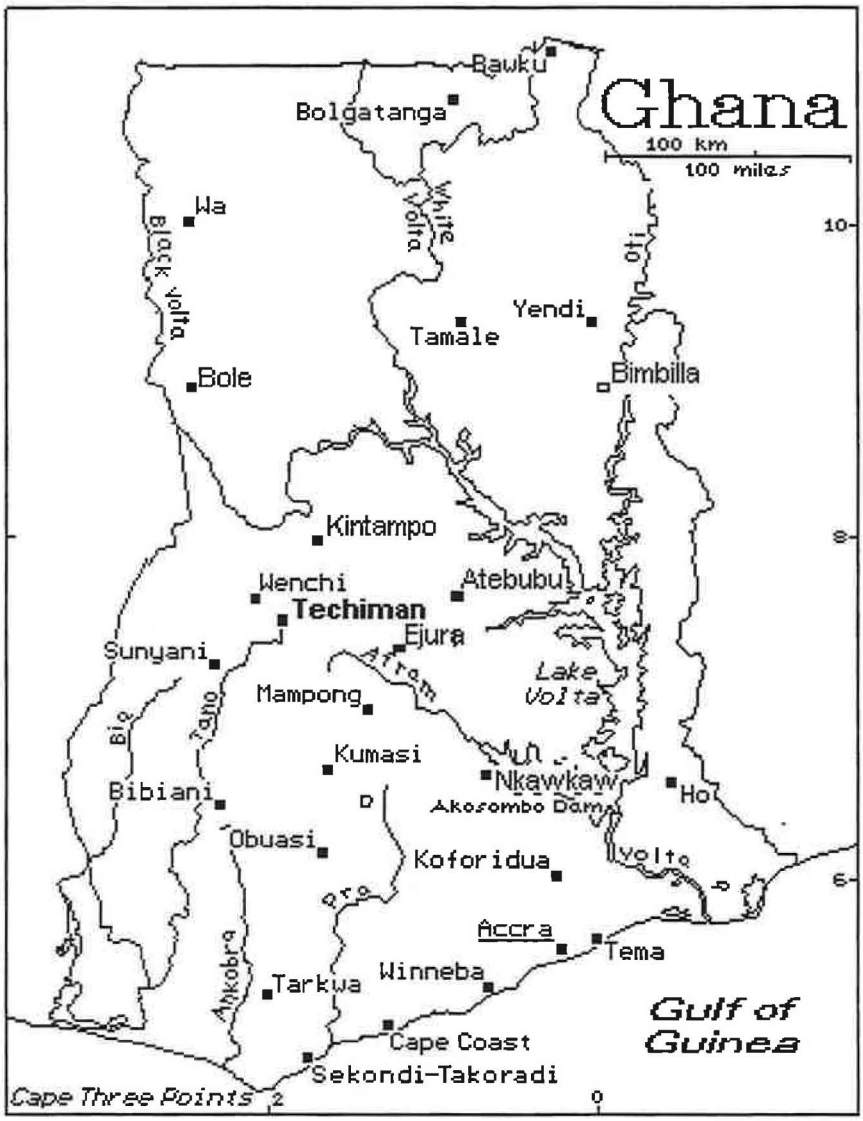
Figure 1: Map of Ghana



SUMMARY

1. The aim of this report is to gain an understanding of the structure of yams marketing in and around Techiman Market in Ghana, and to understand the extent and impact of quality deterioration (called 'physical losses' in this report) on the farmers' and traders' revenues. It should be noted that the data collected on marketing margins and losses was collected using informal techniques which provide indicative results.

2. Techiman market is an important assembly point in Ghana. Situated between the northern and southern markets, many yams pass through this market en route from the north of Ghana to the south. It is located in the Brong Ahafo Region which, along with the Northern Region, is a major yam producing area.

3. There are a **large number of traders** operating in the market and entry into the market is constrained principally by the lack of capital.

4. Data from January 1995 to October 1996 on the **volume of yams** entering and leaving the market reveals strong seasonal trends, with the largest volumes entering and leaving between July and October, corresponding with the harvest season in the Brong Ahafo Region. The average monthly volume of yam entering the market between 1995 and 1996 was 1 200 MT. The average monthly volume leaving the market by Ghana Private Road Transport Union (GPRTU) transport was 900 MT.

5. **Itinerant trading** requires the highest amount of initial capital and was exposed to the highest risks of all the trading activities in the market. The itinerant traders also secure the highest returns of all the traders, with returns on capital employed (ROCE) ranging from 4%-16% over a period of about four weeks with an average ROCE of 11%.

6. Itinerant traders also bear the greatest marketing costs, as would be expected, since they must pay transport costs as well as taxes in both the production area and in the market. Their marketing costs were found to be around 60% of the marketing margin, although for one successful itinerant they were around 40%-50%. For others they could be as high as 92% or 184% for individual heaps, although this percentage would vary for different heaps in any one consignment.

7. The returns of the **retailers** appeared to be much lower, although there was some uncertainty about the accuracy of the data, since it was felt that there was a certain amount of distrust of the interviewer's questions. Some retailers were making much higher returns than others, ranging between 9,000 and 31,000 Cedis per week, with an ROCE ranging from 3%-6% over a period of about one or two weeks. Other retailers were making very small returns or even losses. In one case a retailer made a loss of 23,000 Cedis in one week, and in another made only a small gain of 5,400 Cedis.

8. The returns of the **sedentary wholesalers** in the case studies were also lower than those of the itinerant traders, as would be expected in an efficiently functioning market, since they buy and sell within a relatively short period of time in the same market and therefore bear less risk than the itinerant traders. However, while returns ranged from around 24 000 - 25 000 Cedis, the average ROCE for the three sedentary wholesalers

was 8%, ranging between 3% and 13%, not significantly lower than that of the itinerant traders. Furthermore the sedentary traders get these returns in a period of around one week or less, while the itinerant traders gain the returns over a three or four week period.

9. While it is not possible to draw concrete conclusions from these observations, it is possible that the sedentary wholesalers have more power in the market and thus generate higher returns.

10. **Opportunities of obtaining capital** are restricted for both traders and farmers. Apart from limited donor project activity, there are no formal means by which traders can access credit. The Yam Association and some traders provide short term credit to farmers and traders.

11. An analysis of the **marketing margins** showed that farmers receive around 60%-80% of the final retail price. This is high and suggests that exploitation of the farmer by the trader is not common. However, concrete conclusions cannot be drawn on this without knowledge of the costs of yam production.

12. Informal data collection shows that the **level of physical losses** at the time of the study (October-November) was low, since the yams had been recently harvested. Traders claimed that losses start to increase substantially between January and May, when the yams are older and the weather is hotter causing many tubers to be spoilt by heat damage.

13. While a large number of tubers (38%) were damaged in some way, the type of damage ranged form superficial cuts to severe rotting. The term damage was used to describe grazing of the tuber, rotting, bruising and termite or rodent attack. Damage resulted in a 34% discount from the premium price for the tubers affected, and caused a 2% reduction in price for the whole sample.

14. The incidence of breakage and ageing appeared to be very low (0.3% and 3% respectively of all the tubers in the sample). While the effect on the price of the broken tuber can be significant (on average there was a 41% price reduction for broken tubers) the effect on the sample was small (0.1%) since the occurrence of breakage was limited. Older tubers were reduced by about 19% of the premium price per tuber, a 1% price reduction resulting from ageing for the whole sample.

15. It was clear from the study that **good quality is rewarded by higher prices**, and this is relevant when considering introducing or adapting a technology to enable longer yam storage. Also, there is strong competition between traders in the market which enables the market to function reasonably efficiently, and increases the likelihood that the benefits of a new technology would be distributed among the traders.

16. There remains some doubt, however, about the competition between traders who buy from farmers. There is some evidence that the farmers' ability to negotiate prices for their produce is limited. If this is the case, then there may be little incentive for farmers to use an on-farm technology if they themselves do not receive the benefits of using the technology.

RECOMMENDATIONS

17. It is recommended that the findings of this study are used to develop a methodology to undertake a formal study of the relationship between various types of physical loss and price. The use of more categories of physical loss for the analysis would highlight more specifically which are the greatest causes of loss. The categories recommended are: surface damage, bruising, ageing, termite damage, nematode damage and breakage. In this way the incidence and effect of specific types of loss on price could be measured more precisely, and intervention could therefore be targeted to deal with the types of physical loss which are most important, both in terms of occurrence and in terms of financial impact.

18. In order to isolate the effects of physical loss on price, market fluctuations would need to be incorporated into the model. It is recommended that this is done by establishing a the daily/weekly market price for good quality yams (rather than the 'premium price' used in this report) against which price discounts could be measured. The price at which good quality yams are selling each day would be used as the market price.

19. A sufficient sample size should be collected in the survey (e.g. 30 samples of each variety for each type of trader included in the study).

INTRODUCTION

Background

20. This study was commissioned for the project "Relieving Post-Harvest Constraints And Identifying Opportunities For Improving The Marketing Of Fresh Yam In Ghana". This project aims to determine and assess constraints, and investigate appropriate technical solutions and opportunities for the more effective handling and marketing of fresh yam within Ghana. The project is funded under the RNRRS Crop Post Harvest Programme of the Department for International Development. This report investigates the yam marketing system in Techiman Market in the Brong Ahafo Region of Ghana.

21. The purpose of the work was to characterise the yam marketing system in Techiman Market, commenting on the socio-economic structure of the yam marketing system and determining the relationship between quality and value of yams.

Terms of Reference

22. The terms of reference were to characterise the socio-economic structure of yam marketing in Techiman Market and assess the relationship between produce quality and financial value.

Methodology

23. The study was undertaken over a four week period in October/November 1996 in the Brong Ahafo Region of Ghana, principally in Techiman Market. The team also visited Nkoranza Market and Asantanso Village near Techiman, where traders and farmers were interviewed. A detailed account of the survey in Asantanso village is given in Appendix 2.

24. This study made use of an informal approach to data collection, and individual and group interviews were carried out with purposively sampled representatives of different categories of market participants. Respondents were selected on arrival at the village or market in collaboration with village elders or market associations. Key informants identified and interviewed included producers, producer/traders, urban market traders, consumers, cooked food sellers, market administrators and truck operators. Over 30 traders were interviewed, several of whom were visited on a regular basis, as a case study, throughout the four weeks of field work.

25. Discussions were held on a wide range of topics including production and supply of yams, prices, costs, volumes traded, flows along the marketing chain, seasonality, transport, finance arrangements, physical and financial losses and problems faced in the storage and marketing of yams.

Secondary information of relevance to the yam marketing systems study was also used to complement the primary data collected. This information was derived from the following sources: PPMED, the Statistical Service, MoFA/GTZ reports, Bachelor Theses from the University of Ghana, Legon (see bibliography in Appendix 3), data collected by the Yam Association, GPRTU transport data.

THE YAM MARKETING SYSTEM IN GHANA

27. A general account of the yam marketing system in Ghana is provided in Gray (1996). The Northern and Brong Ahafo Regions are the major yam producing areas in Ghana with 2.3 million metric tonnes produced in 1996 (Policy Planning Monitoring and Evaluation Department (PPMED), Ghana, 1996). The yams are marketed through a network of major and minor markets within the country, with just over 6 800 metric tonnes officially recorded as destined for export in 1995 and additional informal exports to neighbouring countries such as Burkina Faso and the Ivory Coast.

28. Two major transport routes were identified from the Northern Region to the south. One passes through the Volta Region in the east, and the other passes through Techiman, either via Tamale, or via Atebubu and Ejura. Yam produced in the Brong Ahafo Region and Ashanti Region are transported to the major markets at Techiman, Kumasi or Accra, from where they are distributed further (see map on page iii).

29. The marketing system is handled almost exclusively by the private sector, with negligible volumes being distributed by the state run Ghana Food Distribution Corporation (GFDC).

TECHIMAN MARKET

Background

30. Techiman Market is located in the Brong Ahafo Region. It is a large market offering a variety of different food commodities, including yam, cassava, plantain, cowpeas, vegetables, fish and oil. Other commodities also sold in the market include cloth, tools and cooking utensils. Wholesalers from other markets go to Techiman to buy produce in bulk, and load it up for transport back to their market of origin. Techiman also offers retail goods for local consumers.

Market Infrastructure

31. The infrastructure in the market is basic, with limited storage structures meaning that traders must keep produce in the open. Few traders have shaded space for their produce, and most keep them on the ground in the sun, occasionally covering them with straw. A guard watches the produce at night for a fee of 200 Cedis per heap of yams per night.

32. There are no toilet facilities near the market and traders are forced to use a particular area in the market for this purpose. Because of inadequate drainage this leaves an open sewage stream running through the market.

33. There is no supply of running water, and hawkers sell drinking water in plastic bags.

34. There are two World Bank projects in the area with plans to rehabilitate the market. These are the World Bank Urban III Project, and the Agricultural Services Investment Programme (ASIP). The intention is for some infrastructure, such as

stalls/stores, clinics and toilets to be installed under the ASIP, and roads, a lorry park and the drainage system to be constructed under the Urban III Project. Techiman District Assembly will bear 25% of the cost (about 240 million Cedis in 1995), and ASIP will pay the remaining 75%. The District Assembly intends to involve the private sector in raising funds its share of the cost. Although work should have already started on the two projects, there have been delays, and it is unclear when these developments will commence.

Timing of the market

35. Trading in the market begins on a small scale on Tuesday, and starts in force on Wednesday through to Friday. Wednesday is the main day when itinerant traders from other markets arrive in Techiman to purchase produce in bulk.

36. From Saturday to Monday the market is virtually empty, apart from a few retailers. Cattle and goats are driven over the trading area during the weekend to clean up the market debris.

Traders' Associations

37. There are several traders' associations in the market, each relating to a different commodity. Examples of these are the yam, plantain and maize traders' associations.

38. The Yam Association is run by an executive of seven members comprising a Yam Queen and two deputies, an itinerant Yam Queen and two deputies and a secretary, who is the only male member.

39. The association has both a social and an economic function. It assists in organising funeral celebrations when a member dies and provides financial help when a member loses a relative. They have also built a school for traders' children near the market in collaboration with the Canadian Government. It costs the traders 200 Cedis a day to send a child to the school.

40. The economic function of the association is to provide short term loans of a few days and rent out shelters on a daily basis for traders who wish to store their produce in the shade.

41. To meet its expenses the association charges a one-off registration fee of 50 000 Cedis, which traders have to pay before they can start trading on a regular basis in the market. Farmers and occasional traders are not obliged to pay this fee. The association also takes one yam per heap of 110 brought into the market every day.

42. Farmers claim that the association uses its power to exploit them by organising the traders and thus weakening the farmers position. The extent to which the association has power to influence turnover and prices in the market is unclear, however, but generally price negotiation occurs on an individual basis and appears to be subject to competitive market forces. Members of the executive of the association claimed to have no control over flows of yam into the market.

YAMS IN TECHIMAN MARKET

Volume of Yams Entering the Market and Leaving the Market

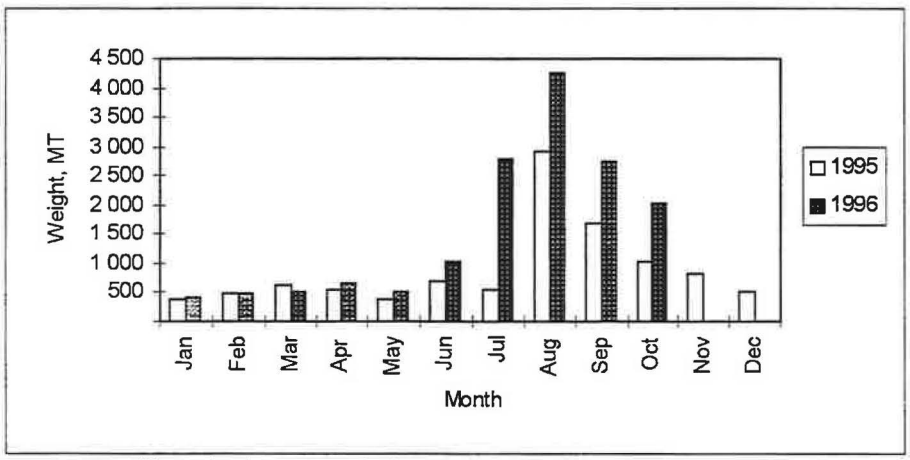
43. The following analysis examines the total of volumes entering and leaving the market. Those yams which enter and do not appear in records as leaving the market are assumed to be retailed in the market, or to be discarded as a result of damage.

44. Figure 2 shows an estimate of the volume of yams entering Techiman Market between January 1995 and October 1996. This was calculated using data provided by the Yam Association in Techiman Market, which keeps records of the tubers it collects for each heap brought to the market by traders. Several samples of tubers were weighed and the average tuber was found to weigh 2.7 kilograms. This was used to calculate the weights entering and leaving the market in this analysis.

45. The data from the Yam Association probably underestimates the true volume of yams entering the market to some extent, since traders who bring small volumes of under 110 tubers into the market are not required to pay the toll and also occasionally traders bringing in large consignments are excused payment for one or two heaps.

46. The secretary of the Yam Association estimated that these unrecorded heaps would amount to about 10% of the total volume entering the market. This has been included in the calculations for Figure 2.

Figure 2: Total Volume of Yams Entering Techiman Market January 1995-October 1996



Data source: Yam Traders' Association
Nb. The average weight of one tuber was 2.7 kilograms

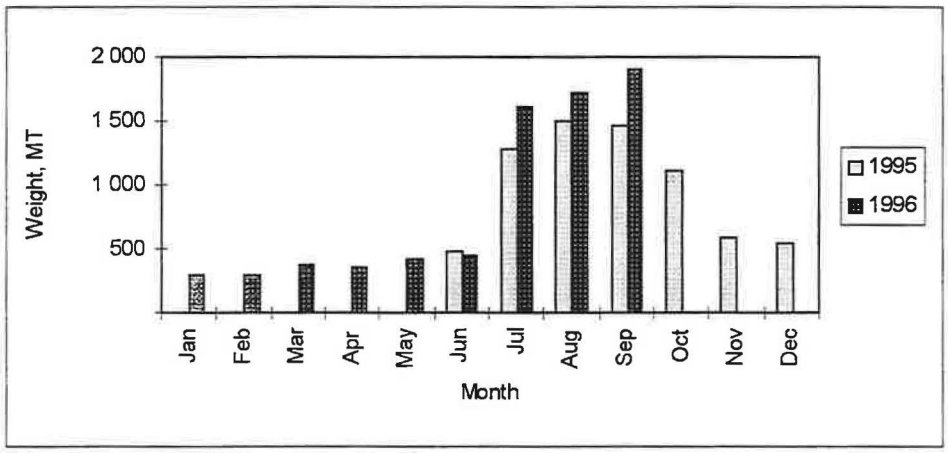
47. The graph shows that there was a much higher volume of yams entering Techiman Market in 1996 than in 1995. The lower volume in 1995 may have resulted from the conflict in the Northern Region between the Konkomba yam farmers and other tribes, which prevented yams from reaching the market. The seasonal variations, follow a similar pattern for both years, with a peak in August and much lower volumes between December and May. In August 1996 over 4 200 MT. of yams were brought into Techiman Market, whereas in January of the same year only around 408 MT. came into the market.

48. The average monthly weight of yam entering the market was 1 200 MT.

Flow of Yams Through the Market

49. Figure 3 shows an estimation of the total volume of yams leaving Techiman Market for other destinations between June 1995 and June 1996. This was calculated using Ghana Private Road Transport Union (GPRTU) waybills[1].

Figure 3: Total Volume of Yam Leaving the Market by Ghana Private Road Transport Union Vehicles, June 1995-September 1996



Data source: GPRTU waybills, Techiman
Note: the waybills showed the number of yams leaving the market, and the weight was calculated using an average weight of 2.7 kg for one tuber.

50. These calculations provide a rough guide only and are likely to underestimate the true volumes leaving the market.

51. One reason for this underestimation is that for certain destinations no records of yams were kept, since the volumes to these destinations are small, and transport charges are often levied for sacks of an indeterminate number of yams, rather than heaps. Generally these smaller volumes of yams are bound for the towns of Sekondi-Takoradi, Obuasi, Winneba, Tarkwa, Nkawkaw or Koforidua (see map on page iii).

52. Furthermore, although possession of a waybill is a legal requirement for any driver transporting commodities, some drivers claimed that it is not necessarily a guarantee of easy passage through police checkpoints. In such circumstances the incentive to obtain a waybill is reduced, and for this reason it is likely that a certain amount of produce is transported without being officially recorded.

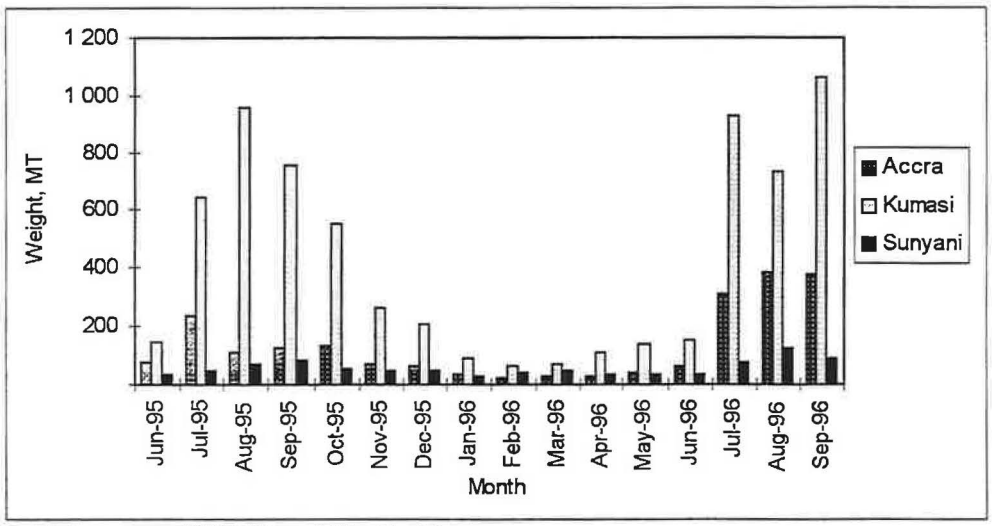
53. The average monthly weight of yam leaving Techiman Market by GPRTU transport was 900 MT.

[1] On receiving a consignment of goods for transport, the union obtains a receipt from the driver stating the quantity of produce being transported and the destination. The driver keeps one copy, and the GPRTU keeps another copy. Thus any losses due to theft can be detected on arrival at the destination.

54. Both Figure 2 and Figure 3 show similar seasonal patterns, with the largest volume of yams entering and leaving the market between July and October. In August 1996, for example, around 4 200 MT. of yams were brought into the market and 1 700 MT. were purchased and taken to other destinations using GPRTU transport. This leaves almost 2 500 MT. which were distributed in and around the Techiman area, or were unofficially transported to other destinations.

55. Figure 4 shows the volume of yams leaving Techiman Market for the three main destinations. It shows that by far the largest volume of yam leaving the market is destined for Kumasi, followed by Accra and then Sunyani.

Figure 4: Total Volume of Yam Leaving the Market by Ghana Private Road Transport Union Vehicles for Accra, Kumasi and Sunyani, June 1995-September 1996



Data source: GPRTU waybills, Techiman
Note: the waybills showed the number of yams leaving the market, and the weight was calculated using an average weight of 2.7 kg for one tuber.

Varieties and Seasonal Availability

56. There are two main yam species grown in Ghana, the white yam (*Dioscorea rotundata*) and the water yam (*Dioscorea alata*). The commercially important white yam varieties in the market from July to August are Lariboko, Dorbari, Monyira (also known as Asana or Muchu Mudu), Dente, Didi, Puna and Tila. Dorbari was going out of season by the time of the study in late October and Dente was coming into season at this time. All the other varieties were in season except for Lariboko which is in season in July.

57. Puna is considered one of the best quality yams in Ghana and traders in Techiman Market can obtain it until March, despite the fact that the local harvest finishes in November. They manage this by changing the source of supplies, procuring yams further north later in the season. Other varieties of white yams can be obtained until June, just before the new harvest of white yams begins.

58. Water yam is mainly available from March to June. It is less popular than the white yams but is available in the season when there are few white yams around and also appears to store better.

59. By the end of the study, in mid-November, the ware yams (those which have not been milked[2]) were starting to enter the market. One itinerant trader claimed that these are of superior quality to the milked yams as they store for longer and also have a better taste. Also, by the time the ware yams are harvested the milked tubers have generally been stored for some time on the farm and are not as good quality as the newly harvested ware yams. Because of this in mid- to end- November the ware yams commanded a price premium over the milked yams and were in high demand.

Sources of Supply

60. The areas of production which traders from Techiman go to buy yam during harvest time in the Region (June-July) are Kintampo and Atebubu. At the time of the study in October, white yams were coming from various local areas in the Brong Ahafo Region.

61. When the supply of yam falls in the Region the itinerant traders travel further north to Bimbilla, Bole, Sawla and Tamale in the Northern Region, where yams are harvested later than in Brong Ahafo.

Market Participants

Sedentary Wholesalers and Commission Agents

62. Many sedentary wholesalers retail part of their consignment. The role of the large scale sedentary wholesalers was initially unclear, since they appeared to add another link in the marketing chain without performing any function which added value to the yams. On further investigation it became evident that large scale wholesalers are convenient customers for itinerant traders supplying yams to the market, since, unlike retailers they tend to buy a whole consignment rather than a few heaps. The convenience for itinerants may be increased by sedentary wholesalers paying up front for a consignment rather than on credit, although many retailers also pay for their yams up front. Transaction time for itinerants may also be reduced when undertaking a one-off sale to a sedentary wholesaler rather than several sales to different retailers. There seems also to be an accepted mode of conduct between traders, whereby traders allow the sedentary traders to buy from the itinerants, especially when competition for yams is high.

63. Furthermore, established contacts and capital enables the sedentary wholesalers to act as commission agents for other traders. In this case the role of the commission agent is to help other wholesalers and retailers to make contact with itinerant traders,

[2] There are two yam harvests in the year, the first harvest involves cutting the top off the yam (milking) and replacing the top back in the soil for seed yams to germinate. The cut tuber is then sold on the market or used for home consumption. The second harvest, which occurs a few months later involves harvesting the complete tuber (the ware yam). These are also often used as planting material for the next season.

and in some cases to guarantee loans to retailers. One commission agent explained that trading on commission is more profitable than wholesaling.

Retailers

64. Sedentary wholesalers usually retail part of their consignment, and there are also several traders who retail all of their consignment. These retailers sell in a specific part of the market, close to the area where fruit, vegetables and cassava are retailed.

65. Retailers perform the market function of sorting and sometimes regrading the yams, and selling them in small quantities to the consumer.

66. Most of the retailers in Techiman spend the first two market days buying yams and begin to sell on Thursday and Friday, when the itinerant traders from other markets buying in bulk have left.

Itinerant Wholesalers

67. There are 360 itinerant wholesalers in the market according to the itinerant Yam Queen. Itinerant wholesalers procure yams from the production areas and transport them back to the market. During the period when farmers in the Brong Ahafo Region are harvesting, many go each week to the production areas, and spend three or four days procuring yams. Later in the year, when local supplies become scarce and traders have to travel further north, they tend to go less frequently, and spend longer in the production area.

68. Their activities include gathering information on supplies, demand and prices, locating and forging contacts with sellers, arranging the means of transport, loading the commodity onto a vehicle and travelling to the point of sale, unloading, stacking and selling.

69. They often rely on people in the production areas to provide them with information on supplies and prices. It seems to be a common practice for these agents to transport the traders to the farm by bicycle for a fee. Some itinerant traders employ agents specifically to travel around the farms to see which farmers have harvested and to initiate negotiations on behalf of the trader.

70. Itinerant traders procuring yams in the areas near to Techiman Market tend to co-ordinate with the timing of the market by leaving for the production areas on a Saturday or Sunday. Yams are loaded onto the truck on the Monday, and if things run smoothly, the trader can arrive back in the market by the time the market begins on Tuesday. If they encounter problems during transport then they may only arrive on Thursday or Friday, by which time most of the large scale wholesale buying has finished. In these cases the itinerant trader is likely to have problems selling the yams that week, and will be forced to store the yams until the next week.

71. Yams which are not sold by the time the market closes on Friday evening are kept under shelters owned by the Yam Association. There are three such shelters in the market, and traders are charged a fee of 2 500 Cedis per day to store yams there.

72. Traders whose principal function is that of itinerant wholesaler have periods when they are sedentary in the market. At the time of the study the itinerant Yam Queen had been sedentary in the market for a few weeks since she was receiving credit repayments from farmers bringing yams to her. Another trader had been sedentary for several weeks since she felt that the condition of the roads was too poor to travel because of recent rains, and was waiting for dryer conditions before she went to the production areas. Some itinerant traders also need time to rest after each trip, and remain in the market for a short while until they have the strength to continue procuring yams in the production areas.

Itinerant Retailers

73. Only one itinerant retailer was encountered during the study, and she was buying yams in Techiman and taking them to Kumasi for sale. Generally itinerant traders deal with large consignments so they can benefit from economies of scale, but retailers occasionally bring small consignments to the market.

Farmers

74. Farmers are free to come to the market to sell their yams to any buyer, but in cases when they have received credit from a particular trader, they are obliged to sell the yams to that trader until the debt is repaid. Farmers in Asantanso village claimed that they are not free to sell to consumers, but are obliged to sell to traders at low prices. This may be because they have large debts with particular traders to whom they must sell.

75. Farmers in Asantanso village complained that the traders use exploitative tactics to reduce the prices. For example, they said that traders boycott their village and send spies to prevent other traders from buying from the village, in order to force the farmers to take their yams to market. It was not possible to confirm whether such practices occur, and the claims were denied by traders.

76. Once at the market, the farmers from Asantanso village claim that their bargaining position is less secure than at the farmgate, since they are obliged to sell before the market closes. However, a different opinion was held by farmers from Kunso, a remote village, eight hours tractor ride from Kintampo. These farmers felt that they get a better price when they come to the market to sell, since very few traders go to their village because it is inaccessible to trucks. These farmers often have to pay labourers after harvest, and therefore they prefer to bring the yams to the market themselves and make a quick sale. If the farmers decide to bring the yams to the market they often group together to hire a tractor for this purpose.

77. Sedentary traders in the market prefer to buy from farmers rather than itinerant traders, since they sell at cheaper prices.

Consumers

78. While Puna is believed to be one of the best quality varieties of yam, many of the consumers interviewed claimed to buy mainly Dente and Tila varieties, since they are cheaper than Puna but still have a good flavour.

79. Consumers use the yam to make ampesi (boiled yam) or pound it together with plantain or cassava to make fufu (a dough-like paste eaten with soups and stews).

80. Consumers recognise that yam is expensive in comparison to other staples, such as plantain and cassava. One consumer pointed out that at the time of the study the price of yams was relatively cheap, and so more people could afford to buy them. By December they claimed that yams would be too expensive, and they would be forced to substitute them with other food.

Traders from Outside Techiman Market

81. Traders come to buy yam in Techiman Market from Accra, Kumasi and Takoradi. A significant number of traders were also reported to come from Togo and Ivory Coast, mainly at the time of the early harvest, since at this time there are more yams in Techiman than elsewhere. At the time of the late harvest, yams are more abundant in other areas, and so these traders tend to purchase elsewhere.

82. The local villages around Techiman have both daily and weekly markets. Traders buy and sell at the daily markets while the weekly markets provide an opportunity for the farmers to market their produce.

Market Fluctuations

83. Traders claimed that the market follows a two weekly cycle and during the four weeks of the study, large weekly fluctuations were apparent. The risks encountered by traders, especially those who bring yams into the market, are clearly high, and on several occasions traders were encountered who were selling at greatly reduced prices having arrived in the market to find that there was oversupply.

Quantity, Quality and Units of Sale

Grading

84. Farmers sort the yams into the different varieties and grade them by size into five categories. The largest tubers, grades one to three, are marketed, and according to farmers in Asantanso village, grades four and five are too small to be accepted by the market. They are therefore used for the farmer's household consumption.

85. The grading is based on size distribution at harvest, and not on the weights of the tubers. The method of grading therefore does not give a standard size for the various categories of large, medium and small, and a small grade for a good crop yield may be equivalent to medium grade for another farmer with a bad crop yield.

86. Traders also claimed that grades on the farm were often higher than in the market. For example, a grade 2 yam on the farm could be sold as a grade 1 in the market.

87. This absence of standardised weights and measures makes visual inspection necessary. This can have the effect of inhibiting the flow of meaningful information through prices but generally traders are experienced in dealing with differing sizes and qualities and this reduces such problems.

Transport

88. Consignments of yams come into the market on large trucks of 10-15 tonnes gross weight. Less frequently they are brought in on tractors or in taxis. The large trucks have a capacity of between 2000 and 5000 tubers. Tractors have a capacity of 1000-2000 tubers. Traders generally use tractors to transport the yams when the roads in the production area are inaccessible for the cargo trucks.

89. Trucks for hire are organised through the Ghana Private Road Transport Union (GPRTU). There are several booths for the GPRTU around the market, each dealing with produce destined for a different Region. All truck drivers are required by law to obtain contracts through one of the transport unions, and only the GPRTU is represented in Techiman Market. When there is a shortage of produce to transport the GPRTU operates a queuing system for the lorries.

Loading and Unloading

90. Yams are loaded and unloaded individually by men who reside in the market. Generally, for unloading, a chain of two or three men is formed whereby the first man, who stands on the truck, throws two yams at a time to the second man who stands on the ground behind the truck. This man in turn lays the yams on the ground ready for collection by the itinerant trader. Observation of this process in the market revealed that yams are rarely dropped or damaged during unloading.

Transport within the Market

91. Within the market several men are available with wheelbarrows to transport the yams around the market, for a fee of between 500 Cedis and 1500 Cedis per 109 tubers. The cost depends on the size of the yams and the distance transported.

92. When itinerant traders arrive in the market, sale often takes place at the point where the yams are unloaded. In cases where the truck has no access to a convenient point of sale, then the itinerant trader must pay a wheelbarrow transporter to take the yams to a convenient spot in the market. This will tend to increase the costs for a trader arriving in the market when the latter is congested and yam supplies are plentiful.

93. Young boys and girls with baskets are also at hand to headload yams after purchase by consumers or small scale traders.

Market Charges levied by the District Assembly

94. Retailers are charged a daily toll of 100 Cedis for trading in the market, and wholesalers pay 200 Cedis per day. If the traders occupy a stall in the market, then they pay 12 000 Cedis rent a year.

95. Itinerant traders must pay 500 Cedis to the Distinct Assembly in the production area where they buy yams, and must pay a further 500 Cedis to the Techiman District Assembly for bringing yams into the market.

96. The Yam Association charges a one-off registration fee of 50 000 Cedis, and takes one yam per heap of 110 brought into the market.

EFFICIENCY OF YAM TRADING IN TECHIMAN MARKET

97. Although there is much debate on definition and measurement, the economic efficiency of the market usually refers to the combined effect of the productive efficiency (technical[3] plus operational[4]) with which marketing services are undertaken, and the degree to which the prices provide incentives to producers and consumers that are consistent with resource availability and demand (exchange efficiency).

Technical Efficiency

98. The extent of physical losses in handling, transport and storage, and their financial impact on the traders, are examined from page 23 onwards. Generally, the analysis revealed that physical losses are not a severe problem and therefore such technical inefficiencies are not significant, certainly in October and November, during the early stages of the yam season.

99. Other factors, such as the poor condition of the roads in Ghana, also lead to technical inefficiencies, increasing journey time and wear and tear on the produce, all of which tend to inflate marketing costs.

Operational Efficiency

Information Flows

100. A necessary condition for a market to be operationally efficient is well organised and rapid transfer of information. In Ghana there are inefficiencies in the transfer of market information which are particularly severe when information needs to be transferred over long distances. While many traders pass on price information by word of mouth, such information is often regarded as confidential, and many traders are not willing to disclose the purchasing price for their yams.

101. Also, the market is volatile, and information does not always pass sufficiently rapidly over distance to enable traders to anticipate sudden gluts in the market to which they bring yams for sale. This increases the risk they face in trading.

102. Within the marketplace, all trading is conducted openly and transfer of price information is very fast and efficient. Generally a particular size and variety of yam is sold for the same price throughout the market, although often skilful consumers are

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[3] Technical efficiency refers to the efficiency with which resources are used in marketing, in terms of the ratios of physical inputs and outputs. The extent of losses in handling, transport and storage is an example of a measure of technical efficiency in marketing.

[4] Operational efficiency is defined as the provision of goods or services at least cost, and using an optimal combination of inputs. Sources of operational inefficiency include lack of incentives and inadequate information. One common source of operational inefficiency in markets it the lack of standardised weights, measures, qualities and grades which often make visual inspection of products necessary. This not only increases the direct costs of buying and selling, but also inhibits longer distance trade (Scarborough, 1992).

able to negotiate a better price. Traders based in the market also have to constantly anticipate daily fluctuations which could lead to them making a loss.

103. Itinerant traders and villagers in the producing areas have developed an efficient system for obtaining information about the location of farms in a particular area where yams have just been harvested. Once the trader arrives in a particular producing area, villagers charge a fee to take them by bicycle to the farms which have yams. Some traders also hire agents to go around the farms for them a few days before they arrive, to find the farmers who have just harvested and to begin negotiations on the trader's behalf.

104. Although some traders in Techiman refused to reveal the source of their yams, claiming that it was confidential market information, there was undoubtedly some exchange of information between traders in the market about the best sources of supply for each week.

105. The farmers encountered during the study were not well linked to price information flows, and were unaware of the price at which yams were being sold in the nearest main market. For example, most farmers interviewed in Asantanso village (see Appendix 2), which is reasonably close to Techiman (around 15km), did not know the prevailing price of yams in Techiman Market. One farmer from the village was, however, encountered in the market checking the prices of yams before he brought his own consignment in for sale.

106. Furthermore the absence of standard weights and measures, makes comparison between different areas difficult, although it is likely that traders and farmers have sufficient experience to make a reasonably accurate assessment of market prices and trends.

Barriers to Entry

107. Another factor which reduces operational efficiency is the presence of barriers to entry, which limit incentives for traders to enter the trade. These can be in the form of high initial capital investment requirements, predatory pricing methods employed by agents already operating in the market or regulations limiting entry into various aspects of trading. There are many yam traders operating in Techiman Market, estimated by the Yam Association at about 200 sedentary traders and about 360 itinerant traders. This suggests that while barriers to entry do exist, they are not insurmountable for many traders.

108. In principle, traders are free to enter and leave the market, and there are no regulations which prevent traders from starting to operate. Before traders or farmers can start trading on a regular basis, however, they must pay 50 000 Cedis to the Yam Association as an enrolment fee.

109. During harvest time it is common for wives and families of farmers to sell the yams from their farm in the market, and there are no barriers preventing them from freely entering the market and leaving once the harvest has finished. Furthermore, since they are not regular traders they are not required to pay the enrolment fee to the Yam Association.

110. While there was no evidence of the association executives using their power to prevent traders from becoming involved in a particular type of trading activity, there are certain rules which have the effect of limiting the numbers of people trading. The enrolment fee is one example of this and another example is the association rule that traders must serve a probationary period of three years operating as a retailer in the market before they are allowed to move into other, more lucrative, trading activities such as sedentary or itinerant wholesaling.

111. The logic behind this rule, according to the Yam Queen is that the traders need a certain amount of experience and capital in order to be trusted to pay farmers for their produce and in order to make a profit for themselves. Another possible reason why the rule is enforced may be to limit to some extent the numbers of traders operating as itinerants and therefore allow some control over the volume of yams brought into the market, possibly reducing gluts. It also enables the established itinerant traders to maintain their market position.

112. Once a trader starts operating as an itinerant the Yam Association Executive has no control over when they go to procure yams, volumes they bring into the market or the timing of unloading the yams from the lorries once in the market. Two years ago, in 1994, the Association attempted to organise a rota system for traders travelling to the north to procure yams, in order to regulate the flow of yams into the market and reduce the extent of shortages and gluts. The system did not work, however, because the itinerant traders did not keep to the rota, and it was therefore abandoned last year.

Capital Requirements for Entering the Trade

113. Once the enrolment fee has been paid, some working capital is needed to enter into the retail business. While the yams can often be obtained on credit from the wholesalers and repaid after sale, the risks of non-sale or of losses due to deterioration of the tuber are borne by the retailer, and they must have sufficient capital to bear this loss. As an estimate, the level of capital necessary may be equivalent to the purchase price of a heap of yams, which would be around 60,000-100,000 Cedis.

114. Retailing requires the smallest working capital of all the types of yam trading in the market. The itinerant trade requires the highest amount of capital, estimated by traders to be a minimum of 2-3 million Cedis.

115. It is likely that age is one factor influencing working capital accumulation. Examination of the age distribution of yam traders in Techiman Market highlights the fact that lack of capital may be a factor limiting free entry into some forms of trading. Thirty three traders (two of which were men) were asked their ages. The numbers of each type of trader in each age range is shown in Table 1.

Table 1: Age Distribution of a Sample of Yam Traders in Techiman Market, Ghana, October 1996[5]

Age	Itinerant Wholesaler	Itinerant Retailer	Sedentary Wholesaler	Sedentary Retailer
15-25		1		5
25-50	10		1	13
50+	2		1	

Note: The distinction between the various types of trader is fluid, and the numbers indicated in the table show the principal role of the various traders interviewed.

116. Many of the younger traders were retailers and no itinerant wholesalers were encountered who were under the age of 25. This is because lack of capital and the obligation to fulfil a probation period of three years retailing in the market acts as a barrier to entry preventing younger traders from moving into more profitable areas of yam trading, for example, the itinerant or large scale wholesale trade. It prohibits many retailers, not only the younger ones, from entering into this line of trade.

117. The sedentary wholesalers interviewed (one of which was the deputy Yam Queen) had been itinerant wholesalers in the past, and had become sedentary traders when they became too old or weak to continue the strenuous trips to the production areas. Although some itinerant traders were encountered who were over fifty, they were few.

Access to Finance

118. Access to finance is a major factor limiting the ability of most traders to expand their business, and therefore acts as a barrier to entry into the areas of yam trading which require higher capital investment.

Formal Credit

119. There is limited formal credit available. There is an International Fund for Agricultural Development (IFAD) project operating in the area which lends to individuals organised into groups. The total amount of credit that one person can obtain from this project is 500 000 Cedis, which must be repaid in instalments within eight months. The nominal interest rate is 38%, which means a negative real interest rate, since inflation is informally estimated to be much higher, at around 70%. The project estimates to have lent to 33 groups involved in food marketing, with 463 beneficiaries, 329 of whom were women. The majority (18) of these groups were yam marketing groups.

120. The credit disbursed is in a revolving loan fund and should in theory be sustainable. However, the repayment rate between 1992 and 1996 was low at 55%, threatening the sustainability of the project.

[5] It must be noted that the number people shown to be involved in each type of trading activity does not represent the proportion of each type of trader operating in the market, since the respondents were not randomly selected.

Informal Credit

121. Extension of credit by the large traders on an informal basis to farmers and other traders appears to be the main means of financing in the marketing chain.

122. The primary motivation for lending by the large traders to the farmers is to gain profits earned from interest payments, paid in the form of yams sold at below market prices. Owing to the sensitive nature of this information, it was not possible to establish the extent to which market prices are reduced for such repayments.

123. Another possible reason is to ensure steady supplies. Some large itinerant traders forge informal contracts with a group of 30-40 farmers, whereby the trader supplies loans and some basic farm or household items, in return for the farmers keeping the yams for that particular trader. For example, the fourth itinerant trader interviewed for the case study in Appendix 1 had established such links with farmers so that they would notify him when their yams were ready. This trader dealt with about 35 farmers, buying 2,000 to 4,000 tubers from each one for the season. He sold to sedentary wholesalers at Techiman, and also to itinerant wholesalers from Kumasi, Accra and Takoradi.

124. Farmers in Asantanso village, near Techiman Market, claimed that they were forced to sell directly after harvest, when prices are lowest, in order to repay their debt. This limits their ability to store the yams and speculate against market prices. One retailer in Techiman Market described the giving of credit to farmers by itinerant traders as a trick of the trade, enabling the traders to gain higher profits by buying the yams at below market rates.

125. Traders also benefit from extending credit to farmers before planting for the purchase of seeds and tools, since this enables the trader to have some influence over the varieties cultivated by the farmer.

126. It is also common for retailers based in the market to receive short term credit from the large traders in the form of delayed payments. Before the yams are given to the retailer a price is agreed, to be repaid on the last day of the market. Damage or losses of tubers which occur during the four days of the market, as a result of heat damage or ageing, become the responsibility of the retailer on transfer. By this means the large trader ensures forward sales, and reduces their own risk of losses.

127. One theory about the large traders' motive for lending to smaller ones is given by Scarborough et. al. 1992[6]. Here it is suggested that the motive may be to increase competition at the lower levels of marketing, thus preventing upward mobility and increased competition amongst larger traders. However, no evidence of this was observed in the field.

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[6] Scarborough V., and Kydd J., 1992. **Economic Analysis of Agricultural Markets: A Manual.** Chatham, U.K.: Natural Resources Institute.

Exchange Efficiency

128. The yam market is generally efficient in terms of exchange. There is a free market in yams, and high levels of competition among traders suggests that prices indicate to a great extent resource availability and demand. Seasonal fluctuations in prices, as shown in Gray (1996) demonstrate that prices change according to the seasonal availability of yams.

129. Exceptions to this case may occur to some extent at the point of the link between the farmers and the rest of the marketing system. As mentioned in paragraph 106, even in villages which were fairly close to a main market such as Techiman, most farmers were not aware of the current market price for yams. In remote villages the situation is more extreme. Traders who procure from these farmers are often the only buyer and therefore have power to depress the price they pay for the yams. However, the power of such traders has a limit, since if these traders offer a price which is too low, then the farmer may take the yams to market himself for sale.

130. It appears as though the itinerant traders act to smooth out locational differences in availability.

MARKETING MARGINS, RETURNS AND LOSSES

Marketing Margins and Returns

131. Appendix 1 gives detailed information about case studies analysing traders profits, discounts and losses over a four week period. Six retailers, four itinerant traders and seven sedentary wholesalers were included in the case studies. Traders were asked to keep a note of the number of heaps they bought, the losses from each heap and the price discounts they made. They were interviewed on a twice weekly basis to discuss the progress of their consignment. It must be noted that the sample size of the traders selected was not large enough for statistical analysis and the traders were not selected at random. Therefore the results are indications only.

132. Physical losses were divided into four broad categories: damaged tubers, broken tubers, old tubers and unsaleable tubers. Damaged tubers were those that had superficial grazing, were partly or wholly rotten, bruised or had evidence of termite or rodent attack. Old tubers were recognisable by their slightly shrivelled skin, and unsaleable tubers were those which were so badly rotten that the trader was unable to sell them even at a discount. It should be noted that tubers were organised into one of the four categories, and therefore, for example, tubers which were rotten and broken were classified as broken. A more in-depth statistical study would be needed in order to single out the effect of each variable on price.

133. In the analysis the term 'premium price' is used to describe the price at which the trader believes he or she will be able to sell the yams when she purchases them. Reductions from this level may occur with healthy yams as a result of fluctuations in the market resulting from an unexpected increase in the supply of yams and a fall in the price. Traders are also occasionally willing to reduce the price as a favour to regular customers. Another example of this is price discounting which was seen in one of the case studies (Retailer No.1), the price of one heap of yams was discounted by 25% since the retailer wanted to ensure quick sale since the weather was very hot, and she wanted to sell the yams before they rotted. Such reductions are likely to occur in an efficiently functioning market, and can be a sign that market information is being quickly and effectively transmitted. Such price reductions, therefore, are not regarded as a problem, and it is likely that the trader expects some reduction at the time of purchase.

134. Nonetheless, in cases where traders frequently misjudge the market and regularly make a loss, there are evidently problems in the transmission of information. Some such cases were encountered in the case studies, although it is possible that the poor performance of some traders was exaggerated because of mistrust of the research team's motives. Two of the retailers performed particularly badly during the weeks they were interviewed, one receiving small positive returns to capital and labour of just under 6,000 Cedis followed by a large negative return in the next week of 19,800 Cedis, and the other making a large negative return of just over 23,000 Cedis, followed two weeks later by a small positive return of 5,400 Cedis. Clearly these retailers could not remain in business if such a performance were maintained over a long period. Other retailers performed much better, one making good returns of nearly 33,000

Cedis in one week followed by a return of over 57,000 Cedis. Such returns are relatively good, considering that a high level civil servant earns around 100,000 Cedis a month.

135. The itinerant traders make the highest returns to labour and capital of all the yam traders, for example, Itinerant Trader No. 4 secured returns to labour and capital of 768,000 Cedis on one consignment. This was a return on capital employed (ROCE)[7] of 16% (calculated by dividing the return of 768,000 Cedis by the sum of marketing costs and buying price of 4,771,600 Cedis). By contrast Itinerant Trader No. 3 made very low returns of 12,400 Cedis on one consignment, a return on capital employed of 4%, but he said that this was because he was concentrating on working on his farm and only brought four heaps to market. Itinerant Trader No.1 made a total return of 124,600 Cedis (return on capital employed of 7%) and Itinerant Trader No. 2 made a total return of 563,000 Cedis (return on capital employed of 18%).

136. The returns gained by itinerant traders on individual heaps are often quite low, but they generally procure many heaps (between 20 and 30) in one consignment, which makes their turnover, and therefore profits, much higher. It must be remembered, however, that while the other traders' profits were calculated on a week's trading, the itinerant trader usually spends eight to ten days procuring yams, and then rests for a few days before going back to the producing areas. One consignment probably represents two week's work for the itinerant trader.

137. As would be expected, the itinerant trade bears the greatest burden of the marketing costs, which include transport, taxes and loading and offloading. Their marketing costs constituted a high proportion of their marketing margin at around 63% (ranging from 46% for Itinerant Traders No. 2 and 4 to 85% for Itinerant Trader No. 3).

138. The returns of the sedentary wholesalers in the case studies were lower than those of the itinerant traders. The sedentary wholesalers bear less risk than the itinerant traders, since they buy and sell within a relatively short period of time within the same market. Three sedentary traders received returns to labour of around 24,000-25,000 Cedis (return on capital employed of 3%, 9% and 13% respectively for the three traders) and one made returns of 59,000 Cedis on one consignment (return on capital employed of 20%). It should be noted that these returns are not significantly lower than those of the itinerant traders, especially considering the fact that the sedentary traders get these returns in a period of around one week or less, while the itinerant traders gain the returns over a four week period.

139. While it is not possible to draw concrete conclusions from this, it suggests that the sedentary wholesalers may wield more power in the market and thus generate higher returns. For example, it is possible that they have means of preventing traders

[7] The ROCE is a financial indicator which shows the returns as a percentage of the total capital employed (i.e. buying price of the yams plus marketing costs). It must be noted that the time period in which the returns are gained is important, for example, retailers and sedentary wholesalers turnover one consignment over a period of a week or two. For the itinerant traders, however, the turnover is slower, with larger volumes, and one consignment may take a period of three weeks or more between purchase and resale.

entering into the sedentary wholesale trade, or they may oblige certain traders to sell to them rather than directly to retailers. However, while several retailers said that at times of shortage they were obliged to purchase from the sedentary wholesalers rather than directly from the itinerant traders, no evidence was found for sedentary wholesalers preventing other traders enter into their trading activity.

140. Retailers' returns were much lower than the itinerant traders, and there were large variations between retailers in terms of the profits they earned. Over the four weeks, Retailer No. 1 achieved average returns of around 21,000 Cedis, and had the best average return on capital employed of all the retailers of 7%. Retailer No. 4 received average returns of 13,000 Cedis, an average return on capital employed of 3%, and Retailer No. 6 received 9,000 Cedis on average, an average return on capital employed of 6%. The remaining 3 retailers fared much worse, although it is probably the case that mistrust led to inaccuracies in data collection. All three had negative average returns, and returns on capital employed of -5%, -36% and -0.5% respectively.

141. Retailers use various techniques to maximise profits in the face of difficult market conditions. One example of such a technique which was observed was the sorting of a heap of a certain grade of tubers into smaller and larger ones, selling the smaller ones first while they are still fresh, and selling the larger ones later at the same price. A similar tactic was used by another retailer one week when there was a shortage of yams on the market and the price was high. She sold retail piles of mixed grade 1 and grade 2 Puna, which enabled her to sell her heap of grade 2 Puna without having to reduce the price.

142. Retailers were also seen to sort a heap of tubers and upgrade a part of the heap, thus enabling them to sell them for a higher price.

143. Farmers were found to receive a high percentage of the wholesale price, generally ranging between 60% and 80%, although without more information on production costs, it is not possible to calculate their returns to capital and labour.

Physical and Financial Losses

144. A summary of the results of physical and financial losses is given in Table 2.

Table 2: Summary of physical and financial losses

Type of loss	% of heaps affected	Extent of loss for all heaps	Average price discount per tuber affected	Average price discount for all heaps
Damage	38%	7%	34%	2%
Breakage	13%	0.3%	41%	0.1%
Ageing	17%	3%	19%	1%

The six retailers included in the case studies sold a total of 47 heaps of yams, each consisting of 109 tubers, over the period of the study.
Note: the term 'damage' is used to describe tubers which were grazed, rotten, bruised or had evidence of termite or rodent attack.

145. There was some evidence of damage due to rot in the retailers' consignments, but it was limited, probably because the study was carried out during the harvest

season when the yams were fresh, and the weather at the time of the study was cooler than later in the season. From January the weather becomes much hotter and traders claimed that much higher losses occur because the tubers are older and many are spoilt by heat damage.

146. Thirty eight percent of the heaps observed (18 heaps) contained some tubers which were damaged in some way, although it must be noted that much of the damage was superficial, for example, skin grazing. The average occurrence of damage for all the heaps observed (those containing no damaged tubers as well as those containing damaged tubers) was 7%.

147. The average price discount resulting from the damage per damaged tuber was 34% of the premium price, ranging from 0% to 79%. For all the heaps examined (including those with no damaged tubers) the average price discount resulting from damage was 3% of the premium price.

148. Only six heaps contained broken tubers, resulting in a physical loss of 0.3% of all heaps. Since breakage is easy to detect at the point of purchase, it is likely that the retailers reject the broken tubers, either by asking for a price discount on the heap, or by asking the seller to replace them with good tubers. Within the market, the yams are carefully handled and therefore occurrence of breakage is minimal.

149. Breakage led to a large price discount per tuber of on average 41% of the premium price, but since the occurrence of breakage was so small, the average reduction in the price for the whole sample was only 0.1% of the premium price.

150. Seventeen percent of heaps (8 heaps) contained tubers which were affected by ageing, and the incidence for all the heaps was on average 3% of tubers in the heap. Each ageing tuber was discounted by an average of 19% of the premium price, and the price reduction on the whole sample resulting from ageing was 1% of the premium price.

151. The losses of itinerant traders were less clear to determine, since at this time of year they sell a heap for a certain price, and included in the price is the assumption that some of yams will be damaged in some way. Retailers are free to inspect the yams and reject any that they feel are bad, but they claimed that they often do not have the time nor the space to inspect all the yams in a heap before payment. Once the yams have been purchased, the chances of the retailer getting replacements for rotten yams are slim.

152. Retailers who find themselves burdened with rotten yams use various methods to disguise the extent of the damage. Examples of such methods which were observed are mixing of good and bad yams in a pile and smearing mud on the yams to disguise holes and bruises.

153. The price discounts made by sedentary wholesalers as a result of losses were also less clear to detect. Again, it is likely that they made a good estimation of the quality of the heap before they purchased it in order to mark-up the price for resale.

Since they sell in units of one heap rather than in smaller units, physical losses are accounted for in the price of the whole heap.

154. There appears to be a market for damaged tubers. Occasionally retailers buy heaps of damaged tubers at a discount from the wholesalers. For example, in week 1, Retailer No. 3 bought a heap of damaged grade 1 Puna tubers for 70,000 Cedis (the prevailing market price for premium tubers was 150,000 Cedis), cut off the damaged parts and sold them for 2,500 per pile (instead of 5,000 Cedis per pile for undamaged tubers). The willingness of retailers to do this suggests that a market exists for lower quality produce sold at discounted prices. Few consumers interviewed, however, were willing to buy damaged tubers at a discount, since they claimed that they did not store well. Only when the consumer was sure that they would eat the yam within one or two days would they consider buying damaged tubers. The main market for damaged tubers appears to be the cooked food sellers, who roast or fry portions of yam for sale in the market and around the town.

APPENDICES

Appendix 1: Calculation of Marketing Margins, Profits and Financial Losses

Marketing margins, profits and losses due to rotten or damaged tubers were examined using case studies of six retailers, four itinerant traders and five sedentary wholesalers over a four week period between 28th October and 24th November.

The calculations of margins, profits and discounts are shown in the tables.

1. Retailers

Retailer 1

WEEK 1 (28TH OCTOBER - 3RD NOVEMBER)

Four heaps of grade 2 Puna were purchased in week 1 at different prices (C100,000, 110,000 Cedis, C120,000 and C130,000 per heap). One heap of grade 3 Puna was purchased for 80,000 Cedis.

During the first week, the premium retail price[1] of grade 2 Puna was 4,000 Cedis per pile of 3, and 263 tubers were sold at this price. Ten piles were discounted to 3,500 Cedis after negotiation with consumers. The whole heap of grade 3 Puna was sold at the premium price of 2,600 Cedis per pile of three.

Six tubers which were broken were reduced from 4,000 Cedis to 2,500 Cedis per pile and sold to a food seller.

The following week, 76 of the remaining tubers were still in good condition but were nonetheless discounted to 3,000 Cedis per pile, since they were older than those from the new consignment.

In addition, there were 52 partially rotten yams, and these were sold for 14,400 Cedis to a food seller. Nine of the yams were completely unsaleable due to extensive rot.

In week 1, the retailer added a total marketing margin of 35,500 Cedis to the wholesale price for the five heaps sold, which gave a total profit of 31,200 Cedis (average of 6,240 Cedis per heap), once the marketing costs were deducted. The grade 2 Puna was deducted by an average of 25,000 Cedis per heap (17% of the premium price of 4,000 per heap) as a result of damage or rot, breakage and ageing.

WEEK 2 (4TH - 10TH NOVEMBER)

Five heaps of yams were purchased in week 2, one grade 1 Puna, one grade 2 Puna, two grade 3 Puna and one grade 2 Tila.

In week 1, trading had been slow since there were too many yams on the market, and many retailers had been unable to sell all of the yams they purchased in that week. In contrast, in week 2, there was a scarcity of yams on the market and so the price was very high. One retailer explained that in that week consumers preferred to buy smaller yams to the bigger ones, since the big yams were too expensive.

For this reason, the retailer decided to mix grade 1 and grade 2 Puna in a pile, since she felt that a pile consisting only of grade 1 would be too expensive. The initial price for a pile of mixed grade 1 and grade 2 was 5,500 Cedis, but on the Sunday of that week[2], the price of the unsold tubers (21 piles) was reduced to 5,000 Cedis per pile. Six tubers were unsaleable due to heat damage. Fifteen grade 1 Punas were partially rotten, and the cut portions were sold for a total of 18,000 Cedis. The marketing margin added to the wholesale price for the two heaps was 28,600 Cedis, and price of the heaps was

[1] This refers to the price at which the retailer expects to be able to sell the healthy tubers.

[2] Trading activity is very limited from Saturday to Monday, and only a handful of retailers operate on these days.

reduced by a total of 15,500 (8% of the premium price) as a result of ageing or rotting. The retailer claimed a loss of 25,000 Cedis on the sale of these two heaps, but a calculation of her costs and revenue suggests that she in fact made a profit of 26,800 Cedis.

One heap of grade 3 Puna was retailed at 3,500 Cedis per pile, but the price for the other heap was reduced to 3,000 Cedis per pile. Seven yams were unsaleable due to extensive rot, and 9 others which were partially rotten (6 from heat and 3 from damage sustained at the farm) were cut into pieces and sold for a total of 3,000 Cedis. Twenty-one other tubers became partially rotten during the time they were in the market, and the cut parts were sold at 500 Cedis and 667 Cedis per tuber portion. Because of these discounts, which amounted to 41,000 Cedis (16% of the premium price), the retailer sold the two heaps for 7,000 Cedis less than the wholesale price, and therefore made a loss.

From the same consignment retailer 1 expected to be able to sell the Tila at 2,000 Cedis per pile of three. However, the trader could see that due to the intense heat of the sun, there was a likelihood of heat damage, and as a loss reduction measure, she reduced the price to 2,000 Cedis per pile of four tubers to ensure a quick sale. This meant a reduction of 25% of the premium price, and added a marketing margin of only 4,500 Cedis to the wholesale price.

In week 2, the retailer added a total marketing margin of 26,100 Cedis to the wholesale price for the five heaps sold, which gave a total profit of 18,000 Cedis (average of 3,600 Cedis per heap), once the marketing costs were deducted. Price reductions resulting from damage or rot, breakage and ageing amounted to 15,500 Cedis per heap (8% of the premium price) for the grade 1 and 2 Puna, 41,400 Cedis (16% of the premium price) for the grade 3 Puna, and 18,200 Cedis (25% of the premium price) for the Tila.

WEEK 3 (11TH - 17TH NOVEMBER)

Retailer 1 bought only two heaps in week 3, one heap of grade 4 Puna, which she bought for 80,000 Cedis and one heap of grade 4 Tila, which she bought for 85,000 Cedis.

She managed to sell both heaps for the premium price of 2,500 Cedis per pile of 3. In order to maximise the revenue from the heap of Tila, the retailer regraded the heap into smaller and larger tubers sold at 2,000 Cedis and 3,000 Cedis per heap respectively.

She made a total profit of 14,400 in week 3.

WEEK 4 (18TH - 24TH NOVEMBER)

Four heaps were purchased in week four, one grade 2 Puna, two grade 3 Puna and one grade 2 Tila. Despite the fact that retailer 1 claimed that the hot weather was causing the yams to rot faster, two of the four heaps were sold at the premium price. Twenty-six piles of the grade 3 Puna were reduced by 1,000 Cedis to 2,000 Cedis per heap and 10 piles out of the 36 piles of Tila were reduced from 3,000 Cedis to 2,500 Cedis per pile, resulting in a price discount of 25% for the Puna and 6% for the Tila. Her profit in week 4 was 19,900 Cedis.

Retailer 2

WEEK 1 (28TH OCTOBER - 3RD NOVEMBER)

Retailer 2 bought four heaps of tubers in week 1, one grade 1 Puna, two grade 2 Puna and one grade 1 Tila.

Of the grade 1 Puna, 77% was sold at the premium price of 5,000 Cedis per pile. Thirteen of the grade 1 Puna tubers and 12 of the grade 4 Puna tubers rotted due to a combination of heat damage in the market, which was the major cause, and damage sustained at the farm, which was the minor cause. Damaged grade 1 Puna, which had less than half the tuber cut away, sold at 1,000 Cedis per tuber instead of premium price of 1,600 Cedis, and damaged grade 4 Puna, with more than half the tuber cut away, sold at 1,000 Cedis per pile instead of premium price of 2,000 Cedis. Extensive

nematode infestation on some Tila tubers[3] forced the retailer to reduce their retail price from 4,000 Cedis to 3,500 Cedis per pile.

A reduction in price by 16% of the premium price resulted in retailer 2 selling the grade 1 Puna at a price of 12,000 Cedis lower than the wholesale price, and therefore making a loss on that heap. One of the heaps of grade 4 Puna was sold for the premium price, 10,800 Cedis higher than the wholesale price, and 11% of the other heap was sold at a discount of 6% of the premium retail price, 8,700 Cedis higher than the wholesale price. The grade 1 Tila was sold at a reduction of 13% of the premium price, at a price of 2,800 Cedis higher than the wholesale rice. The total profit from the week's consignment was just 5,900 Cedis.

WEEK 2 (4TH - 10TH NOVEMBER)

Since prices were higher in week 2, as a result of scarcity of yams, retailer 2 mixed grade 2 and grade 3 Puna and sold them for 3,000 Cedis per pile. The following week, 11 piles remained unsold, but the retailer was not willing to reduce the price, and made a loss of 19,800 Cedis on the week's consignment.

WEEK 3 (11TH - 17TH NOVEMBER)

The retailer sorted the heap of grade 2 Puna into smaller and larger tubers and sold them at 3,000 Cedis and 3,500 Cedis per pile respectively.

WEEK 4 (18TH - 24TH NOVEMBER)

Retailer 2 was not at the market when the team visited as she had attended a funeral. Her fellow traders informed the team that she had suffered a substantial loss on a heap of Tila that week, with 70 tubers being unsaleable due to rot.

Retailer 3

WEEK 1 (28TH OCTOBER - 3RD NOVEMBER)

Retailer 3 bought four heaps of yam in week 1, three heaps of Puna were bought, two of which were grade 1, and one grade 2, and one heap of grade 2 Tila. One of the heaps of grade 1 Puna was damaged and was therefore bought from the wholesaler at a substantially reduced price of 70,000 Cedis for the heap. Portions of the tubers from this heap then had to be cut away before sale, but a higher marketing margin (of 20,800 Cedis) was added to these damaged tubers than was added to the healthy grade 2 Puna (5,300 Cedis).

All of the heaps apart from four partially rotten grade 1 Puna from the healthy heap of Puna were sold at the premium price (Puna grade 1 for 5,000 per pile (damaged Puna grade 1 for 2,500 per pile); Puna grade 2 for 4,000 Cedis per pile; and Tila for 3,500 per pile).

The rotten Puna were discounted to 1,200 Cedis from 1,667 Cedis per tuber.

In week 1, the retailer added a total marketing margin of 78,100 Cedis to the wholesale price for the four heaps sold, and suffered a very small price discount as a result of rot (1,900 Cedis, only 1% of the premium price of 181,700 Cedis for the heap of grade 1 Puna) as a result of rot. Her profit for the week was 32,900 Cedis (average of 8,225 Cedis per heap).

[3] Nematode infestation is recognisable on the tuber, since it causes rough, deeply lined skin, and a brown discolouration under the surface of the skin.

WEEK 2 (4TH - 10TH NOVEMBER)

Retailer 3 had purchased just one heap of grade 1 Puna in week two, and sold it all within the same week. Six piles of Puna were sold at 6,000 Cedis, and the remainder of the heap was sold at 5,000 Cedis. The margin added onto the wholesale price was 17,600 Cedis, and she made a profit of 57,300 Cedis for the week.

Retailer 4

WEEK 1 (28TH OCTOBER - 3RD NOVEMBER)

Retailer 4 bought three heaps in week 1, one heap of Puna grade 2 for 140,000 Cedis, one heap of Puna grade 3 for 95,000 Cedis and one heap of Tila grade 2 for 85,000 Cedis.

The retailer intended to sell the grade 2 Puna for 5,000 Cedis per pile, but since some of the tubers were damaged, she had to cut away the rotten portions of 15 tubers sell them for between 300 Cedis and 800 Cedis a piece (900-2,400 Cedis per pile). The retailer stores her yams in a shed, protected from direct sunlight, and therefore suspected that the damage had occurred at the farm as a result of careless harvesting.

All of the grade 3 tubers were sold for the premium price, but 25 Tila tubers were unsold due to rot and the trader claimed to have made a loss of 25,000 Cedis on the sale of the heap. She suspected that the tubers had been exposed to the sun at the farm, as signs of heat damage appeared after two days storage at the market.

The trader added a total marketing margin of only 6,000 Cedis to the wholesale price for the three heaps sold, and obtained a profit of 2,700 Cedis for the week.

WEEK 2 (4TH - 10TH NOVEMBER)

In week 2 the retailer bought two heaps of yams, one grade 1 Puna for 170,000 Cedis and one grade 2 Tila for 80,000 Cedis.

She intended to sell the Puna for 5,000 Cedis per pile, but discounted seven heaps to 4,000 Cedis per pile. One pile was unsaleable due to rot. She sold the heap for a total of 400 Cedis less than the wholesale price, and therefore made a loss.

She managed to sell the Tila for the premium price of 2,500 Cedis per pile.

She added a total marketing margin of 10,400 Cedis to the wholesale price for both heaps, and made a profit of 8,200 Cedis for the week.

WEEK 3 (11TH - 17TH NOVEMBER)

On the team's subsequent visit to this trader, she claimed that the wholesale prices that she had quoted a week earlier were in fact lower (by 5,000 - 10,000 Cedis), and so her profit margin was greater than the team had been previously led to believe.

In week 3 she bought five heaps: one heap of grade 1 Puna for 160,000 Cedis, one heap of grade 2 Puna for 85,000 Cedis, one heap of a variety known as Dorkuban (grade 2) for 60,000 Cedis, one heap of grade 3 Dorkuban for 40,000 Cedis and one heap of Dente for 85,000 Cedis.

She wholesaled the Puna grade 1 for 90,000 for one half heap and 81,000 Cedis for the other half. She also divided the grade 2 Puna in half and sold one half for 47,000 Cedis and the other half for 45,000 Cedis.

Dorkuban grade 2 was also wholesaled at 35,000 Cedis for half a heap. Dorkuban grade 4 was regraded into smaller and larger tubers, and nine piles were sold at 1,000 Cedis per pile of 3 (333

Cedis per tuber), with the remainder being sold at 2,000 Cedis per pile of 4 (500 Cedis per tuber). In week 3 her profit was 27,300 Cedis.

WEEK 4 (18TH - 24TH NOVEMBER)

Retailer 4 bought few yams this week since she had a limited cash flow due to credit sales the previous week. In week 4 she was waiting for her customers to repay.

Retailer 5

WEEK 2 (4TH - 10TH NOVEMBER)

Retailer 5 bought four heaps of yams in week 2, all were Puna, grades 1, 3 4 and 5.

She intended to sell the grade 1 Puna for 5,000 Cedis per heap, but 13 tubers were partially rotten and were cut into pieces and mixed with seven partially rotten grade 3 Puna. The whole batch sold for 8,000 Cedis. Only 30 tubers of the grade 3 Puna were sold at the premium price of 3,500 Cedis per pile, and apart from the seven rotten tubers the rest were reduced to 3,000 Cedis per pile. She was unable to sell the grade 4 Puna at the premium price of 2,500 Cedis per pile, and was forced to reduce them to 2,000 Cedis. The premium price for grade 5 Puna was 2,000 Cedis per pile of 3, and 10 heaps were sold at this price, but the rest was reduced to 2,000 Cedis per pile of 4.

The retailer claimed that all the yams in her consignment had to be discounted due to a slow moving market, and she therefore made a loss. However, very little discounting was necessary as a result of rot or damage. Her loss in week 2 was 23,200 Cedis.

WEEK 4 (18TH - 24TH NOVEMBER)

The retailer claimed that the market was still moving slowly, and she therefore bought just one heap of Puna grade 1, as there was a risk of being unable to sell a larger quantity. She managed to sell the whole heap, with 94 tubers selling for the premium price of 3,000 Cedis per pile and the rest selling at a discount at 2,500 Cedis per pile.

She made a small profit of 5,400 Cedis for the week, which was insufficient to recoup the losses borne in week 2.

WEEK 5 (25TH NOVEMBER - 1ST DECEMBER)

The retailer had sorted the grade 2 Puna into two sizes; some retailing at 4,000 Cedis per pile, and some at 3,000 Cedis per pile. Similarly, the grade 3 Puna was sorted into two sizes, one selling for 2,500 Cedis per pile and the other for 2,000 Cedis per pile. She explained that this time is the beginning of the hot season when many yams rot due to heat damage. Most of the damaged yams are presently coming from the farm.

Retailer 6

WEEK 2 (4TH - 10TH NOVEMBER)

Retailer 6 bought three heaps of yams in week 2: one heap of Puna grade 3 for 100,000 Cedis, one heap of Puna grade 5 for 75,000 Cedis and one heap of Tila grade 3 for 55,000 Cedis.

The premium price of the grade 3 Puna was 3,500 Cedis per pile, but no tubers were sold for this price, and the retailer was forced to reduce the price to 2,500 Cedis per pile because of the conditions in the market. Ten tubers were partially rotten and were sold at 1,000 Cedis per pile. One pile which did not sell in week 2 was reduced to 2,000 Cedis the next week, since they were older than the other tubers on the market.

The grade 5 Puna was sorted into smaller and larger tubers. Thirty six tubers were retailed at 2,000 Cedis per pile, with the remainder being sold at 2,500 Cedis per pile.

The premium price of the grade 3 Tila was 2,000 Cedis per pile of three, and the retailer managed to sell 17 piles at this price. Later she reduced the price to 2,000 Cedis per pile of four. Three of the tubers were unsaleable due to rot.

The retailer made a loss on the grade 3 Puna, selling them for 14,900 Cedis lower than the wholesale price. She added a margin of 9,800 Cedis and 6,000 Cedis onto the wholesale price of the grade 5 Puna and the grade 3 Tila respectively, but nonetheless made a loss of 2,200 Cedis for the week.

She complained that there had been many rotten yams in weeks 1 and 2, and that the buying prices were also on the high side. She believed that both of these factors, had reduced her profits.

WEEK 3 (11TH - 17TH NOVEMBER)

The retailer bought two heaps in week 3, one of grade 5 Puna and one of grade 3 Tila, both of which she bought for 80,000 Cedis.

She sold five piles of the Puna for the premium price of 3,500 Cedis per pile. Seven piles of tubers were damaged and were discounted to 2,500 per pile and 17 piles were sold the following week at a reduced price of 2,300 Cedis per pile since the tubers were older. She also discounted four other piles of healthy tubers to 2,300 per pile because of the conditions in the market.

Four piles of the Tila were sold at the premium price of 2,500 Cedis per pile and the rest were discounted to 2,400 Cedis per pile to ensure that they would sell within the week. She managed to make a profit of 20,600 Cedis from the week's trading.

Itinerant Traders

Itinerant 1

WEEK 2 (4TH - 10TH NOVEMBER)

The itinerant trader 1 bought 18 heaps in week 2, of Dente, Tenya, Muchumudu, Puna and Kyiri Kumasi varieties from BuoTumtum, 134 kilometres from Techiman market.

She had been hoping to sell the Kyiri Kumasi at 110,000 Cedis, but this variety is very soft and many of the tubers had broken during transport to the market. She therefore had to sell them at 90,000 Cedis per heap. She claimed to have made a loss, but analysis of her costs and revenue shows that she made a small profit of 5,600 Cedis for the 3.5 heaps of this variety, and she also made a small profit of 3,200 Cedis for two heaps of grade 1 Dente.

She made her largest profits of the week on the sale of 11 heaps of Muchumudu at a profit of 122,600 Cedis (average profit of just over 11,000 Cedis per heap) which she had sorted into four different sizes for sale.

However, she did make a loss of 8,400 Cedis on both the grade 1 Tenya and the grade 2 Puna.

Her total profit for the consignment was 124,600 Cedis. However, she hires a bicycle in the producing area at a cost of 3,000 Cedis per day to scout for yams around the farms, and if this cost is included for 2 days (6,000 Cedis) and also her own transport costs to the production area are assumed to be 10,000 Cedis, then this reduces her profit to 108,600 Cedis.

She takes eight to ten days to procure one consignment, longer when there are transport problems such as the breakdown of vehicles, which she said occurred about twice a month. She hires a bicycle at a cost of 3,000 Cedis per day to scout for yams in the producing areas. On this trip, she hired a bicycle for two days. The yams brought to market on this occasion had been stored in a pit for one month. She claimed that there is very little rotting during this season because the climate is dry.

Itinerant 2

WEEK 3 (11TH - 17TH NOVEMBER)

The second itinerant trader was a male who had bought 20 heaps for the consignment for week 3 of the varieties Muchumudu, Puna, Dorbare, Afibetua and Dente from Daman Nkwanta, 150 kilometres from Techiman.

He had bought a consignment which he believed had been harvested eleven days previously, and had been left on the ground and covered with leaves. He found that the quality of the consignment was satisfactory and there was no rotting, although 20 tubers were broken.

He managed to make a much higher profit in week 3 than the first itinerant trader made in week 2. He made a profit on the sale of every heap, obtaining the highest profit per heap of 60,900 Cedis on the sale of grade 2 Muchumudu. The lowest profit per heap of 5,900 Cedis was gained by the sale of grade 2 Dente. His total profit for the whole consignment was 563,000 Cedis.

If additional costs such as his own transport, assumed to be 10,000 Cedis, and the cost of hiring a bicycle for two days (6,000 Cedis) are included, then his profit for the consignment would in fact be 547,000 Cedis.

He said that normally he takes about 8 days to procure and sell one consignment, but this depends on his success in bargaining for yams.

Itinerant 3

WEEK 2 (4TH - 10TH NOVEMBER)

The third itinerant trader interviewed was also a male, who had just bought a small consignment of four heaps since he has been working on his farm for the past month. Normally he buys between 10 and 20 heaps. For this consignment he bought Tila and Dorbare varieties from Aburokan, about 112 kilometres from Techiman. The yams had been stored in a pit on the farm for the past three months. It took him 5 days to buy and sell his consignment.

He made a small profit on one heap of 13,100 Cedis on grade 2 Tila, and of 6,200 Cedis on two heaps of grade 1 Dorbare. The heap of grade 2 Dorbari sold at a loss of 6,900 Cedis, and his total profit for the consignment was small at 12,400 Cedis. However, his own transport costs have not been included in the calculation of his total profit, and these costs are likely to substantially reduce his profit from the consignment.

Itinerant 4

WEEK 3 (11TH - 17TH NOVEMBER)

The fourth itinerant trader interviewed was a husband and wife team who procure yams together. For week 3 they had purchased over 3,000 tubers.

The transport cost to the producing areas for the two traders was 5,000 Cedis each. In addition, they hired a bicycle to scout for yams at 6,000 Cedis per day for 4 days. For ease of calculation, these costs have been included in the calculation of profits for the total consignment, rather than for each individual heap. The truck collected the yams straight from the farm, and there was no additional transport cost from the farm to the village.

The traders made a profit on each heap, ranging between 20,000 Cedis and 36,000 Cedis per heap. They claimed that although the profit per heap is relatively low, the bulk turnover makes the trade more profitable. Their overall profit for the whole consignment was 768,400 Cedis.

Sedentary Wholesalers

The costs of the sedentary wholesaler are very low, including only the market fee of 200 Cedis per day per heap. In the calculation of the wholesaler's profit, it is assumed that it takes an average of two days for the sale of their week's consignment. Their profits are also generally lower than itinerant traders since they have only a minor function in the market, and add no value to the heap of yams.

Sedentary Wholesaler 1

WEEK 3 (11TH - 17TH NOVEMBER)

The first sedentary wholesaler interviewed for the case study had bought only two heaps in week 3, both of which were of the Afibetua variety. She claimed that she would add a margin of 10,000 Cedis onto the purchasing price of the yams, and therefore, assuming that it took her two days to sell the yams, she made a profit of 15,600 Cedis.

The quality of the yams was generally good, although a many were bruised. Three tubers were broken, and she intended to replace them with unbroken tubers bought from market retailers, and take the broken tubers home for her own consumption or to offer a discount of C3,600 on the heap.

Sedentary wholesaler 2

WEEK 3 (11TH - 17TH NOVEMBER)

The second sedentary wholesaler was selling a consignment of three heaps of Didi tubers. The trader did not know when the yams had been harvested, but believed that they may be four months old. She added 20,000 Cedis to the buying price and received a profit of 58,800 (19,600 per heap). This appears to be a reasonably good profit, considering she devotes little time to procuring and selling the yam.

Approximately 50 tubers of Didi were chipped. Chipping appears to be characteristic of this variety as the tuber has small protrusions on its surface which chip off relatively easily during handling and transportation. However, chipping of the tubers is not a reason for reducing their price, as apart from the breakage, the quality of the tubers was satisfactory. Prices are reduced only when the quality has deteriorated, for example, due to rot. Depending on the extent of damage, partially rotten yams are sold at a discount after the spoilt portions have been removed. In cases of extensive damage, rotten tubers are replaced by sound ones which are purchased from market retailers.

Sedentary Wholesaler 3

WEEK 3 (11TH - 17TH NOVEMBER)

This sedentary wholesaler bought eight heaps of yams of Muchumudu, Tenya, Lili and Tila varieties. All the yams were in good condition, and she believed that she would be able to sell everything in two days.

She had been hoping to sell the grade 1 Tenya for 100,000 Cedis, but found that customers were only willing to pay 80,000 Cedis for this variety which she purchased at 95,000 Cedis. She therefore believed that she would incur a loss on that heap, and it appears that she did lose 15,000 Cedis on this variety.

She made a profit on each of the other heaps of between 9,200 Cedis and 13,200 Cedis. Her total profit for the week was 25,800 Cedis.

Sedentary Wholesaler 4

WEEK 3 (11TH - 17TH NOVEMBER)

This wholesaler had bought five heaps of Tila, Puna, Muchumudu and Dorbare varieties, and claimed that she planned to add a small margin of between 4,000 Cedis and 7,000 Cedis onto the buying price.

If she sold the yams as expected then she would make a profit of 25,800 Cedis, assuming that it took her two days to sell the whole consignment.

She had to retail the Puna since there was no buyer for the entire heap and she claimed that she would also retail the other varieties if there were no customers for whole heaps. If the market is slow, then she is planning to reduce the price, particularly if she has made a profit on some of the heaps.

Sedentary Wholesaler 5

WEEK 3 (11TH - 17TH NOVEMBER)

This wholesaler had bought one heap of Muchumudu and one heap of Didi, and planned to add 10,000 Cedis to the buying price of each of the heaps, which would have given her a profit of around 19,200 Cedis for both heaps.

Sedentary Wholesaler 6

WEEK 2 (4TH - 10TH NOVEMBER)

The wholesaler had bought five heaps of Tila grades 1 and 2, and planned to add 20,000 Cedis to the buying price of each heap of grade 1 Tila, and 30,000 Cedis to the buying price of each heap of grade 2 Tila. However, since fifteen of the grade 1 tubers were partially rotten, she could not sell them and therefore used them for her own consumption. In the tables, the price of these rotten tubers has been estimated and deducted from her expecting buying price, leaving her with an estimated profit of 13,295 Cedis for each heap. Her total profit for the week was 42,495 Cedis.

WEEK 4 (18TH - 24TH NOVEMBER)

In week 4 she bought six heaps of the Tila and Namtò varieties. She planned to add 25,000 Cedis to C30,000 per heap, which would have given her a profit of 57,600 Cedis for the whole consignment. Her claim that she adds such a high margin onto each heap does not conform with the reports of other sedentary wholesalers, who claim to add margins of 5,000 Cedis to C10,000 per heap. This illustrates the difficulty of obtaining reliable information from some traders.

WEEK 5 (25TH NOVEMBER - 1ST DECEMBER)

In week 5 she bought only three heaps of Tila and Muchumudu varieties. Again she planned to add a large margin of 25,000 to 30,000 Cedis, which would give her a profit of 53,800 Cedis for the week's consignment.

Sedentary Wholesaler 7

She bought two heaps in week 3 and three heaps in week 4, adding margin of between 5,000 and 1,000 Cedis to each heap. In week 3, if her sales went as planned, her profits would be 10,500 Cedis for the whole consignment, and in week 4 they would be 23,800 Cedis.

Intermediaries

There are many intermediaries in the market acting on behalf of the buyers and sellers. The intermediaries bargain for the price of the yams and receive a commission of around 2,000 Cedis per heap.

TECHIMAN MARKET: Calculation of Marketing Margins, Return to Labour and Capital and Financial Losses

Retailer No.1.

Variety of yam	Puna G2	Puna G3	Total wk 1	Puna G1	Puna G2	Puna G3	Tila G2	Total wk 2
	Week 1			Week 2				
Date purchased	29/10/96	29/10/96		05/11/96	05/11/96	05/11/96	05/11/96	
Quantity purchased/heaps	4	1	5	1	1	2	1	5
Wholesale price/heap	115,000	80,000		200,000	140,000	110,000	50,000	
Total wholesale price	460,000	80,000	540,000	200,000	140,000	220,000	50,000	610,000
Premium retail price/tuber	1,333	867		1,833	1,833	1,167	667	
Max. potential revenue/heap	145,300	94,500		199,800	199,800	127,200	72,700	
Max. marketing margin/heap	30,300	14,500		-200	59,800	17,200	22,700	
Max. potential revenue	581,200	94,500		199,800	199,800	254,400	72,700	
Max. marketing margin	121,200	14,500		-200	59,800	34,400	22,700	
No. of damaged tubers sold	52	0		15 *		9	0	
Damaged tubers as % of total	12%	0%		7%		4%	0%	
Price per damaged tuber	278	0		1,200		333	0	
Revenue from damaged tubers	14,400	0		18,000		3,000	0	
% Price discount per tuber	79%	0		35%		71%	0	
No. of broken tubers sold	6	0		0		9	0	
Broken tubers as % of total	1%	0%		0%		4%	0%	
Price per broken tuber	833	0		0		667	0	
Revenue from broken tubers	5,000	0		0		6,000	0	
% Price discount per tuber	38%	0		0		43%	0	
No. of older tubers sold	76	0		0		12	0	
Older tubers as % of total	17%	0%		0%		6%	0%	
Price per older tuber	1,000	0		0		500	0	
Revenue from older tubers	76,000	0		0		6,000	0	
% Price discount per tuber	25%	0		0		57%	0	
No. of discounted tubers sold	30	0		63		79	109	
Discounted tubers as % of total	7%	0%		29%		36%	100%	
Price per discounted tuber	1,167	0		1,667		1,000	500	
Revenue from discounted tubers	35,000	0		105,000		79,000	54,500	
% Price discount per tuber	12%	0		9%		14%	25%	
No. of premium tubers sold	263	109		134		102	0	
Premium tubers as % of total	60%	100%		61%		47%	0%	
Price per premium tuber	1,333	867		1,833		1,167	0	
Revenue from premium tubers	350,600	94,500		245,600		119,000	0	
No. of unsaleable tubers (spoilt)	9	0		6		7	0	
Unsaleable tubers as % of total	2%	0%		3%		3%	0%	
No. of tubers remaining unsold	0	0		0		0	0	
Total revenue	481,000	94,500	575,500	368,600		213,000	54,500	636,100
Revenue/heap	120,200	94,500		184,300		100,500	54,500	
Total marketing margin	21,000	14,500		28,600		-7,000	4,500	
Marketing margin/heap	5,200	14,500		14,300		-3,500	4,500	
Reduction in revenue/heap	25,050	0		15,500		20,700	18,200	
Reduction as % of premium price	17%	0		8%		16%	25%	
Marketing Costs								
Market fees (2 days)	400.00	400.00		400.00		400.00	400.00	
Porter's fees/ heap	500.00	500.00		500.00		500.00	500.00	
Watchman (2 nights)/ heap	200.00	200.00		200.00		200.00	200.00	
Total marketing costs	3200	1100	4300	1800		1800	1100	4700
Return to Labour and Capital	17,800	13,400	31,200	26,800		-8,800	3,400	18,000

Note: One heap is: 109 tubers

G = Grade

* the two heaps of Puna G1 and G2 were joined together for sale

TECHIMAN MARKET: Calculation of Marketing Margins, Return to Labour and Capital and Financial Losses

Retailer No.1.

Variety of yam	Puna G4	Tila G4	Total wk 3	Puna G2	Puna G3	Puna G3	Tila G2	Total wk 4
	Week 3			Week 4				
Date purchased	12/11/96	12/11/96		20/11/96	20/11/96	20/11/96	20/11/96	
Quantity purchased/heaps	1	1	2	1	1	1	1	4
Wholesale price/heap	80,000	85,000	165,000	130,000	100,000	90,000	95,000	415,000
Total wholesale price	80,000	85,000	165,000	130,000	100,000	90,000	95,000	415,000
Premium retail price/tuber	833	833		1,333	1,000	1,000	1,000	
Max. potential revenue/heap	90,800	90,800		145,300	109,000	109,000	109,000	
Max. marketing margin/heap	10,800	10,800		15,300	9,000	19,000	14,000	
Max. potential revenue	90,800	90,800		145,300	109,000	254,400	109,000	
Max. marketing margin	10,800	5,800		15,300	9,000	164,400	14,000	
No. of damaged tubers sold	0	0		0	0	78	0	
Damaged tubers as % of total	0%	0%		0%	0%	72%	0%	
Price per damaged tuber	0	0		0	0	667	0	
Revenue from damaged tubers	0	0		0	0	52,000	0	
% Price discount per tuber	0	0		0	0	33%	0	
No. of broken tubers sold	0	0		0	0	0	0	
Broken tubers as % of total	0%	0%		0%	0%	0%	0%	
Price per broken tuber	0	0		0	0	0	0	
Revenue from broken tubers	0	0		0	0	0	0	
% Price discount per tuber	0%	0		0		0%	0	
No. of older tubers sold	0	0		0		0	0	
Older tubers as % of total	0%	0%		0%	0%	0%	0%	
Price per older tuber	0	0		0	0	0	0	
Revenue from older tubers	0	0		0	0	0	0	
% Price discount per tuber	0%	0%		0%	0%	0%	0%	
No. of discounted tubers sold	0	0		0	0	0	30	
Discounted tubers as % of total	0%	0%		0%	0%	0%	28%	
Price per discounted tuber	0	0		0	0	0	833	
Revenue from discounted tubers	0	0		0	0	0	25,000	
% Price discount per tuber	0	0		0	0	0	17%	
No. of premium tubers sold	109	109		109	109	30	78	
Premium tubers as % of total	100%	100%		100%	100%	28%	72%	
Price per premium tuber	833	833		1,333	1000	1,000	1,000	
Revenue from premium tubers	90,800	90,800		145,300	109000	30,000	78,000	
No. of unsaleable tubers (spoilt)	0	0		0	0	0	0	
Unsaleable tubers as % of total	0%	0%		0%	0%	0%	0%	
No. of tubers remaining unsold	0	0		0	0	0	0	
Total revenue	90,800	90,800	181,600	145,300	109000	82,000	103,000	439,300
Revenue/heap	90,800	90,800		145,300	109000	82,000	103,000	
Total marketing margin	10,800	5,800		15,300	9000	-8,000	8,000	
Marketing margin/heap	10,800	5,800		15,300	9000	-8,000	8,000	
Reduction in revenue/heap	0	0		0	0	27,000	6,000	
Reduction as % of premium price	0%	0		0%	0	25%	6%	
Marketing Costs								
Market fees (2 days)	400.00	400.00		400.00	400.00	400.00	400.00	
Porter's fees/ heap	500.00	500.00		500.00	500.00	500.00	500.00	
Watchman (2 nights)/ heap	200.00	200.00		200.00	200.00	200.00	200.00	
Total marketing costs	1100	1100	2200	1100	1100	1100	1100	4400
Return to Labour and Capital	9,700	4,700	14,400	14,200	7,900	-9,100	6,900	19,900

Note: One heap is: 109 tubers

G = Grade

Retailers

TECHIMAN MARKET: Calculation of Marketing Margins, Return to Labour and Capital and Financial Losses

Retailer No.2.

Variety of yam	Puna G1	Puna G4	Puna G4	Tila G1	Total wk 1	Puna G2	Puna G3	Total wk 2
	Week 1					Week 2		
Date purchased	30/10/96	29/10/96	30/10/96	29/10/96		06/11/96	07/11/96	
Quantity purchased/heaps	1	1	1	1	4	1	1	1
Wholesale price/heap	165,000	80,000	60,000	140,000		100,000	100,000	
Total wholesale price	165,000	80,000	60,000	140,000		100,000	100,000	
Premium retail price/tuber	1,667	833	667	1,500		1,000	1,000	
Max. potential revenue/heap	181,700	90,800	72,700	163,500		109,000	109,000	
Max. marketing margin/heap	16,700	10,800	12,700	23,500		9,000	9,000	
Max. potential revenue	181,700	90,800	72,700	163,500		109,000	109,000	
Max. marketing margin	16,700	10,800	12,700	23,500		9,000	9,000	
No. of damaged tubers sold	13	0	12	0		3 *		
Damaged tubers as % of total	12%	0%	11%	0%		3%		
Price per damaged tuber	1000	0	333	0		0		
Revenue from damaged tubers	13,000	0	4,000	0		0		
% Price discount per tuber	40%	0	50%	0		0		
No. of broken tubers sold	0	0	0	0		0		
Broken tubers as % of total	0%	0%	0%	0%		0%		
Price per broken tuber	0	0	0	0		0		
Revenue from broken tubers	0	0	0	0		0		
% Price discount per tuber	0%	0%	0%	0%		0%		
No. of older tubers sold	0	0	0	0		0		
Older tubers as % of total	0%	0%	0%	0%		0%		
Price per older tuber	0	0	0	0		0		
Revenue from older tubers	0	0	0	0		0		
% Price discount per tuber	0%	0%	0%	0%		0%		
No. of discounted tubers sold	0	0	0	15		0		
Discounted tubers as % of total	0%	0%	0%	14%		0%		
Price per discounted tuber	0	0	0	1,167		0		
Revenue from discounted tubers	0	0	0	17,500		0		
% Price discount per tuber	0%	0%	0%	22%		0%		
No. of premium tubers sold	84	109	97	94		182		
Premium tubers as % of total	77%	100%	89%	86%		167%		
Price per premium tuber	1,667	833	667	1,333		1,000		
Revenue from premium tubers	140,000	90,800	64,700	125,300		182,000		
No. of unsaleable tubers (spoilt)	0	0	0	0		0		
Unsaleable tubers as % of total	0%	0%	0%	0%		0%		
No. of tubers remaining unsold	12	0	0	0		33		
Total revenue	153,000	90,800	68,700	142,800	455300	182,000		182000
Revenue/heap	153,000	90,800	68,700	142,800		182,000		
Total marketing margin	-12,000	10,800	8,700	2,800		82,000		
Marketing margin/heap	-12,000	10,800	8,700	2,800		-18,000		
Reduction in revenue/heap	28,700	0	4,000	20,700		0		
Reduction as % of premium price	16%	0%	6%	13%		0%		
Marketing Costs								
Market fees (2 days)	400.00	400.00	400.00	400.00		400.00		
Porter's fees/ heap	500.00	500.00	500.00	500.00		500.00		
Watchman (2 nights)/ heap	200.00	200.00	200.00	200.00		200.00		
Total marketing costs	1100	1100	1100	1100	4400	1800		1,800
Return to Labour and Capital	-13,100	9,700	7,600	1,700	5,900	-19,800		-19,800

Note: One heap is: 109 tubers

G = Grade

* the two heaps of Puna G2 and G3 were joined together for sale

TECHIMAN MARKET: Calculation of Marketing Margins, Return to Labour and Capital and Financial Losses

Retailer No.3.

Variety of yam	Puna G1	Puna G2	Total wk 1	Puna G1	Tila G2	Puna G1	Total wk 2
	Week 1			Week 2			
Date purchased	30/10/96	29/10/96		30/10/96	29/10/96	05/11/96	
Quantity purchased/heaps	1	1	2	1	1	1	3
Wholesale price/heap	150,000	140,000	290,000	70,000	105,000	170,000	345,000
Total wholesale price	150,000	140,000		70,000	105,000	170,000	
Premium retail price/tuber	1,667	1,333		833	1,167	1,833	
Max. potential revenue/heap	181,700	145,300		90,800	127,200	199,800	
Max. marketing margin/heap	31,700	5,300		20,800	22,200	29,800	
Max. potential revenue	181,700	145,300		90,800	127,200	199,800	
Max. marketing margin	31,700	5,300		20,800	22,200	29,800	
No. of damaged tubers sold	4	0		109	0	0	
Damaged tubers as % of total	4%	0%		100%	0%	0%	
Price per damaged tuber	1,200	0		833	0	0	
Revenue from damaged tubers	4,800	0		90,800	0	0	
% Price discount per tuber	28%	0		0%	0	0	
No. of broken tubers sold	0	0		0	0	0	
Broken tubers as % of total	0%	0%		0%	0%	0%	
Price per broken tuber	0	0		0	0	0	
Revenue from broken tubers	0	0		0	0	0	
% Price discount per tuber	0%	0%		0%	0%	0%	
No. of older tubers sold	0	0		0	0	0	
Older tubers as % of total	0%	0%		0%	0%	0%	
Price per older tuber	0	0		0	0	0	
Revenue from older tubers	0	0		0	0	0	
% Price discount per tuber	0%	0%		0%	0%	0%	
No. of discounted tubers sold	0	0		0	0	91	
Discounted tubers as % of total	0%	0%		0%	0%	83%	
Price per discounted tuber	0	0		0	0	1,667	
Revenue from discounted tubers	0	0		0	0	151,600	
% Price discount per tuber	0%	0%		0%	0%	9%	
No. of premium tubers sold	105	109		0	109	18	
Premium tubers as % of total	96%	100%		0%	100%	17%	
Price per premium tuber	1,667	1,333		0	1,167	2,000	
Revenue from premium tubers	175,000	145,300		0	127,200	36,000	
No. of unsaleable tubers (spoilt)	0	0		0	0	0	
Unsaleable tubers as % of total	0%	0%		0%	0%	0%	
No. of tubers remaining unsold	0	0		0	0	0	
Total revenue	179,800	145,300	325100	90,800	127,200	187,600	405600
Revenue/heap	179,800	145,300		90,800	127,200	187,600	
Total marketing margin	29,800	5,300		20,800	22,200	17,600	
Marketing margin/heap	29,800	5,300		20,800	22,200	17,600	
Reduction in revenue/heap	1,900	0		0	0	12,200	
Reduction as % of premium price	1%	0%		0%	0%	6%	
Marketing Costs							
Market fees (2 days)	400.00	400.00		400.00	400.00	400.00	
Porter's fees/ heap	500.00	500.00		500.00	500.00	500.00	
Watchman (2 nights)/ heap	200.00	200.00		200.00	200.00	200.00	
Total marketing costs	1100	1100	2,200	1100	1100	1100	7700
Return to Labour and Capital	28,700	4,200	32,900	19,700	21,100	-328,500	-287,700

Note: One heap is: 109 tubers

G = Grade

Retailers

TECHIMAN MARKET: Calculation of Marketing Margins, Return to Labour and Capital and Financial Losses

Retailer No.4.

Variety of yam	Puna G2	Puna G3	Tila G2	Total wk 1	Puna G1	Tila G2	Total wk 2
	Week 1				Week 2		
Date purchased	30/10/96	29/10/96	29/10/96		05/11/96	05/11/96	
Quantity purchased/heaps	1	1	1	3	1	1	2
Wholesale price/heap	140,000	95,000	85,000	320,000	170,000	80,000	250,000
Total wholesale price	140,000	95,000	85,000		170,000	80,000	
Premium retail price/tuber	1,667	1,000	833		1,833	833	
Max. potential revenue/heap	181,700	109,000	90,800		199,800	90,800	
Max. marketing margin/heap	41,700	14,000	5,800		29,800	10,800	
Max. potential revenue	181,700	109,000	90,800		199,800	90,800	
Max. marketing margin	41,700	14,000	5,800		29,800	10,800	
No. of damaged tubers sold	15	0	0		0	0	
Damaged tubers as % of total	14%	0%	0%		0%	0%	
Price per damaged tuber	520	0	0		0	0	
Revenue from damaged tubers	7,800	0	0		0	0	
% Price discount per tuber	69%	0%	0%		0%	0%	
No. of broken tubers sold	0	0	0		0	0	
Broken tubers as % of total	0%	0%	0%		0%	0%	
Price per broken tuber	0	0	0		0	0	
Revenue from broken tubers	0	0	0		0	0	
% Price discount per tuber	0%	0%	0%		0%	0%	
No. of older tubers sold	0	0	0		0	0	
Older tubers as % of total	0%	0%	0%		0%	0%	
Price per older tuber	0	0	0		0	0	
Revenue from older tubers	0	0	0		0	0	
% Price discount per tuber	0%	0%	0%		0%	0%	
No. of discounted tubers sold	15	0	60		21	0	
Discounted tubers as % of total	14%	0%	55%		19%	0%	
Price per discounted tuber	1,167	0	667		1,333	0	
Revenue from discounted tubers	17,500	0	40,000		28,000	0	
% Price discount per tuber	30%	0%	20%		27%	0%	
No. of premium tubers sold	79	109	24		85	109	
Premium tubers as % of total	72%	100%	22%		78%	100%	
Price per premium tuber	1,667	1,000	833		1,667	833	
Revenue from premium tubers	131,700	109,000	20,000		141,600	90,800	
No. of unsaleable tubers (spoilt)	0	0	25		3	0	
Unsaleable tubers as % of total	0%	0%	23%		3%	0%	
No. of tubers remaining unsold	0	0	0		0	0	
Total revenue	157,000	109,000	60,000	326000	169,600	90,800	260400
Revenue/heap	157,000	109,000	60,000		169,600	90,800	
Total marketing margin	17,000	14,000	-25,000		-400	10,800	
Marketing margin/heap	17,000	14,000	-25,000		-400	10,800	
Reduction in revenue/heap	24,700	0	30,800		30,200	0	
Reduction as % of premium price	14%	0%	34%		15%	0%	
Marketing Costs							
Market fees (2 days)	400.00	400.00	400.00		400.00	400.00	
Porter's fees/ heap	500.00	500.00	500.00		500.00	500.00	
Watchman (2 nights)/ heap	200.00	200.00	200.00		200.00	200.00	
Total marketing costs	1100	1100	1100	3300	1100	1100	2200
Return to Labour and Capital	15,900	12,900	-26,100	2,700	-1,500	9,700	8,200

Note: One heap is: 109 tubers

G = Grade

Retailers

TECHIMAN MARKET: Calculation of Marketing Margins, Return to Labour and Capital and Financial Losses

Retailer No.4.

Variety of yam	Puna G1	Puna G2	Dorkuban G2	Dorkuban G3	Dente	Total wk 3
	Week 3					
Date purchased	13/11/96	13/11/96	14/11/96	14/11/96	14/11/96	
Quantity purchased/heaps	1	1	1	1	1	5
Wholesale price/heap	160,000	85,000	60,000	40,000	85,000	430,000
Total wholesale price	160,000	85,000	60,000	40,000	85,000	
Premium retail price/tuber	1,667	1,000	642	500	833	
Max. potential revenue/heap	181,700	109,000	70,000	54,500	90,800	
Max. marketing margin/heap	21,700	24,000	10,000	14,500	5,800	
Max. potential revenue	181,700	109,000	70,000	54,500	90,800	
Max. marketing margin	21,700	24,000	10,000	14,500	5,800	
No. of damaged tubers sold	0	0	0	0	0	
Damaged tubers as % of total	0%	0%	0%	0%	0%	
Price per damaged tuber	0	0	0	0	0	
Revenue from damaged tubers	0	0	0	0	0	
% Price discount per tuber	0%	0%	0%	0%	0%	
No. of broken tubers sold	0	0	0	0	0	
Broken tubers as % of total	0%	0%	0%	0%	0%	
Price per broken tuber	0	0	0	0	0	
Revenue from broken tubers	0	0	0	0	0	
% Price discount per tuber	0%	0%	0%	0%	0%	
No. of older tubers sold	0	0	0	0	0	
Older tubers as % of total	0%	0%	0%	0%	0%	
Price per older tuber	0	0	0	0	0	
Revenue from older tubers	0	0	0	0	0	
% Price discount per tuber	0%	0%	0%	0%	0%	
No. of discounted tubers sold	54	54	0	93	0	
Discounted tubers as % of total	50%	50%	0%	85%	0%	
Price per discounted tuber	1,500	833	0	333	0	
Revenue from discounted tubers	81,000	45,000	0	31,000	0	
% Price discount per tuber	10%	17%	0%	33%	0%	
No. of premium tubers sold	54	54	109	16	109	
Premium tubers as % of total	50%	50%	100%	15%	100%	
Price per premium tuber	1,667			500	833	
Revenue from premium tubers	90,000	47,000	70,000	8,000	90,800	
No. of unsaleable tubers (spoilt)	0	0	0	0	0	
Unsaleable tubers as % of total	0%	0%	0%	0%	0%	
No. of tubers remaining unsold	0	0	0	0	0	
Total revenue	171,000	92,000	70,000	39,000	90,800	462800
Revenue/heap	171,000	92,000	70,000	39,000	90,800	
Total marketing margin	11,000	7,000	10,000	-1,000	5,800	
Marketing margin/heap	11,000	7,000	10,000	-1,000	5,800	
Reduction in revenue/heap	10,700	17,000	0	15,500	0	
Reduction as % of premium price	6%	16%	0%	28%	0%	
Marketing Costs						
Market fees (2 days)	400.00	400.00	400.00	400.00	400.00	
Porter's fees/ heap	500.00	500.00	500.00	500.00	500.00	
Watchman (2 nights)/ heap	200.00	200.00	200.00	200.00	200.00	
Total marketing costs	1100	1100	1100	1100	1100	5500
Return to Labour and Capital	9,900	5,900	8,900	-2,100	4,700	27,300

Note: One heap is: 109 tubers

G = Grade

TECHIMAN MARKET: Calculation of Marketing Margins, Return to Labour and Capital and Financial Losses

Retailer No.5.

Variety of yam	Puna G1	Puna G3	Puna G4	Puna G5	Total wk 2	Puna G1	Total wk 4
	Week 2					Week 4	
Date purchased	06/11/96	06/11/96	06/11/96	06/11/96		20/11/96	
Quantity purchased/heaps	1	1	1	1	4	1	1
Wholesale price/heap	160,000	110,000	80,000	65,000	415,000	100,000	100,000
Total wholesale price	160,000	110,000	80,000	65,000		100,000	
Premium retail price/tuber	1,667	1,167	833	667		1,000	
Max. potential revenue/heap	181,700	127,200	90,800	72,700		109,000	
Max. marketing margin/heap	21,700	17,200	10,800	7,700			
Max. potential revenue	181,700	127,200	90,800	72,700		109,000	
Max. marketing margin	21,700	17,200	10,800	7,700		9,000	
No. of damaged tubers sold	13	7	0	0		0	
Damaged tubers as % of total	12%	6%	0%	0%		0%	
Price per damaged tuber	460	285	0	0		0	
Revenue from damaged tubers	6,000	2,000	0	0		0	
% Price discount per tuber	72%	76%	0%	0%		0%	
No. of broken tubers sold	0	0	0	0		0	
Broken tubers as % of total	0%	0%	0%	0%		0%	
Price per broken tuber	0	0	0	0		0	
Revenue from broken tubers	0	0	0	0		0	
% Price discount per tuber	0%	0%	0%	0%		0%	
No. of older tubers sold	0	0	0	0		0	
Older tubers as % of total	0%	0%	0%	0%		0%	
Price per older tuber	0	0	0	0		0	
Revenue from older tubers	0	0	0	0		0	
% Price discount per tuber	0%	0%	0%	0%		0%	
No. of discounted tubers sold	33	72	109	79		15	
Discounted tubers as % of total	30%	66%	100%	72%		14%	
Price per discounted tuber	1,333	1,000	667	500		833	
Revenue from discounted tubers	44,000	72,000	72,700	39,500		12,500	
% Price discount per tuber	20%	14%	20%	25%		17%	
No. of premium tubers sold	63	30	0	30		94	
Premium tubers as % of total	58%	28%	0%	28%		86%	
Price per premium tuber	1,667	1,167	0	667		1,000	
Revenue from premium tubers	105,000	35,000	0	20,000		94,000	
No. of unsaleable tubers (spoilt)	0	0	0	0		0	
Unsaleable tubers as % of total	0%	0%	0%	0%		0%	
No. of tubers remaining unsold	0	0	0	0		0	
Total revenue	155,000	109,000	72,700	59,500	396200	106,500	106500
Revenue/heap	155,000	109,000	72,700	59,500		106,500	
Total marketing margin	-5,000	-1,000	-7,300	-5,500		6,500	
Marketing margin/heap	-5,000	-1,000	-7,300	-5,500		6,500	
Reduction in revenue/heap	26,700	18,200	18,100	13,200		2,500	
Reduction as % of premium price	15%	14%	20%	18%		2%	
Marketing Costs							
Market fees (2 days)	400.00	400.00	400.00	400.00		400.00	
Porter's fees/ heap	500.00	500.00	500.00	500.00		500.00	
Watchman (2 nights)/ heap	200.00	200.00	200.00	200.00		200.00	
Total marketing costs	1100	1100	1100	1100	4400	1100	1100
Return to Labour and Capital	-6,100	-2,100	-8,400	-6,600	-23,200	5,400	5,400

Note: One heap is: 109 tubers

G = Grade

TECHIMAN MARKET: Calculation of Marketing Margins, Return to Labour and Capital and Financial Losses

Retailer No.6.

Variety of yam	Puna G3	Puna G5	Tila G3	Total wk 2	Puna G5	Tila G3	Total wk 3
	Week 2				Week 3		
Date purchased	06/11/96	06/11/96	06/11/96		12/11/96	12/11/96	
Quantity purchased/heaps	1	1	1	3	1	1	2
Wholesale price/heap	100,000	75,000	55,000	230,000	80,000	80,000	160,000
Total wholesale price	100,000	75,000	55,000		80,000	80,000	
Premium retail price/tuber	1,167	833	667		833	833	
Max. potential revenue/heap	127,200	90,800	72,700		90,800	90,800	
Max. marketing margin/heap	27,200	15,800	17,700		10,800	10,800	
Max. potential revenue	127,200	90,800	72,700		90,800	90,800	
Max. marketing margin	27,200	15,800	17,700		10,800	10,800	
No. of damaged tubers sold	10	0	0		21	0	
Damaged tubers as % of total	9%	0%	0%		19%	0%	
Price per damaged tuber	333	0	0		833	0	
Revenue from damaged tubers	3,300	0	0		17,500	0	
% Price discount per tuber	71%	0%	0%		0%	0%	
No. of broken tubers sold	0	0	0		0	0	
Broken tubers as % of total	0%	0%	0%		0%	0%	
Price per broken tuber	0	0	0		0	0	
Revenue from broken tubers	0	0	0		0	0	
% Price discount per tuber	0%	0%	0%		0%	0%	
No. of older tubers sold	3	0	0		51	0	
Older tubers as % of total	3%	0%	0%		47%	0%	
Price per older tuber	667	0	0		833	0	
Revenue from older tubers	2,000	0	0		51,000	0	
% Price discount per tuber	43%	0%	0%		0%	0%	
No. of discounted tubers sold	96	36	54		12	97	
Discounted tubers as % of total	88%	33%	50%		11%	89%	
Price per discounted tuber	833	667	500		767	800	
Revenue from discounted tubers	80,000	24,000	27,000		9,200	77,600	
% Price discount per tuber	29%	20%	25%		8%	4%	
No. of premium tubers sold	0	73	51		15	12	
Premium tubers as % of total	0%	67%	47%		14%	11%	
Price per premium tuber	0	833	667		1,167	833	
Revenue from premium tubers	0	60,800	34,000		17,500	10,000	
No. of unsaleable tubers (spoilt)	0	0	3		10	0	
Unsaleable tubers as % of total	0%	0%	3%		9%	0%	
No. of tubers remaining unsold	0	0	0		0	0	
Total revenue	85,300	84,800	61,000	231100	95,200	87,600	182800
Revenue/heap	85,300	84,800	61,000		95,200	87,600	
Total marketing margin	-14,700	9,800	6,000		15,200	7,600	
Marketing margin/heap	-14,700	9,800	6,000		15,200	7,600	
Reduction in revenue/heap	41,900	6,000	11,700		-4,400	3,200	
Reduction as % of premium price	33%	7%	16%		-5%	4%	
Marketing Costs							
Market fees (2 days)	400.00	400.00	400.00		400.00	400.00	
Porter's fees/ heap	500.00	500.00	500.00		500.00	500.00	
Watchman (2 nights)/ heap	200.00	200.00	200.00		200.00	200.00	
Total marketing costs	1100	1100	1100	3300	1100	1100	2200
Return to Labour and Capital	-15,800	8,700	4,900	-2,200	14,100	6,500	20,600

Note: One heap is: 109 tubers

G = Grade

TECHIMAN MARKET: Calculation of Marketing Margins, Return to Labour and Capital and Financial Losses

Itinerant Trader No. 1

Variety of yam	Dente G1	Tenya G1	Muchu Mudu G1	Muchu Mudu G2	Muchu Mudu G3	Muchu Mudu G4	Pona G2	Kyiri K'si	Total con-signment
Date purchased	03/11/96	03/11/96	03/11/96	03/11/96	03/11/96	03/11/96	03/11/96	03/11/96	
Place purchased	Buo-Tumtum	Buo-Tumtum	Buo-Tumtum	Buo-Tumtum	Buo-Tumtum	Buo-Tumtum	Buo-Tumtum	Buo-Tumtum	
Distance from Techiman	134 km	134 km	134 km	134 km	134 km	134 km	134 km	134 km	
Quantity purchased/heaps	2	1	1.5	6.5	2	1	1	3.5	18.5
Farmgate price/heap	120,000	100,000	130,000	80,000	60,000	40,000	90,000	70,000	
Total farmgate price	240,000	100,000	195,000	520,000	120,000	40,000	90,000	245,000	1,550,000
Transport/heap farm-village	7,000	7,000	7,000	7,000	7,000	7,000	7,000	7,000	
Transport/heap, village-market	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	
Loading fee/heap	500	500	500	500	500	500	500	500	
Council ticket/heap	500	500	500	500	500	500	500	500	
Market toll/heap	200	200	200	200	200	200	200	200	
Offloading/heap	200	200	200	200	200	200	200	200	
Trader's own transport costs	0	0	0	0	0	0	0	0	
Total marketing costs/heap	18,400	18,400	18,400	18,400	18,400	18,400	18,400	18,400	
Total marketing cost	36,800	18,400	27,600	119,600	36,800	18,400	18,400	64,400	340,400
Wholesale price/heap	140,000	110,000	160,000	110,000	90,000	75,000	100,000	90,000	
Total wholesale price	280,000	110,000	240,000	715,000	180,000	75,000	100,000	315,000	2,015,000
Marketing cost as % of w'sale price	13%	17%	12%	17%	20%	25%	18%	20%	17%
Farmgate price as % of w'sale	86%	91%	81%	73%	67%	53%	90%	78%	77%
Marketing cost as % of marketing margin	92%	184%	61%	61%	61%	53%	184%	92%	73%
Return to Labour and Capital/heap	1,600	-8,400	11,600	11,600	11,600	16,600	-8,400	1,600	
Total Return to Labour and Capital	3,200	-8,400	17,400	75,400	23,200	16,600	-8,400	5,600	124,600

One heap consists of 109 tubers

G : Grade

TECHIMAN MARKET: Calculation of Marketing Margins, Return to Labour and Capital and Financial Losses

Itinerant Trader No. 2

Variety of yam	Muchu Mudu G1	Muchu Mudu G1	Muchu Mudu G2	Pona G1	Pona G1	Pona G1	Dorbare G1	Afibetua G1	Dente G1	Dente G2	Total con-signment
Date purchased	10/11/96	10/11/96	10/11/96	10/11/96	10/11/96	10/11/96	10/11/96	10/11/96	10/11/96	10/11/96	
Place purchased	Daman Nkwanta	Daman Nkwanta	Daman Nkwanta	Daman Nkwanta	Daman Nkwanta	Daman Nkwanta	Daman Nkwanta	Daman Nkwanta	Daman Nkwanta	Daman Nkwanta	
Distance	150 km	150 km	150 km	150 km	150 km	150 km	150 km	150 km	150 km	150 km	
Quantity purchased/heaps	5	2	2	1	3	1	1	2	2	1	20
Farmgate price/heap	150,000	130,000	85,000	200,000	170,000	140,000	100,000	100,000	140,000	90,000	
Total farmgate price	750,000	260,000	170,000	200,000	510,000	140,000	100,000	200,000	280,000	90,000	2,700,000
Transport/heap farm-village	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	
Transport/heap, village-market	13,000	13,000	13,000	13,000	13,000	13,000	13,000	13,000	13,000	13,000	
Loading fee/heap	400	400	400	400	400	400	400	400	400	400	
Council ticket/heap	500	500	500	500	500	500	500	500	500	500	
Market toll/heap	0	0	0	0	0	0	0	0	0	0	
Offloading/heap	200	200	200	200	200	200	200	200	200	200	
Trader's own transport costs	0	0	0	0	0	0	0	0	0	0	
Total marketing costs/heap	24,100	24,100	24,100	24,100	24,100	24,100	24,100	24,100	24,100	24,100	
Total marketing costs	120,500	48,200	48,200	24,100	72,300	24,100	24,100	48,200	48,200	24,100	482,000
Wholesale price/heap	190,000	190,000	170,000	235,000	235,000	235,000	140,000	140,000	170,000	140,000	
Total wholesale price	950,000	380,000	340,000	235,000	705,000	235,000	140,000	280,000	340,000	140,000	3,745,000
Marketing cost as % of w'sale price	13%	13%	14%	10%	10%	10%	17%	17%	14%	17%	13%
Farmgate price as % of w'sale	79%	68%	50%	85%	72%	60%	71%	71%	82%	64%	72%
Marketing cost as % of marketing margin	60%	40%	28%	69%	37%	25%	60%	60%	80%	48%	46%
Return to Labour and Capital/heap	15,900	35,900	60,900	10,900	40,900	70,900	15,900	15,900	5,900	25,900	
Total Return to Labour and Capital	79,500	71,800	121,800	10,900	122,700	70,900	15,900	31,800	11,800	25,900	563,000

One heap consists of 109 tubers

G : Grade

TECHIMAN MARKET: Calculation of Marketing Margins, Return to Labour and Capital and Financial Losses

Itinerant Trader No. 3

Variety of yam	Tila G2	Dorbare G1	Dorbare G2	Total con-signment
Date purchased	04/11/96	04/11/96	04/11/96	
Place purchased	Aburokan	Aburokan	Aburokan	
Distance from Techiman	112 km	112 km	112 km	
Quantity purchased/heaps	1	2	1	4
Farmgate price/heap	40,000	80,000	40,000	
Total farmgate price	40,000	160,000	40,000	240,000
Transport/heap farm-village	4,000	4,000	4,000	
Transport/heap, village-market	12,000	12,000	12,000	
Loading fee/heap	0	0	0	
Council ticket/heap	500	500	500	
Market toll/heap	200	200	200	
Offloading/heap	200	200	200	
Trader's own transport costs	0	0	0	
Total marketing costs/heap	16,900	16,900	16,900	
Total marketing costs	16,900	33,800	16,900	67,600
Wholesale price/heap	70,000	100,000	50,000	
Total wholesale price	70,000	200,000	50,000	320,000
Marketing cost as % of w'sale price	24%	17%	34%	21%
Farmgate price as % of w'sale	57%	80%	80%	75%
Marketing cost as % of marketing margin	56%	85%	169%	85%
Return to Labour and Capital/heap	13,100	3,100	-6,900	
Total Return to Labour and Capital	13,100	6,200	-6,900	12,400

One heap consists of 109 tubers

G : Grade

TECHIMAN MARKET: Calculation of Marketing Margins, Return to Labour and Capital and Financial Losses

Itinerant Trader No. 4

Variety of yam	Puna G1	Puna G2	Puna G3	Monwia G1	Monwia G2	Monwia G3	Onyemo G1	Onyemo G2	Onyemo G3	Total con-signment	
Date purchased	14/11/96	14/11/96	14/11/96	14/11/96	14/11/96	14/11/96	19/11/96	19/11/96	19/11/96		
Place purchased	Kwadwo Abe (Atebubu dist)	Kwadwo Abe (Atebubu dist)	Kwadwo Abe (Atebubu dist)	Kwadwo Abe (Atebubu dist)	Kwadwo Abe (Atebubu dist)	Kwadwo Abe (Atebubu dist)	Kwadwo Abe (Atebubu dist)	Kwadwo Abe (Atebubu dist)	Kwadwo Abe (Atebubu dist)		
Distance											
Quantity purchased/heaps	6	8	6.0	1.0	2.0	2.0	2.0	2.0	2.0	31	
Farmgate price/heap	200,000	150,000	100,000	140,000	90,000	60,000	180,000	100,000	65,000		
Total farmgate price	1,200,000	1,200,000	600,000	140,000	180,000	120,000	360,000	200,000	130,000	4,130,000	
Transport/heap farm-village	0	0	0	0	0	0	0	0	0		
Transport/heap, village-market	18,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000		
Loading fee/heap	400	400	400	400	400	400	400	400	400		
Council ticket/heap	500	500	500	500	500	500	500	500	500		
Market toll/heap	400	400	400	400	400	400	400	400	400		
Offloading/heap	300	300	300	300	300	300	300	300	300		
Trader's own transport costs	34,000	0	0	0	0	0	0	0	0		
Total marketing costs/heap	19,600	19,600	19,600	19,600	19,600	19,600	19,600	19,600	19,600		
Total marketing costs	117,600	156,800	117,600	19,600	39,200	39,200	39,200	39,200	39,200	641,600	*
Wholesale price/heap	245,000	190,000	150,000	180,000	140,000	100,000	235,000	150,000	110,000		
Total wholesale price	1,470,000	1,520,000	900,000	180,000	280,000	200,000	470,000	300,000	220,000	5,540,000	
Marketing cost as % of w'sale price	8%	10%	13%	11%	14%	20%	8%	13%	18%	12%	
Farmgate price as % of w'sale	82%	79%	67%	78%	64%	60%	77%	67%	59%	75%	
Marketing cost as % of marketing margin	44%	49%	39%	49%	39%	49%	36%	39%	44%	46%	
Return to Labour and Capital/heap	25,400	20,400	30,400	20,400	30,400	20,400	35,400	30,400	25,400		
Total Return to Labour and Capital	152,400	163,200	182,400	20,400	60,800	40,800	70,800	60,800	50,800	768,400	**

One heap consists of 109 tubers

* Includes the trader's own transport costs

** Not equal to the sum of the Return to Labour and Capital from each variety, since includes the trader's own transport costs.

G : Grade

TECHIMAN MARKET: Calculation of Marketing Margins, Return to Labour and Capital and Financial Losses

Sedentary Wholesaler No. 1

Variety of yam	Afibetua G1	Total consignment
	Week 2	
Date purchased	12/11/96	
Quantity purchased/heaps	2	2
Buying price /heap	110,000	
Total buying price	220,000	220,000
Expected Sale price/heap	120,000	
Total expected sale price	240,000	240,000
No. of damaged tubers	3	
Discount	3,600	
Actual Sale price/heap	118,200	
Marketing margin/heap	8,200	
Total marketing margin	16,400	16,400
market fee c200/day/heap	400	
Return to Labour and Capital	7,800	15,600

One heap consists of 109 tubers
G: Grade

Sedentary Wholesaler No. 2

Variety of yam	Didi G2	Total consignment
	Week 2	
Date purchased	12/11/96	
Quantity purchased/heaps	3	3
Buying price /heap	100,000	
Total buying price	300,000	300,000
Expected Sale price/heap	120,000	
Total expected sale price	360,000	360,000
No. of damaged tubers	50	
Discount/heap	0	
Actual Sale price/heap	120,000	
Marketing margin/heap	20,000	
Total marketing margin	60,000	60,000
Market fee c200/day/heap	400	
Return to Labour and Capital	19,600	58,800

One heap consists of 109 tubers
G: Grade

Sedentary Wholesaler No. 3

Variety of yam	Tenya G1	Lili G3	Tila G2	Muchu'du G1	Muchu'du G2	Total con-signment
	Week 2					
Date purchased	13/11/96	13/11/96	13/11/96	13/11/96	13/11/96	
Quantity purchased/heaps	1	1	2	2	2	8
Buying price /heap	95,000	70,000	85,000	145,000	110,000	
Total buying price	95,000	70,000	170,000	290,000	220,000	845,000
Expected Sale price/heap	80,000	80,000	90,000	152,000	115,000	
Total expected sale price	80,000	80,000	180,000	304,000	230,000	874,000
No. of damaged tubers	0	0	0	0	0	
Discount/heap	0	0	0	0	0	
Actual Sale price/heap	80,000	80,000	90,000	152,000	115,000	
Marketing margin/heap	-15,000	10,000	5,000	7,000	5,000	
Total marketing margin	-15,000	10,000	10,000	14,000	10,000	29,000
Market fee c200/day/heap	400	400	800	800	800	
Return to Labour and Capital	-15,400	9,600	9,200	13,200	9,200	25,800

One heap consists of 109 tubers

G: Grade

Sedentary Wholesaler No. 4

Variety of yam	Tila G1	Tila G2	Puna	Muchu'du G3	Dorbare G4	Total con-signment
	Week 2					
Date purchased	12/11/96	12/11/96	12/11/96	12/11/96	12/11/96	
Quantity purchased/heaps	1	1	1	1	1	5
Buying price /heap	56,000	52,000	65,000	55,000	38,000	
Total buying price	56,000	52,000	65,000	55,000	38,000	266,000
Expected Sale price/heap	60,000	58,000	70,000	62,000	43,000	
Total expected sale price	60,000	58,000	70,000	62,000	43,000	293,000
No. of damaged tubers	0	0	0	0	0	
Discount/heap	0	0	0	0	0	
Actual Sale price/heap	60,000	58,000	70,000	62,000	43,000	
Marketing margin/heap	4,000	6,000	5,000	7,000	5,000	
Total marketing margin	4,000	6,000	5,000	7,000	5,000	27,000
Market fee c200/day/heap	400	400	400	400	400	
Return to Labour and Capital	3,600	5,600	4,600	6,600	4,600	25,000

One heap consists of 109 tubers
G: Grade

Sedentary Wholesaler No. 5

Variety of yam	Muchu'du	Didi	Total con-signment
	Week 2		
Date purchased	13/11/96	13/11/96	
Quantity purchased/heaps	1	1	2
Buying price /heap	145,000	130,000	
Total buying price	145,000	130,000	275,000
Expected Sale price/heap	155,000	140,000	
Total expected sale price	155,000	140,000	295,000
No. of damaged tubers	0	0	
Discount/heap	0	0	
Actual Sale price/heap	155,000	140,000	
Marketing margin/heap	10,000	10,000	
Total marketing margin	10,000	10,000	20,000
Market fee c200/day/heap	400	400	
Return to Labour and Capital	9,600	9,600	19,200

One heap consists of 109 tubers
G: Grade

Sedentary Wholesaler No. 6

Variety of yam	Tila G1	Tila G2	Total con-signment	Tila	Namto	Total con-signment	Tila	Muchu'du	Total con-signment
	Week 2			Week 4			Week 5		
Date purchased	06/11/96	06/11/96	06/11/96	19/11/96	19/11/96	19/11/96	26/11/96	26/11/96	
Quantity purchased/heaps	3	2	5	4	2	6	1	2	3
Buying price /heap	100,000	80,000		120,000	120,000		85,000	125,000	
Total buying price	300,000	160,000	460,000	480,000	240,000	720,000	85,000	250,000	335,000
Expected Sale price/heap	120,000	110,000		150,000	150,000		110,000	155,000	
Total expected sale price	360,000	220,000	580,000	600,000	300,000	900,000	110,000	310,000	420,000
No. of damaged tubers	15	0		0	0		0	0	
Discount/heap	5,505	0		0	0		0	0	
Actual sale price/heap	114,495	110,000		150,000	150,000		110,000	155,000	
Marketing margin/heap	20,000	30,000		30,000	30,000		25,000	30,000	
Total marketing margin	60,000	60,000	120,000	120,000	60,000	180,000	25,000	60,000	85,000
Market fee c200/day/heap	1,200	800	2,000	1,600	800	6,400	400	800	
Return to Labour and Capital	13,295	29,200	42,495	28,400	29,200	57,600	24,600	29,200	53,800

One heap consists of 109 tubers

G: Grade

Sedentary Wholesaler No. 7

Variety of yam	Puna G1	Tila G1	Total con-signment	Tila G1	Tila G4	Didi	Total con-signment
	Week 3			Week 4			
Date purchased	13/11/96	13/11/96	13/11/96	20/11/96	20/11/96	20/11/96	
Quantity purchased/heaps	1	1	2	1	1	1	3
Buying price /heap	145,000	65,000		110,000	30,000	40,000	
Total buying price	145,000	65,000	210,000	110,000	30,000	40,000	180,000
Expected Sale price/heap	151,000	70,000		120,000	40,000	45,000	
Total expected sale price	151,000	70,000	221,000	120,000	40,000	45,000	205,000
No. of damaged tubers	0	0		0	0	0	
Discount/heap	0	0		0	0	0	
Actual Sale price/heap	151,000	70,000		120,000	40,000	45,000	
Marketing margin/heap	6,000	5,000		10,000	10,000	5,000	
Total marketing margin	6,000	5,000	11,000	10,000	10,000	5,000	25,000
Market fee c200/day/heap	400	400	800	400	400	400	
Return to Labour and Capital	5,600	4,600	10,200	9,600	9,600	4,600	23,800

One heap consists of 109 tubers

G: Grade

Appendix 2: Survey at Asantanso Village

Farmers in Asantanso village, near Techiman, were interviewed about their village, yam cultivation and marketing. The information was collected using informal participatory techniques, and the results are included in this appendix.

Background

Village profile

Location

Asantanso is a village located in the Techiman district of the Brong Ahafo Region. It is about ten kilometres east of Techiman, the district capital.

Population

The inhabitants estimated that the population of the village was about 800, out of which 60% are men and 40% made up of women. Children, classified by villagers as people of 17 years and below, constitute 70% of the total population. The literacy rate amongst the total adult population was estimated by villagers to be about 20%, but only 5 to 10% of adult females were considered literate.

There is a large immigrant community in the village, estimated to be about 80 to 90% of the total population.

The majority (80%) of the residents in the village are Christian, 15% are Muslims and the remaining 5% of the population practise other forms of religion.

Infrastructure

The village has a clinic, a primary school and two churches (New Apostolic and Roman Catholic). There is a stream which serves as a source of water for domestic use. The village lacks potable water and toilet facilities.

Economic Activities

Income Generating Activities

The main income generating activity is crop farming, with yam being the main cash crop, followed by maize, cassava, plantain and cocoyam. Also grown are groundnut, vegetables and sorghum and millet for brewing a traditional alcoholic drink known as Pito.

Other income generating activities ranked descending order in terms of the number of people involved are animal rearing (pigs, sheep, goats and poultry), trading, pito brewing and gari (fermented grated cassava) processing.

Women are responsible for pito brewing, petty trading as well as selling of kenkey[1] and cooked rice. Both women and men are involved in gari processing. Another local drink akpeteshie is distilled by men only.

Farmers gain their highest income from farming in July and August. Some income was also generated from January to March. During the rest of the year the farmers claimed to make no, or negligible income from farming.

Expenditure Pattern

Villagers were asked to score categories of expenditure with maize grains, according to the proportion of their total expenditure absorbed by each. Investment in farming activities was found to command the highest proportion of farmers total expenditure (27%), followed by purchase of consumer products, such as clothes, food and cooking utensils (23%). About 18% of expenditure goes on children's education and 13% is spent on funerals The rest was spent on health (10%), savings (6%) and others (3%).

Cultural and Social Practices

Wealth in the village is measured in terms of acreage of land under cultivation and number of animals kept. There are no women headed households in the village, since all of these women have moved to Techiman. Some of these women have, however, kept their houses and farms in the village, despite the fact that they are not resident there.

Farmers in the village have not formed any type of co-operative society to help them in their farming activities. There are, however, some youth associations whose activities do not directly involve agriculture.

Land Utilisation

Land Tenure

The land in the village belongs to the Techiman Traditional Council (Akwamu Division). Share cropping and cash lease systems are practised in the village. Share cropping is practised for maize and cassava cultivation. For maize the sharing ratio of the harvest is 2:1 for farmer and land owner respectively. The corresponding sharing ratio for cassava is 1:1. Where yam is cultivated, all the proceeds from yam go to the farmer in the first year. In the second year when the land is put under maize/cassava, the harvest is shared according to the ratios mentioned above. If farmers have the money, they can pay for the land by cash lease. None of the migrant population own land.

Land, Soil and Water Management

The soil at the north of the village is sandy loam where yam grows better than any other part of the village land. Yam is grown all around the village apart from a small portion of land to the east, where the soil contains a lot of gravel. Cassava, cocoyam and maize are grown

[1] Pounded, fermented maize.

almost everywhere. Plantain is not grown in the southern part (towards Techiman) because of the sandy soil.

There is a stream that passes north of the village, but it is not used for cultivation since it dries up during the dry season. Periodic flooding of the stream renders farms beyond it inaccessible to farmers.

Some of the farms are located within a few metres of the village, but others are as far as eight kilometres away.

Crop Production

Crops Grown

Crops grown include yam, cassava, plantain and maize, cocoyam, vegetables, groundnut, sorghum and millet. Farmers were asked to rank in descending order the importance of each crop in terms of area under cultivation. It was found that farmers devote the largest portion of their land to yam cultivation, followed by maize, which was considered important because it is harvested twice a year. Cassava was the next most important, followed by plantain and cocoyam.

In a similar exercise, cassava was found to be the most important crop for consumption purposes, followed by yam (mostly water yam), cocoyam, plantain, vegetables and groundnut.

Farmers were asked to estimate the proportion of each crop destined for sale and consumption respectively. The results of this investigation are summarised in Table 1.

Table 1: Crop Ulilisation by Farmers

Crop	% Sold	% Consumed
Yam (white)	90	10
Yam (water)	20	80
Cassava	40	60
Maize	80	20
Plantain	85	15
Cocoyam	90	10

The table shows that white yam, maize, plantain and cocoyam are grown principally as cash crops, and water yam and cassava are grown principally for home consumption.

Yam Farm Size

Yam farms are measured according to number of mounds. The tables below show the distribution of the number of mounds owned by a group of 41 farmers present during the first session of interviews. Table 2 shows number of farmers owning various sizes of farm. The third column in the table shows the percentages of each group found to own each size of

farm[2]. The fourth column describes the farmers' own estimations of the percentage of people in the whole village who own the various sizes of farm.

Table 2: Distribution of the size of yam farms

Size of farm measured by number of yam mounds	Number of farmers	% of group	% of village estimated by farmers
1 - 5 000	24	59	50
5 001 - 10,000	9	22	30
10,001 - 15,000	3	7	15
>15,000	5	12	5

According to farmers the smallest size of yam farm is 1 000 mounds. Those who had farms of less than 1 000 mounds were too poor to afford the seed yams and were not classified as serious yam farmers.

Normally farms belonging to women are small and they range between 1 and 5 acres. Small farmers constitute about 50% of the farming population. It was estimated that 20% of these small farmers also work on the farms of the large farmers.

Farm Labour

Large farmers do not have a problem acquiring casual labour, since migrant labourers come down from the north seasonally to farm small farms and also work on the farms of the large farmers. There do not appear to be landless labourers in the village but small farm families work on the farms of the large farmers.

Trends in Crop Production

The farmers believed that the production of yam and maize would increase over the next few years. This increase, they believed, would be followed by cassava, whereas cocoyam production would decrease. According to them cocoyam has an adverse effect on the yield of yam when the two crops are grown together.

The farmers said that the yam business was lucrative and has got better since the revolution of 1981, since they have been encouraged to commercialise their activities. They said that they still have problems marketing their produce because of the restrictive practices of market women.

Yam Production

Varieties

Two main yam species are grown in the village, white yam (*Dioscorea rotundata*) and water yam (*Dioscorea alata*). Varieties of white yam grown include Puna, Dorbari, Lilli (or Didi)

[2] These percentages are not, however, representative for the whole village, since the samples were not randomly selected.

and Tila. Others are Mmowe (also known as Asana or Muchu-mudu), Nananto, Laribako and Asobayere. Varieties of water yam cultivated in the village are Akaba, Dahobo, Weda and Matches.

Farmers estimated that white yam constitutes 85% of yam production in terms of volume whilst water yam makes up remaining 15%. This is because white yams generate more income than water yam.

Farmers were asked to rank the varieties of yam according to those which gave a greater yield. They ranked Lilli as giving the highest yield, followed by Dorbari, Nananto, Puna, Asobayere, and water yam.

Despite that fact that Puna has the best taste and the highest value of all the varieties grown by farmers, they preferred to grow Dorbari. They estimated that about 40% of the volume of the whole yam harvest is dedicated to Dorbari as opposed to 10% to Puna and 25% to Lilli. This is because Dorbari is hardier than Puna and commands higher prices than Lilli. Puna requires more skilled husbandry, being more susceptible to rotting and needs fertile soil such as sandy loam. Furthermore, Puna seed yams often do not germinate and once harvested the tubers have a short storage life. Lilli is very hardy but does not taste as good as Dorbari and, therefore, attracts lower prices.

Of this harvest, farmers estimated that 35% of income generated from yam production was from the sale of Dorbari, 20% from Lilli, 10% from Puna and 15% from water yam.

These figures are farmers estimates, and there appears to be some contradiction between them. For example, farmers estimate that water yam generates the same proportion of income as the volume harvested. This is despite the fact that farmers keep water yam for home consumption during the lean season, selling it mainly at the very end of the season to dispose of it before the new white yam comes in.

White yams such as Dorbari and Lilli, on the other hand, which have a higher value than water yam and are grown for cash, were estimated to contribute a smaller proportion to total income than the volume harvested.

Of the water yam, the variety known as Matches is grown in the greatest volumes, followed by Akaba, Dahobo and Weda. Akaba was preferred in terms of taste followed by Matches, Weda and Dahobo.

Farmers estimated that of the white yam varieties traders preferred Puna, followed by Dorbari and Mmowe. The variety of water yam favoured by traders is Akaba, followed by Matches, Weda and Dahobo.

Harvesting

There are generally two harvests of the yam crop. The first harvest is carried out about six months after planting (late June and early July) when the vines are not yet dry. Yams obtained from this harvest are mostly sold or consumed by the farmers. According to farmers these yams are 'immature' and cannot store well. They therefore have to be disposed of within a week.

This first harvest, known as milking, is carried out to allow the vines to produce tubers (seed yams) which are used for planting the following year. The need for money also drives the farmers to harvest their yam after six months. During this harvest, the tuber is carefully severed from the vine. The vine is then put back in the mound and the mound re-shaped to facilitate the rejuvenation of the vine and the formation of the seed yam. According to farmers about 80% of the yams are harvested at the first harvest and the rest harvested during the second harvest around October/November.

The second harvest is carried out after the rejuvenated vines are dead and dry. The tubers are harvested and stored for future planting.

Where no seed yams are needed the first harvest is not carried out. In this case yams are harvested after the vines have died and dried up. Tubers obtained from this harvest are called 'ware' yams. According to the farmers ware yams have a greater storage potential and taste better than the immature yams harvested after six months. Farmers nevertheless, claimed that they are able to sell immature yams because they are harvested at a time when yams are scarce.

Large scale yam farmers, due to initial glut during the first harvest and labour constraints leave some yams in the field until the second harvest.

Farmers estimated that under good conditions they would lose about 500 tubers out of every 4 000 mounds[3]. Under poor conditions, such as late rains and excessive heat, they could lose up to 2 000 out of 4 000 tubers. Late rains cause drought resulting in non germination of seed yams and death of vines. Lack of water also facilitates the incidence of insect damage.

Lilli and Nananto varieties are harvested after eight months, normally from mid-September to the end of October. Dorbari and Puna remain in the soil for six months before being harvested from mid-July until the end of September.

Marketing

According to farmers, about 3,000 tubers out of every 4,000 harvested are sold. The remaining quarter is kept for home consumption.

There are no village based middlemen and retailers in the village. Transportation of the yams to the market by farmers is carried out by both men and women. There appears to be no co-operative or group selling at the village. Each farmer is thus responsible for his or her negotiations.

Farmers harvest and sell the yams when they need money. They believe that they have a stronger bargaining position when they sell to traders at the village, than when they are forced to take the yams to Techiman Market. This is because at the village they have the option of refusing to sell if they cannot negotiate a favourable price, since they can store them for some time. At the market, on the other hand, once they have paid transport costs, they must sell before the end of the week when the market closes, and are in a weaker bargaining position.

[3] One tuber grows per mound.

Nonetheless they take about 80% of the yam harvest destined for sale to the market, rather than selling them in the village. They claimed that this was because the traders have formed a cartel that prevents itinerant traders from Techiman, Accra and Kumasi going to certain yam producing areas. The cartel apparently sends spies to the village to monitor any 'unauthorised' trade. They stop the traders from buying from the producing areas by putting some impediments in their way, for example, detaining traders' vehicles.

Traders normally buy yams from the village during the months of June, July and the early parts of August when there are few yams around from other areas.

Quality and Grading

The farmers have five grades into which they group the yams. The sole criterion for grading is size. Diseased or rotten yams are not graded. Grades one and two are sold to traders to be resold. Grade three is sold by the farmers themselves whilst Grades four and five are kept for home consumption. Out of 1 000 tubers harvested, farmers estimated that 500 would be Grade one, 300 Grade two and the remaining 200 Grades three to five. When harvest is poor, out of 1000 tubers about 200 would be Grade one, 500 Grade two, and 200 - 300 tubers would be Grade three. Grades four and five normally account for about 10% of the harvest, whether good or poor.

Out of the marketable yams farmers find it easiest to sell the large sizes of all the varieties variety. The traders prefer the large sizes since they believe them to be more mature and less prone to damage in transit.

Farmers said they were very careful with handling of the yams since traders do not accept damaged yams. However, during harvesting (milking) the farmers have to cut off the top and this damages the yam and makes it more susceptible to rotting. Ware yams on the other hand, do not suffer such cuts.

Causes of Yam Losses

The causes of losses as identified by farmers included excessive heat caused by the sun, insects which bore into the yam tuber and stunt the growth of the plant, termite attack and millipedes. Shortage of vehicles and bad roads was also seen as a problem which leads to greater yam losses.

Price

According to farmers white yams attract highest prices when the harvest season begins in June and July declining in August and September. Prices are high in June possibly because the village is one of the first to harvest during this month when there is not much yam on the market.

Water yam is available from January to May. A seasonal calendar drawn by farmers showed price peaks for water yam to occur in March and May. The price in April was low, and farmers explained that this was because there were many yams in the system, and therefore the farmers in the village do not sell water yam in this month. In May however, the price of water yam goes up, despite the fact that every farmer wants to dispose of his/her remaining water yam before the arrival of the new white yams in June.

Farmers also showed on the seasonal calendar that they gain their highest income from white yams in August, and from water yam in March.

The prices of white yam given by farmers was 70,000 Cedis for 110 Grade one, 60,000 Cedis for 110 Grade two and 40-50,000 Cedis for 110 Grade three.

Although the wholesale unit is referred to as 'one hundred', there are in fact 110 tubers in each heap. Farmers add ten tubers to every 100 purchased, claiming that traders insist on it as a part of 'risk sharing', even though, farmers claimed that the traders lost only two to three yams during transportation.

Farmers do not tend to sell the farm to the traders for the latter to harvest the yam since in this way the farmers have control over the seed yams.

Credit

Credit can sometimes be obtained from the market women before the season begins when the price of yam is high. The loan is calculated in monetary terms and repaid according to the number of yams needed to generate the amount of the loan. Since the loans are repaid at the time of harvest when the price of yams is low, farmers at times do not have yams to pay for the loan and end up more in debt by the beginning of the next harvest.

Storage

The small scale farmers, who grow between one and two hundred mounds, market their yams as soon as they are harvested. The larger scale farmers store some of the harvest in pits for a maximum of one week. In some cases the yams are kept in heaps and covered with leaves and vines. According to farmers 'ware' yams are more storable and can be stored until January when the weather becomes too hot to store them for longer.

Farmers claimed that their grandfathers stored yams by tying them to stakes in barns. This type of storage method has changed as yam has become cultivated on a more commercial basis.

Now farmers in this village select the mature white yams, arrange them vertically in pits with the tips down and cover them with soil. Those destined for home consumption are kept in raised huts. Yams are also kept on the farm and harvested when needed for home consumption. When ware yams were stored for a period over two months, farmers estimated that 25% of the produce would start to rot or be attacked by rodents.

No curing is carried out by the farmers.

Problems

Farmers were asked to rank and score with 100 maize grains the problems they encounter in the production of yam. The results of this exercise are shown below:

	Number of maize grains
Credit (unavailability or usurious)	39
Access to markets	23

Transport	21
Heat	7
Insect	6
Termites	2
Millipedes	1
Storage	1

Apparently people had been to the village prior to the team's visit to talk about feeder roads, and this might be the reason for the high score assigned to transportation. It appears that farmers did not mention rodent attack because they believed it is a problem they cannot do anything about. Also, their main interest was in yams that they market. Damage to yams for their own consumption, such as rodent damage to yams stored on raised barns was not considered as important.

Farmers try to reduce the problem of heat by capping the mounds with mulch and or planting the seed yam deeper in the mound. Insect problems are minimised by dipping the seed yams in an insecticide (which they referred to as DDT) before planting.

The use of minisett for white yam cultivation is not practised by the farmers, as according to them, the minisetts get dehydrated and do not germinate. They however, use minisett for water yam cultivation.

Appendix 3: Bibliography

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