AH

R6638-003

Natural Resources Institute

Overseas Development Administration

REPORT ON A VISIT TO GHANA
from 11 - 29 Oct 1994

Integrated Food Crop Systems Project in Brong Ahafo

Project No. F0065

R R Schippers, V Suglo
P Bruce and S A Kuffour

Circulation:

NRI Strategy Area Manager FSCU
Programme Manager
Problem Area Manager

Loose Copies:

NRI

R G Poulter
A Gordon
J Orchard
A Westby
H Warburton
J Sherington
A King
J Bennett
S Gowen
J Orchard

Ghana:

V Suglo
P Bruce
S Awiti-Kuffour
L Delimini
Prof. K A Haizel
T Ahima

ODA
Ms F Proctor
Mr A Willson (BHC, Accra)

NATURAL RESOURCES INSTITUTE
Central Avenue
Chatham Maritime
Kent ME4 4TB

Tel +44 634 880088
Fax +44 634 880066/77

SUMMARY

1. This report concerns a need assessment study undertaken in the Brong Ahafo region of Ghana during October 1994 . This study follows on from the rural appraisal of farming systems carried out in May/June 1994 and a survey of vegetable production carried out in September 1994. These studies were undertaken as part of the Integrated Food Crop Systems Project: Enhancing smallholder livelihoods through adding value to agricultural production in Brong Ahafo Region. The primary objective of the study was to prioritise the major post-harvest constraints of vegetable growers and to identify possible solutions and opportunities for future action.

2. Most farmers considered the lack of capital or credit to be the main constraint in order to enable them to expand their farm -preferably near a source of water-, pay labour or to buy fertilizers, pesticides or seeds. Apart from these financing requirements the main constraints observed were:

(a) marketing
(b) pest and disease problems
(c) land and water-related problems
(d) seeds -quality and availability
(e) crop diversification

3. Financial matters were considered to be outside the scope of the present assignment and therefor only limited attention was given to the issue. As far as the topics of pests and diseases plus land and water-related problems is concerned, a decision was taken to leave these to other specialists who will make visits at a later date.

4. In Brong Ahafo the two most important vegetables, in terms of production and consumption are tomato and garden egg. Less important commodities are hot pepper and okra followed by few others like onion and shallots and even less common exotic vegetables such as lettuce, cucumber and carrots. According to MOFA, the present area cultivated with vegetables in Brong Ahafo region are: tomatoes 43,500 ha, garden egg 16,400 ha, peppers 4,600 ha and okra 1,890 ha. Approximately 60 % of the local population is engaged in vegetable production in one way or another.

5. Marketing is considered to be the main constraint especially for the vast majority of farmers who do not belong to a cooperative or farmer's association. Most farmers start growing their crops with the onset of the rains so that by the time that they can start harvesting, their neighbours will have a crop available at the same time. Peaks in supply are thus inevitable whilst the level of demand is not sufficient, especially in case of highly perishable fresh vegetables. Other factors which effect efficient marketing by farmers include insufficient quality awareness and a variety choice which is not demand-led. The marketing structure of middlemen, wholesalers, market queens and retailers does not function to protect the interests of the farming community.

6. Most farmers are able to produce their own seeds and others will either get seeds from their neighbours or buy them at a low price from markets. Few farmers buy seeds from either professional seed merchants or from the Ministry of Agriculture. When farmers produce their own seed this is almost always extracted from fruits which could not be sold

for whatever reason. Unsold produce at the markets such as tomatoes, garden egg, peppers or okra would not be thrown away but would be used for seed extraction. The result of these actions could be noticed,especially in older production areas where a clear varietal deterioration could be seen coupled with evidence of seed borne diseases.

7. Brong Ahafo is likely to be suitable for the production of a much wider range of vegetable crops as can be seen around Accra. Onions are hardly grown in Brong Ahafo and the varieties grown tend to split into shallot-like sets. However, one farmer was seen growing onions of a good non-splitting variety obtained from the north. This showed that they can be produced. Farmers mentioned that onions from the area do not store well, which is the reason that they do not grow them. If however, farmers could plant onions throughout the year, storage won't be an issue. Trials and demonstrations of year-round cultivation are therefore recommended. Similar trials and demonstrations are recommended for a wide range of other vegetables including leafy vegetables such as *Amaranth, Celosia, Basella,* Kenaf, *Corchorus, Talinum fruticosum* and other semi-indigenous vegetables which can be seen growing around Accra.

8. The Brong Ahafo Region was found to be a rich genetic resource for local vegetables and follow-up action has been suggested to preserve its germplasm. Simultaneously, the local landraces are considered to be of great use as a source for future breeding work. Suggestions were made to make selections from within those landraces and turn these into local varieties to be multiplied and released by a seed company to be formed. Further feasibility studies are recommended to establish a sound bases for such a seed company.

9. It was noticed that the farmer's knowledge on agronomic issues could well be improved but that no official institute is currently involved with basic or adapted research on vegetable crops. Farmers require guidance on issues such as the choice of which crop to grow, planting distances, the use of organic fertilizers, simple pruning techniques and several other topics. The establishment of a local horticultural research facility is strongly recommended.

10. After this preliminary survey of the problems and visits to major markets in Accra, Kumasi and Techiman, suggestions were made to follow this up with a feasibility study and a scenario for action has been proposed.

TERMS OF REFERENCE

11. The terms of reference were as follows:

(a) To identify post-harvest constraints and opportunities of small-scale vegetable producers in Brong-Ahafo and to develop a prioritised list of actions for futher research.

(b) Describe the range of horticultural crops grown, their varieties and qualities as perceived by growers, traders and consumers.

(c) To analyse the cropping seasons and peaks and shortages in supply and describe local and regional vegetable marketing systems and provide suggestions for improvement if considered to represent a significant constraint.

(d) To assess possible location and causes for post-harvest losses on-farm and in distribution.

(e) To consider processing as an alternative to fresh-market sales; specifically to investigate the requirement and feasibility of processing including suggestions for further inputs to assess techniques, economic viability and operational arrangements.

(f) Comment on supplies of vegetable seeds, selection criteria for further multiplication and means of improving or stabilizing locally preferred varieties.

(g) To select villages and groups of farmers as beneficiaries and participants in the project, based on analyses of the baseline survey undertaken in September 1994.

INTRODUCTION

12. The main aim of this ODA funded project under the Adaptive Research Initiative is to enhance smallholders livelihoods through adding value to agricultural production in Brong Ahafo Region. A process approach was used starting with a baseline survey and followed by more detailed studies including the present one. This investigates the primary constraints effecting small-scale vegetable farmers and investigates possible solutions to these problems in order to develop a plan of action for the future.

13. Participants of the study were: the project coordinator, Mr E K J Suglo from Ghana's National Agricultural Research Programme, Mr S A Kuffour, post-harvest specialist from the Department of Agriculture in Sunyani and R R Schippers, principal horticulturist at the Natural Resources Institute, U.K. Many farmers throughout Brong Ahafo region and officials from the Ministry of Food and Agriculture also participated in the study.

14. The present team decided to concentrate on the main topics of marketing, seed supply and crop diversification, excluding issues related to credit. For marketing, advice was sought from Mr Preachet Bruce, head of the marketing department of PPMED in Accra who accompanied the team to Techiman market. Mr Bruce also prepared a background paper on marketing including an overview of margins obtained in the chain between producers and consumers, attached as Annex 1.

I MAJOR VEGETABLES AND THEIR VARIETIES IN BRONG AHAFO:

15. As mentioned above, the main vegetable crops grown in Brong Ahafo are garden egg, tomatoes, peppers and okra. All others are of minor importance at this moment. Since much of the seeds used is produced locally, without strict selection criteria, a very diverse range of varieties has developed. Some of these can be considered as landraces, adapted to the local environment and stress conditions imposed by diseases and pests, and

these probably incorporate genes for tolerance or resistance to these diseases. Hence the importance of preserving these landraces for the future as a possible source of tolerance to the various local stress factors, which may not exist in imported varieties.

A Garden Egg

16. Of particular interest is the **garden egg**, which is more popular in Brong Ahafo than anywhere else in Ghana and probably more popular in this region (including neighbouring Ivory Coast) than anywhere else in the world. In other African countries e.g. Uganda and Tanzania this crop is gaining in importance Garden egg is a locally domesticated vegetable originating from the Central African species *Solanum anguivi* and has developed into a highly heterogenous complex now refered to as *Solanum aethiopicum*. A related species, which was seen around Accra, *Solanum macrocarpon*, has similar white egg-shaped fruits and is mainly produced for its edible leaves. This *Solanum macrocarpon* is the species which is more frequently encountered in Nigeria and Cameroon. Another related species which is mainly collected from the wild, is frequently seen on the markets. This has a cluster of up to 10 small green fruits, which are bitter and are mainly used in soups.

17. The garden egg must have been cultivated locally for a long time, judging by the many varieties which can be found. Fruits vary in size from about 8 mm to about 10cm long and have a colour range from dark green through pale green through pure white, light yellow to orange to deep red and even to half white/half purple. Some are uniformly coloured and some are striped. Others are clearly bi-colourous. Fruits occur solitary or in scymes or clusters. The leaf shape is varied as well and so does the leaf surface, ranging from sliightly hairy to smooth. Fruits can be either bitter or more neutral in taste. The texture of the skin is usually soft in the immature stage, but toughens towards maturity. At the markets preference is given to varieties which are egg-shaped and white in colour, yellow or orange fruits fetch a lower price. Most customers prefer small fruits, especially when the price is high, large fruits become too expensive. Consumers prefer the soft skinned types, usually associated with a clear white colour. For soups however, where some more bitter taste is often appreciated, a more tough skin is not a real problem since any coarse element will be sieved out

18. The most common garden egg variety is called **Awroro**, a slightly pale green to white variety, turning yellow and later to light orange with age. The variety is broadly egg-shaped, approx. 4x6 cm, with a slight extrusion towards its pistil end. Towards the end of its production plants produce somewhat smaller and more narrow fruits. In the Ofuman area, many farmers are now growing the variety **Kwafre**, which originated in Ejura, a farming area east of Kumasi. Kwafre has a more blocky shape, is approx. 5x6 cm and has a virtually flat pistil base whereas the fruit is not round but more irregularly lobed. Kwafre is pure white and the fruits hardly changes shape when the plants become old. The recent introduction called **K 19**, has a shape between Awroro and Kwafre and is more round at the base. Another variety called **Obulu**, is an even more round Awroro type. An introduction from Ivory Coast was called **Dwamcea** which is a long type of approx 25x65 mm with small spine-like appendages on the fruit skin. Fruits turn dark bright orange in colour towards maturity. This variety is not very popular in Abesim where it was found. Of local importance is the **Ansruwia** variety, with its typical clusters of up to 7 somewhat flattened fruits of approx. 25x22mm sometimes larger, sometimes smaller. These fruits are more bitter than Awroro or Kwafre and reach maturity at an early stage. Fruits are usually

green, often striped and turn orange towards maturity. Farmers can expect to get a higher price for this variety but this does not compensate for lower yields and higher picking costs. In periods of over-supply, chances of selling one's crop are higher with this variety than for the others. Ansruwia is mainly used for soups (partly due to its more bitter taste) whereas the Awroro types are mainly used in stews.

B Tomato

19. **Tomatoes** as seen in Brong Ahafo are generally degenerated varieties which probably originated from the French variety **Supermarmande**, a flat, multilocular variety with deep lobes, sweet in taste and juicy and the American variety **Heinz 1350** which is oblate in shape, smooth, with approximately 5 locules. Heinz 1350 was originally a multi-purpose processing and fresh market variety, more fleshy and bland in taste than Marmande. Even though local names are given (**Rosta** for the Supermarmande type and **Power** for the Heinz 1350 type) there are many intermediates such as the variety **Runno**, which starts in its early stages of its plant life looking like a somwhat oval type of Power and later on converts to Rosta. For local and short-distance markets, the variety Rosta is preferred but for the long-distance markets preference is given to Power, which is more solid and has a longer shelf life (7 days as against 4 days for Rosta). Farmers also prefer Rosta because of its size, which allows boxes to be filled faster than Power. Traders do not like Rosta because of its susceptability to cracking, especially after heavy rains. All tomato crops seen are grown as a bush type and thus without any support.

20. Private traders and MOFA are currently introducing the processing varieties **Roma VF** and **Laureno 70**, into northern Ghana but not as yet in Brong Ahafo. The demand for (especially) Laureno 70 is on the increase due to its good shipping qualities. Its introduction in Brong Ahafo can therefore be expected in the near future. Seeds for these two varieties are currently imported into the country.

C Okra (called Okro in Ghana)

21. **Okra** is very popular in Ghana and is used both in stews and in soups (together with Kokonte) where its high mucous content is much appreciated. For this reason the short, fat varieties (belonging to *Abelmoschus caillei)* are more popular than the longer varieties (*Abelmoschus esculentus)* which tend to develop its parchment layers faster, especially the angular types where this process occurs at an earlier stage than the ones which are round in cross-section. Unfortunately, the short, fat varieties have a much lower yield than the longer types. One solution is to harvest the longer varieties and especially the angular types at an earlier stage when the fruits can still be snapped with relative ease.

22. A wide range of names were given to the various types of okra, which were generally descriptive ones such as **Asuntem** "the early one" or **Burupo**, "the late one". A variety with a widespread calyx was called **Blupo**. No attempt was made to get proper names for varieties since these were not uniform and secondly, the range of shapes, sizes and colour (from light green to dark green to dark red) for both fruits and plant shape and size were extremely heterogenous. The two species preserve their genetic identities since the hybrids, which can occasionally be seen, do not produce viable seeds. There appears ample scope for selection. This was actually seen on one farm owned by Samwell Opoku in the Wenchi area. He made consistent selections himself, resulting in a good, uniform

crop with high yields. This farmer was an exception for more than one reason since he also planted his crop in neat rows at uniform planting distances, made use of fertilizers and pesticides, took care of weeding and was generally well organized.

D Pepper

23. Two main groups of **pepper** varieties can be seen, none of them with distinct varietal names but clearly originating from two distinct lines. No apparent crosses between these main types were observed. The first is a small, roundish type locally called Makuhim, belonging to the **Marie Janette** group of French origin. These are quite hot, about 2-3 cm in diameter with large wrinkles and a relatively thin cell wall (when compared with bell peppers). The variety is popular on the fresh market but is not suitable for drying. The second group called **Mako** by one farmer, are **Cayenne** types of probable Indian origin, about 8-10cm long and approximately 8mm in diameter. They are highly heterogenous but this is not a problem since a large proportion is used for drying to be subsequently ground, such that its original shape is of little interest. Farmers should however, be interested in a stable variety purity since field visits showed enormous differences in yield between individual plants, suggesting the potential for varietal selection. Some plants were infested with viruses belonging to two or three species, whereas others appeared free from viruses. Some plants were loaded with fruits whereas others appeared to drop their fruits at an early stage. Again, plant shapes varied significantly, offering the opportunity to select for types which grow taller and less broad, thus requiring less space for the same yield potential.

II CONSTRAINTS OF THE MARKETING SYSTEM

A Constraints associated with seasonality

24. Cropping seasons used to be more distinct in the past than at present due to the recent erratic rainfall pattern. Farmers blame logging activities and consequent reduction of the area covered by closed forests, for this change in weather. As a consequence, farmers find it more difficult to plan their nurseries since they no longer know when the rains are likely to start. Similarly, nurseries established to coincide with the drop in river water levels where new crops could be planted on the muddy banks, may no longer provide good quality seedlings at the time needed, being either over-grown or too young. Farmers are thus forced to stagger their nursery sowing time and are forced to accept consequent losses of planting material accordingly. This does not stimulate farmers to use the more expensive seed from selected plants.

25. Commodity prices also no longer follow a predictable seasonal pattern so that vegetable production is becoming more of a gamble as it becomes more difficult at the time of sowing to foresee gluts or periods of short-supply. The above can be demonstrated by the price fluctuations for 5 vegetables based on wholesale prices at Techiman market (Table 1). These prices are expressed in Cedis.

Table 1: Wholesale vegetable prices at Techiman market (price in Cedis, not corrected for inflation)

Wholesale price for a 27 kg "mini-"bag of Garden Egg

Month	1990	1991	1992	1993	1994
January	2067	677	2961	3130	3064
February	1522	864	3645	3604	3880
March	1560	2784	3834	2425	3375
April	5200	1620	5273	2307	4725
May	3800	2789	1138	4747	3720
June	925	4218	1845	2122	3440
July	1376	3172	737	2060	2095
August	757	1449	1774	2278	4016
September	1060	1512	1323	2136	3806
October	347	1670	2961	906	
November	1250	1370	1603	2480	
December	540	1323	2209	675	

Wholesale price for a 52 kg box of Tomatoes

Month	1990	1991	1992	1993	1994
January	4220	3480	4320	3933	6775
February	4025	2495	4800	5395	4500
March	2760	15700	4225	4667	9790
April	3520	9700	10300	9600	16530
May	7700	4640	18467	9333	21530
June	6408	8000	4653	14825	5275
July	2195	7200	2424	11900	4768
August	2236	6233	3775	5550	9150
September	3840	7125	4740	4575	15480
October	5115	4000	3900	4755	
November	2776	2675	7725	5780	
December	4675	2740	4273	12000	

Wholesale price for a 22kg basket of Okra

Month	1990	1991	1992	1993	1994
January	1000	1258	2167	2853	2207
February	1440	1407	2960	3015	3640
March	1260	2507	3507	2810	4080
April	1150	2560	3084	2470	5100
May	1473	1772	2013	2213	2390
June	2795	1550	1626	2525	2300
July	1520	2160	876	2245	2320
August	1038	2580	1670	2505	6400
September	1965	2947	1370	2800	8750
October	1680	2107	2167	3030	
November	1250	1850	1675	1990	
December	540	1370	1266	1200	

Wholesale price for a 15 kg sack of dried pepper

Month	1990	1991	1992	1993	1994
January	7645	8220	21067	14933	15750
February	10175	4650	22533	12825	15350
March	11332	4740	30150	10667	16000
April	10510	4155	28200	10125	18267
May	18733	3700	29200	9200	18700
June	14060	5150	16800	9975	32150
July	10225	5650	12880	9725	26320
August	11104	7933	12700	10225	24600
September	7100	9000	16950	8750	29440
October	8150	9133	13750	9100	
November	8512	12800	14400	9750	
December	7750	17550	10933	10000	

Wholesale price for a 73 kg "maxi-"bag of onions

Month	1990	1991	1992	1993	1994
January	12380	10420	22267	11375	17600
February	8775	9100	17200	13233	13850
March	7580	9270	11800	10430	15000
April	7845	13190	14636	11750	16800
May	10260	15272	15533	13500	24400
June	14100	17000	19167	16700	25900
July	16900	23150	23240	21750	33400
August	17740	28667	24700	22000	
September	18435	37600	33000	25200	
October	25000	36933	35400	33000	
November	24000	30600	35000	55333	
December	15925	23550	32267	44000	

26. The statistical information in Table 1 was provided by the Sunyani office of the Policy, Planning, Monitoring and Evaluation Department (PPMED) of the Ministry of Food and Agriculture. PPMED employs their own staff at the Techiman market where information is collected on a daily basis. Prices mentioned relate to early morning prices, which are usually the highest of the day. Further, these prices reflect the sale between market-based wholesalers and retailers and not the price which farmers receive for their produce! Apart from the monthly statistics as above, PPMED can also supply weekly information, which was considered to be too detailed for the current report.

27. The daily information on prices as collected by PPMED in main markets throughout the country is announced by radio on a weekly basis. This is a significant contribution to clarity of the markets and, in theory, should allow traders to distribute produce from areas with low prices to areas where the demand is higher. When asking traders about the effect which this information had on their activities the response was rather mixed. Many traders consider that the information does not reflect the prices they can obtain, especially since it

is announced on a weekly rather than on a daily basis. Farmers can become frustrated because the prices which they obtain are invariably lower than those announced.

28. During periods of gluts, farmers cannot normally dispose of their produce for a price which will exceed harvesting and transport costs (from the farm to the roadside). In such cases crops remain unharvested and rot in the fields, causing pest and disease problems for the remaining crop plus volunteer crops in the following season. These volunteer crops could carry diseases and be a host for pests, thus making it more difficult to effectively create the isolation, timewise, needed to control such pest and disease problems.

B Constraints associated with sales from the farmer to the trader

29. Farmers were observed to have a tendency to work on his or her own and to negotiate prices with traders directly without consulting neighbours. It means that traders will need to spend a lot of time before they have a truckload of produce from many individual small-farmers and these costs (time for the trader plus the truck) are reflected in the price offered to farmers. Frequently farmers who are desperate for cash will sell for a low price and are at the mercy of a trader.

30. Small farmers, especially in the more remote places, usually sell to professional marketing intermediaries who in turn sell to itinerant traders. At village level, trade also takes place between households, where one member of a small village can act as marketing intermediary. Farmers along the main road normally sell directly to itinerant traders. It is quite possible that these traders have built up a special relation either through provision of credit or through sales during periods of short supply. Larger farmers or farmer's marketing organisations can act as farmer-wholesaler and bring their produce directly to the market. A further alternative is for out-of-town traders from Accra, or Kumasi or other main consumption areas, to go to production areas directly where they collect mainly from either larger farmers or road-side collection points (assembling points) or from groups of farmers. Buying and selling of food crops occurs on the farms, roadsides including roadside markets, villages, rural markets and urban markets.

C Constraints associated with the markets

31. At every market, there is a structure limiting the sale of a specific commodity to members only. This means that at the small roadside markets, farmers are not allowed to sell their produce directly, but have to do so through a recognized member of the market. Farmers can, however, sell their produce along the road, away from the market but will have less chance of success because he or she cannot offer the choice of produce which most buyers would like to see.

32. When traders enter the rural (e.g. Techiman) or urban market they have to see the market queen first who will then appoint one or more market based wholesalers who sell the produce on their behalf. This can be at either pre-arranged prices or for the price obtained during the day, which means that settlement will take place the following day. This could mean that the produce will remain unsold or will be sold at a big discount towards the end of a day when dealers wish to clear their stocks. In all cases, the market queen will receive her commission which can be up to 1000 Cedis per container and in addition the market authorities or the city council will also demand a fee of between 100

and 150 Cedis per container on arrival. Buyers will have to pay the same or more again to the market authorities when leaving the market. In theory at least, a farmer who brings his produce to the market himself could get a negative price for his product after paying the various levies and subsequent inability of the wholesaler to sell the product.

33. Techiman market is the largest rural market within Brong Ahafo region and serves as assembly market or transit market for the entire country. It is located near the main road to the north through Kintampo to Tamale and main roads to Kumasi and Accra. Space arbitrage takes place by traders taking advantage of low prices in one market in order to sell in other markets where prices are higher. In addition, traders coming from e.g. Ivory Coast or Togo will sell their produce first and with the proceeds buy other goods from the market. This barter trade will allow them to circumvent currency transactions. Commodities dealt with are mainly the less perishable ones such as root crops, cereals and pulses for which the market could act as assembly point so that larger traders can fill up their trucks with one commodity from just one place. Only a few perishable crops such as fruits and vegetables were seen in Techiman market. In fact, the total volume of tomatoes, garden egg, peppers and okra was minimal for such a large market. Out-of-town traders from Accra or Kumasi will deal with farmers directly and therefore have only a limited interest in purchasing vegetables in Techiman. At rural and urban markets, the wholesalers sell their produce mainly to small retailers and to a lesser extent to other wholesalers operating from smaller markets or to institutions.

34. Towards the end of a market day, when prices have dropped significantly because wholesalers wish to clear their produce, local chop bars will come and buy the produce at a discount. Very many small retailers (mainly women) will handle small volumes of vegetables which they sell at a fixed price per (small or large) heap. This heap varies in size and in quality between early morning and late afternoon but prices don't change. By the time that the remaining produce has deteriorated to the extent that it can no longer be sold, retailers will still be able to get some money for their produce for example by selling tomatoes or peppers to seed extracters or by selling onions or okra to the chop bars. Market losses are thus quite low and rarely exceed 15 %.

35. Produce is not sold by weight - even at the wholesale level - so that total volumes expressed in tonnes are virtually impossible to obtain. The size of wholesale measures is not consistent, such that in periods of shortage a bag of produce will weigh less than during periods of over-supply. A crate of tomatoes is frequently over-loaded whereby the excess top layer usually gets crushed, especially when other crates are being put on top of this. Traders can however, sell these crushed tomatoes to a chop bar at a discount and consider this extra weight as additional margin for them.

36. Problems arise during evening and night hours due to lack of security. Traders are often forced to sleep next to their produce (in Techiman) for fear of it being stolen. In 31st December market, in Accra the main gate is locked at 7 o'clock in the evening and traders and customers are asked to leave at 6 o'clock. Even in this case, security is a major concern, hence the need to sell all stocks before the end of the day. When the produce is returned to the market next day, prices will be much higher again in comparison with the price of the previous evening.

37. The volume of produce which can enter a market is determined by commodity marketeers associations for example the tomato marketeers association in 31st December market in Accra. Market queens have a main function in distributing produce between wholesalers. She is also involved in settlement of disputes between market based wholesalers or when required, other wholesalers. At these markets, wholesalers are competing between themselves with price settings determined by demand and supply. Commodity associations, with the market queen as chairperson, ensure that the total volume will not exceed demand in order to prevent gluts at the market with corresponding erosion of their margins. The farmer's consequent inability to sell a large share of his or her produce in periods of excess supply is of no concern to the market based wholesalers, causing serious conflicts with farmers who are however, not organized to handle such a situation. Marketing opportunities for farmers are generally intransparent, mainly caused by the structure of the marketing chains with the inability to trade directly at all levels, coupled with poor representation of farmer's interests at wholesale markets.

D Mechanisms for relieving constraints associated with marketing

38. Solutions to these marketing problems were hoped to be found through a market information system. Weekly price announcements are broadcast on radio which cover 10 different crops. These do not include garden egg and accordingly a request was made to consider its inclusion due to its importance in Brong Ahafo. Information on prices is also published in newspapers and in bulletins aimed at policy makers and traders but less so at producers. These bulletins are prepared by the PPMED on a weekly and monthly basis and cover prices at the most important markets in Ghana for 20 different crops. A further solution is now being implemented through the setting-up of a special farmers market where marketeers will not play a dominant role. Negotions for this farmers market are going on between the National Farmers Association, MOFA and the Accra Metropolitan Authority to re-instate the old market next to Accra's railway station. This market is to be provided with a paved floor, rather than the mudpools as seen at Accra's 31st December and Agbogboloshi markets and the Kumasi Central market. A further improvement is hoped to be found through the provision of storage facilities which will avoid the very low prices now prevailing towards market closing time.

39. Organised marketing of fruits and vegetables other than for one large processing customer is rare in Ghana. Only one successful marketing association was encountered which was in Ofuman with 400 members. Here members do not pay any fees, but traders who wish to get regular produce from the Ofuman garden egg farmers association need to pay a contribution. Farmers have formed committees and the executives negotiate with traders about the minimum price. No maximum price is fixed, only a minimum price. Members will have to abide by this price even if they are desperate for money, which can be the case when they have to pay for instance for doctors fees. If a member accepts a lower price then he will automatically loose his rights to sell his produce through the association. This organisation is very successful since traders know that they can fill their trucks with good quality in just one place. A market traders association was formed and permanent market stalls were constructed. Other committees within the organisation are dealing with varietal aspects and quality aspects in general. Further developments led to provision of agricultural inputs and other services. This organisation was formed around Tom and Agnes Ahima, best farmer in Ghana in 1987 who subsequently set up the Ofuman agricultural project and a graduate farmer training scheme.

III CREDIT

40. Credit was mentioned as the main constraint for farmers but this topic was not addressed due to the lack of specialised knowledge by the team members. Discussions were however held with the NGO Global 2000 which initially experienced significant problems with credit schemes. After a number of years they came up with a success formula through a concept whereby farmers will be responsible both as individuals and as a group. Their present approach is to form small groups of between 5 and 10 farmers who should know and trust each other and who should be known in their village. Individual loans are given to these farmers and when repayment (plus 22.5 % interest) is due the whole group will be financially responsible in case one or more members fails to repay. This means that they will have to pay up for their colleague and failing to do so will have as a consequence that they will become blacklisted and no longer being able to get any credit from any bank. The second stage involves a larger group of 10 to 20 farmers for which the amount of credit could be higher. The interest rate is also higher at 28 % which is still lower than current commercial interest rates of about 37 %. Global 2000 mediates for the Agricultural Development Bank, which provides the funding. IFAD/MOFA provide a rural credit to groups of farmers in Brong Ahafo region, specially geared towards women. In case of recognized natural disasters, non-repayment is accepted, but the loan will be re-scheduled but not cancelled. The 7 districts in which the scheme operates are Techiman, Sunyani, Inkurasa, Kitampo, Attebubu, Tano and Sene.

IV SUPPLY OF VEGETABLE SEEDS

41. Farmers in Brong Ahafo currently select their own seed, obtain them from other farmers in the village or purchase them at the markets and elsewhere. The present methods of seed selection tend to lead to low quality. Many farmers demonstrated that they would choose fruits from selected plants based on yield and varietal characteristics, and some select from crops which were free from seed-transmissable diseases. No farmer was known to produce a crop solely for seed production so that seeds are always a by-product. When visiting markets in Techiman, Kumasi and Accra, several women were found to specialise in buying crop left-overs, which could not be sold at the end of the day even including rotten fruits, for seed extraction purposes. These seeds were subsequently sold to traders or directly to farmers. Often traders will provide farmers with seed of a variety of their choice, but they also purchase from market women. A number of farmers clearly expressed an interest in good quality seed and mentioned that they would be prepared to pay a higher price for quality, especially after seeing a demonstration plot where such seed had been used successfully.

42. At present only a few farmers obtain their seed through the Ministry of Food and Agriculture or from seed merchants. Ghana is currently importing substantial amounts of seeds from Holland, Italy, Denmark Japan and the USA. These are exotic vegetable seeds such as carrots and cabbages. Tomato seeds are mainly imported for producers in the north of Ghana, who make use of irrigation facilities. Information on imports of vegetable seeds in terms of total weight and value was not found to be easily available, whereas the figures provided were not considered reliable.

V CONSERVATION OF GENETIC RESOURCES

43. Coupled to the seed multiplication effort as suggested will be the need to preserve the presently rich source of genetic material as found in Brong Ahafo. As mentioned above, there is a wide range of garden egg varieties. With on-going selection for a few favourite varieties there is a distinct chance that a number of locally grown varieties may disappear because their characteristics are less appealing. These include varieties with dark green stripes or purple varieties. A similar wide range of varieties can be observed for okra, peppers and many other vegetable species including cucurbits used for consumption of seed e.g. the Neri or Colocynth (*Citrullus lanatus*) and Egusi melon (*Cucumeropsis mannii)* types.

VI PROCESSING TO MAINTAIN MARKET PRICES

44. The terms of reference for the visit included investigation of the potential of processing as an alternative to fresh-market sales. Processing is normally considered when prices are low unless a crop is grown on contract to a processing company. At present no such company operates in Brong Ahafo after the closure of TOMACAN company at Wenchi in 1986. The other fruit and vegetable processing companies in Ghana, which were operating under the Ghana Industrial Holding Corporation GIHOC such as Pwulugu tomato factory in the Upper East region and the Nsawam cannery in the Eastern region, are no longer in business. The main reasons given for these companies to fail included the high price paid for cans which make the end product uncompetitive with fresh produce. A second reason was the non-availability of produce to be processed for a large part of the year. In addition poor management resulted in the inability to pay ready cash for the produce from farmers.

45. The time of low prices usually coincides with the rainy season. This therefore means that preservation by sun drying of a commodity is difficult or impossible unless one has access to covered storage where the produce can be stored during periods of rain. The two most important vegetables in Brong Ahafo, tomatoes and garden egg are not very suitable for drying and this is thus hardly carried out. Also demand for dried sliced tomatoes or garden egg is very limited; it is mainly for use in soup. A few farmers do split or slice these fruits and dry them in the sun for 7-10 days during the dry months of December to February. The dried products are stored in pots or gourds for later use.

46. Hot peppers and okra, are very much in demand in their dried form. After harvesting hot pepper, the product is left for three days to ripen off. Blanching is done by putting the peppers in boiling water for 5 - 10 minutes after which the stalks are removed. Sun drying takes about 7-10 days during which they loose about 65 % of their original weight. When dried in more humid conditions as prevailing during the rainy season, chances for mould growth increase, strongly effecting their quality. Hot pepper is usually sold whole and not as a ground product. The practise of mixing pepper powder with cheap kola nuts or other adulterants has turned customers away from this product. Customers like to see what they are buying. Sun drying of okra is widely carried out by farmers and traders alike. Either whole fruits or slices are dried in the sun. The product can be stored for up to about 5 months after which it will loose its desirable slimy consistency when reconstituted in water and used in soups.

47. Low-cost solar dryers have been introduced, but are still not commonly seen, partly because their expense is still considered too high. Also, village level small processing plants would be useful during periods of gluts. The right technology at an affordable price still seems to be lacking. This issue will be discussed further within NRI to see whether any technology could be made available and what type of additional action will need to be taken.

VII SELECTION OF VILLAGES FOR FURTHER WORK

48. After prioritising constraints, actions are suggested (Section VIII) to address issues related to constraints of marketing, seed supply and crop diversification as mentioned previously in this report. Since Brong Ahafo is a very large region, it is not realistic to propose activities for the entire region so that instead, a selection had to be made. The criteria used for this selection included representation of the three main zones: forest, transitional and savannah. This was by itself not easy because virtually the entire region could be described as transitional since there are no natural forests left and in areas close to real forests there is hardly any vegetable production. Also, towards the north, the savannah areas were not true savannah. In the end, a concensus was reached on areas which originally belonged to the three zones. A second criterium was the choice of areas covered by the baseline surveys whereby a better understanding of both people and the conditions under which they operate would be known. A further criterium was the inclusion of both areas near main roads and areas located near secondary roads. The last criterium was used to select areas with different crops plus capacity to produce at different times of a year in order to facilitate marketing efforts, being the major constraint dealt with. Based on the above and in consultation with local agricultural authorities, the selected villages are:

(a) Abesim
(b) Techimantia
(c) Akrobi/South Wenchi
(d) Pamdu/Manso area.

49. The Abesim area covers a strip of land of up to 5-10 km to the south of the main road from Kumasi to Sunyani, east of the Tano river, up to Terchire and including the village Yamfu. It is an old and established area where farmers concentrate on garden egg production with some tomatoes and okra. Farmers currently dispose of their produce partly by sales along the main road but more importantly through sales at the collection centre near the Cocoa Marketing Board in Abesim Village, which take place every Tuesday and Friday. Old plots of land, located near the rivers and near the road, are badly affected by pests and diseases. Varietal degradation is also very clear. A cooperative movement was started some years ago in order to attract credit, but since its objectives failed to materialise, the cooperative ceased to function and farmers work independently. The area has a large vegetable farming community with between 500 and 700 farmers producing both for subsistence and for sale to the market.

50. Techimantia is located roughly halfway between the tarmac roads Sunyani/Kumasi and the tarmac road Kumasi/Techiman. A connecting road exists between these two tarmac roads with the village Bechem on one end and Akomadan on the other.

Techimantia is located approximately halfway between the two. No telephone is available but in case of urgent messages a facility could be found in Bechem. The area is known for its tomatoes with a peak production in March/April. The crop rotation is cassava/tomato/cassava/tomato etc. Far less important are garden egg and okra. There are between 500 and 800 farmers in Techimantia who produce vegetables for the market. Traders come both from Accra and Kumasi but only come when they need the product. In periods of large supplies elsewhere, they do not turn up. Some farmers are able to supply yearround, allowing good margins to be made which offset the losses incurred during the glut season. There is no central loading place or collection centre. Farmers sell from along the road and harvest after agreeing the price with a trader who will have to wait for his product to be harvested first. Market intermediaries and itinerant traders operate from Akomadan village. In Techimantia, farm labour will be paid basic wages plus food and will get a bonus on top of their wages when the price for the crop is good. Diseases are of major concern in the area.

51. Akrobi, southeast of Wenchi town, is a village located on a secondary road where the most important crop grown is okra, followed by peppers and some tomatoes. The village population of 3500 people includes between 200 and 300 farmers engaged in vegetable production for the market, with cultivated land in excess of 0.5 acres. The area extends into Wenchi where a wider diversity of market gardeners can be found. It does however, not extend to the area northeast of Wenchi where the former tomato processing plant is located and where farmers joined to form the tomato growers association. This particular area was excluded because these farmers are already well organised and have the opportunity to link up with the Ofuman farmers group which already enjoy their own marketing arrangements and other services. The Akrobi area is sandy and yields of okra peak in May/June. Their good time -with high prices- is during October/November. Marketing is a major constraint because only few traders are aware of their existence.

52. The Pamdu/Manso area is in a semi-savannah belt along the road from Techiman to Kintampo. This area has an extended rainfall period with mainly light rain whereas small rivers with muddy banks provide opportunities for out-of-season production between February and April. The sandy soils of the area are good for a wide range of produce including peppers, okra, garden egg and tomato but also some onions and watermelons. Marketing takes place along the roadside with marketeers supplying boxes after agreement has been reached on prices. Many farmers live far away from the main road so that delivery of crops usually takes place at the end of the day after the trader has been waiting for several hours. Traders do not usually come in periods of oversupply when the farmers will need to go to the main market in Techiman themselves, hoping to find a buyer for their produce. Glut period for garden eggs is October when prices dropped to 500 Cedis per bag, which is less than the transport costs. Between the farmers there is a good cooperation and people exchange services such as labour for planting etc. when called for, without payment. Between the two villages there are approximately 200 -250 farmers who are producing vegetables for the market, next to the ones used for home consumption.

VIII SUGGESTED FUTURE ACTIVITIES

Improved marketing structure in target villages

53. A suggestion is made to improve marketing in the four centres as described in Section VII by establishing four satellite stations, linked to one service centre or alternatively four service centres linked up with a central marketing office. Every centre should have its own manager who should be a paid external specialist and not a member of the farming community to avoid conflicts of interest. The satellite manager jointly with the general manager could then invite potential buyers to purchase the various commodities from one centre rather than from hundreds of individual farmers. Negotiations on prices could be made by telephone and farmers can have their crops ready when the trader arrives, avoiding waste of valuable time. Farmers could harvest in the afternoon, grading, sorting and packing could be done in the evening and the truck driver could depart during the night in order to arrive with fresh produce early in the morning at long-distance markets.

54. At the satellite stations quality aspects could get a better attention; including packing. Traders can make long-term pre-arrangements for the next season whereby farmers could plant according to the demand of the trade. The four centres have partly been selected based on the opportunity to be able to offer a wide range of produce over an extended season. The main factors for successful marketing: quality, adequate quantities, a range of products and consistent supply would be achieved through such a system.

55. The suggestion for improved marketing as presented above will need to be worked out further and to be discussed in detail with local leaders including farmers and traders. Initial discussions were held with a few people concerning ways for farmers to work as a group rather than as individuals. When the concept as described was mentioned, they reacted most favourably. Organisational arrangements with farmers will still need to be made but it is not considered wise at this stage to pursue this matter until a proper feasibility study has been made. Such a feasibility study will need to look into production costs for the farmer and possible margins which he or she could make. The economic aspects and costings of the envisaged sales structure including additional facilities will need to be studied in detail. Also, talks will need to be held with the National Farmers Union with regard to the use of the new farmers' market in Accra.

56. The service centre concept, with one general manager heading all units, will allow for other additional services. The organization could have a representative at the main market in Accra and another representative in Kumasi who will not only provide daily information on supply and price levels but can also contact potential buyers. The service centre could be used as a means to disseminate information with regard to crop production, pest and disease control, seed supply, raising of quality awareness etc. At the centres there could be an assembly point with a concrete slab (no muddy places) and some covered storage space whilst a generator should allow for work during the evening. The centres are likely to attract small businesses dealing with farm input supplies and could also serve as a focal point for credit institutes who could deal with clusters of farmers. One way of organising the farmers is for a representative of a cluster (of say 10 members) to join the executive committee, which in turn appoints the manager and be responsible for the decision making processes. A more detailed proposal for a service centre as outlined can be prepared when considered useful.

Recommendations for improving seed quality

57. Given the observations that Brong Ahafo farmers currently mainly use seed which is hardly selected with seed transmissable diseases present, there appears ample scope for improvement. It is therefore suggested to start a specialised vegetable seed production activity, jointly with Dr Olympio of the Dept. of Horticulture of the University of Science and Technology in Kumasi and with advice from Mr L Delimini, head of the Ghana Seed Inspection Unit.

58. This activity could start by selecting the very best plants from a farmers field, belonging to a variety which is in "potential" demand. These plants, which should be visibly free from seed transmissable diseases and show good yield potential, should be marked and the immediately surrounding plants of the same crop removed to reduce disease problems and to be able to better observe the plant selected. Fruits from these individual plants should be harvested separately and their seeds extracted. At the end of a season one can therefore have a series of containers with seed from individual selected plants. Not more than 50 % of these seeds to be sown and resultant plants to be observed in lines which originated from the original single plants. A strenuous selection will need to take place from here onwards and to follow separate rules for self-pollinated crops and cross-pollinated crops which can be presented in a separate paper if so desired. Resultant seed can be used as a generation of breeders seed or even foundation seed for further multiplication as commercial seed (or certified seed if there is a need to do so which is debatable at present).

59. This commercial seed production MUST be done in isolated areas, away from normal production fields. Areas which are likely to be suitable include Navrongo and Bolgatanda in the Upper East , Bontanga in the Northern region and Sankana Dam in Upper West region. Simple and cheap seed extraction technology can be used such as a fermentation process for wet seed and drying could be done in the shade, using for example cheese cloth.

60. A laboratory sized clipper-type of seed cleaning equipment should be used, with adapted screens for the range of crops to be dealt with. These will initially include tomatoes, garden egg, pepper, okra and onion and in a later stage possibly also amaranth, corchorus, kenaf and others. A second important requirement is moisture proof seed packets. Ideally these are either cans with a lacquered coating or aluminium foil packets with polythene lining. As a first step though, heavy polythene could also be used, which has the advantage that farmers can see the seed for themselves and will note them to be clean and uniform.

61. An organisation will need to be set up dealing with production, processing and packing of seeds on the one hand and with marketing and distribution on the other hand. Preliminary discussions held indicated that the set-up of a specialised company is not likely to represent a problem from the investment point of view but that guidance will be needed. A follow-up is however, required to hold more detailed discussions with seed merchants and potential investors whilst at the same time a feasibility study will need to be made indicating total demand for the various types of seed, the prices which farmers are likely to be willing to pay, seed production costs, including processing, packaging and distribution.

In this exercise, the potential replacement of imports will need to be looked into. Also the potential opportunity to export vegetable seeds to neighbouring countries should be looked into.

Recommendation for preservation of germplasm

62. In order to prevent the genetic erosion as described above, it is recommended that an extensive variety collection be made to preserve the germplasm found in hundreds of local strains of the various varieties. These varieties can then be observed in special assembly plots and be described where feasible on quality attributes as well as phenological characteristics. Simultaneously the range of varieties could be tested for desirable characteristics such as tolerance or resistance to certain pests and diseases, which could be useful in future breeding programmes. After these observations have been made, a good sample of the seed should be despatched to a gene bank for preservation and the remainder to be kept for further local studies. Seeds should be distributed further through a network of organizations with similar interests including local seed companies if they have expressed interest. As a follow-up, a special proposal should be made under the Darwin Initiative, which may include elements of training and cooperation with other networks in different countries.

The need for adaptive agronomic research

63. Even though not considered a post-harvest constraint, it was felt that general agronomy was a limiting factor and since pre-harvest practices have a strong influence on post-harvest results, I would like to make some suggestions on this topic. It was felt that there is a general need for guidance on cultivation practices for vegetable production. This already starts at nursery level where farmers currently broadcast their seeds rather than using seed drills. When young plants are sown in lines it is easier to remove undesirable off-types or weak plants whilst at the same time the leaves can expand and thus forming stronger plants.

64. A second issue requiring attention are simple trials to determine plant spacings in single or double rows. Other methods like pruning or removing fruits at an early stage to delay harvesting are hardly practised if at all. Cultivar trials geared to finding early or late strains could similarly contribute to an expansion of the growing season, thus reducing the present peaks in production. Also fertilizer trials, including green manure, would be most useful for farmers. Consideration should be given to replacement of Sulphate of Ammonia by Calcium Ammonium Nitrate in order to address the acidification process. Investigations into appropriate grading and sorting criteria would also be needed especially when more emphasis is given to quality. It is thus clear that a horticultural research facility would be most welcome. Such a facility could possibly be linked with a service centre as proposed above. The Crops Research Institute in Kumasi was originally designed to incorporate vegetable crops, but the present facility deals primarily with agricultural crops such as cereals and grain legumes.

65. If a horticultural research facility could be set up in whatever form, one of its main topics could be introduction and promotion of alternative vegetables. One of the prime candidates would be onions, which were seen to perform well in Brong Ahafo, yet, they are hardly cultivated. Probably some varietal research will need to be carried out and guidance

will need to be given that onions can also be produced from seed as against the current practise of planting onion sets, which results in a series of small bulbs (variety Bawku red). Other crops which deserve far more attention than what they are currently getting include the various "greens" which are seen in Accra but not or hardly in Brong Ahafo. There also appears scope for carrots, beans, fresh cowpeas, chinese cabbages, cucurbits and others.

Additional suggestions

66. The following issues should also be considered in the future:

Enforcement of proper weights in the markets, if possible by law. Market authorities enforce this at both the wholesale and retail levels.

Introduction of smaller containers for vegetables to enhance its quality. Packaging could be further improved through the introduction of "nest boxes".

Chemical analyses facility should be available at the markets to establish residues of pesticides on vegetables.

Preparation of leaflets on harvesting and handling of perishable crops.

Comparing the economics of crop production of vegetables, maize, cowpeas, yams etc. to give an indicationof the best returns to the farmer.

To include garden eggs in the weekly broadcast on prices.

Principal discussants:

Mr Attah Agyopong, Regional Officer PPMED, Brong Ahafo
Mr and Mrs Ahima, Ofuman Agricultural project
Mr Owusu Asare, District Agricultural Extension Officer, Wenchi
Mr Tareke Berhe, Sr agronomist, Sasakawa GLOBAL 2000
Mr L. L. Delimini, Head, Ghana Seed Inspection Unit
Mr Osei Frimpong, Regional Director of Agriculture, Brong Ahafo
Mr Haizel, Farming Systems Officer, Wenchi Farm Institute
Mr T. Kobi, Deputy Regional Extension Officer, Brong Ahafo
Mr Mensah, Desk officer IFAD for Sunyani
Mr Owusu, Head, Wenchi Farmers Institute

Literature used (next to NRI reports):

Kojo Sebastian Amanor (August 1993) Social/Environmental Baseline study, Wenchi Farmer Training Project
S. Asuming-Brempong et al (Dec. 1991) Agricultural Marketing Development in Ghana: Strategies and Projects; technical report prepared for the Min. of Agriculture/World Bank
Stephen Awiti-Kuffour(October 1994) Post-harvest handling of vegetables in the Brong Ahafo region
P.A. Bruce (January 1994) Techiman Market Development Project - a report prepared for the worldbank
P.A. Bruce (October 1994) Agricultural Marketing in Ghana
K.A. Haizel (September 1994) National Agricultural Research Strategic Plan Final Report
L. de Lardemelle (September1992) FAO report on two case studies on improved market places in Accra, Ghana
J.S. Siemonsma and Kasem Piluek (1993) Protea - Plant Resources of South East Asia (Vegetables)
J.M.C.Stevels (1990) Legumes traditionnels du Cameroun, une etude agro-botanique

ANNEX 1

AGRICULTURAL MARKETING IN GHANA
by Mr Preachet Bruce

1.0 In most developing countries as in Ghana, research, development and investment efforts have often been focused primarily on production. Marketing has been assigned a passive role in the developmental process with the result that gains in production have been lost through inefficiencies in marketing. It is therefore not surprising to come across a number of well intentioned projects in the country that got bogged down because of unavailability of marketing opportunities within the project write up.

1.1 The traditional marketing system

According to Normal et al (1982) the vast majority of Nigeria agricultural produce move through networks of private markets which consists of most simple forms of private trade which takes place between households at village level or at some local exchange point such as roadsides and stations. The next form of marketing occurs where people meet periodically in some organised manner to buy and sell to satisfy their needs as well as to exchange information with relatives and friends. Beyond these are the larger daily markets found in urban areas. This situation is not very different from Ghana. For in Ghana food crop marketing is largely a private sector business. This comprises of many itinerant traders, assemblers, transporters, small scale processors, and space arbitragers. The system serves the needs of consumers in both rural and major urban centres. Estimates for 1983 indicate that of the economically active population of about 4.2m at that time, 2.3m (57%) were engaged in agriculture (including fishing and forestry). This situation has not changed much now. This implies that the marketable surplus per farmer is relatively small (even though the aggregate is substantial) such that individual marketing strategies are not likely to influence the market trend. Moreover, Ghana's agriculture largely follows after the rainfall pattern, thus establishing a definite high and low production periods. An efficient marketing system is therefore necessary to reduce the price spread between harvest and lean season. For example Asante et al (1989) report a seasonal price variation index of 70 in September (harvest season) and 145 in June (lean season) for maize for the period 1980 to 1988.

1.1.1 Trader Types

Two types of traders are involved in getting food to the consumers: the itinerant traders and the market based traders. The itinerant trader, after procuring the commodities sends

them to an assembling point which may be located in the village or at nearest rural market or at the roadside en route to the final destination. It is from these assembling points that the itinerant trader moves the purchased produce to her market of operation, usually in the urban consumption areas. The market based traders receive commodities from the itinerant traders and retail to consumers. Buying and selling of food crops occurs on the farms, roadsides, village, rural market or urban markets. Village markets are organised on particular days of the week whilst most urban markets are daily.

1.1.2 Market Types

1.1.2.1 Farm Gate:

A few producers sell off their produce at the farm. This practice is normally confined to crops like cassava. In this practice, the buyer is responsible for the harvesting of the crop. Cassava bought this way is either for processing into garri and other forms or for sale outside the area.

1.1.2.2 Roadside Market:

Roadside markets started as farmers' markets where small farm surpluses are sold out mainly to motorists by the producers themselves. However, these markets are now run by mainly men and women traders. These markets are commodity specific and are daily or periodic. They have developed into a well defined organisations with recognised leadership handling a variety of commodities. Direct producers who are not members of these roadside markets are not allowed entry. Whatever they want to sell could be sold through the bona fide members of the organisation. Of course, such a potential seller has the liberty to move some few metres away from the main bulk of sellers and establish his own point of sales. For various reasons, however, such a seller would find it very difficult to compete with the already established sellers.

1.1.2.3 Village Market:

These markets are located in the villages. They are, at most times, very small markets offering few commodities to local consumers. Commodities handled include salt, smoked and dried fish etc. Sales are made mostly on retail basis.

1.1.2.4 Rural Markets:

A lot of these rural markets are similar to the village markets described above. However, some of them are of utmost significance to the marketing system of the country. Such markets include Techiman in the Brong Ahafo, Mankessim in the Central Region, Ejura in Ashanti and Damongo in Northern Region. These markets are rural wholesale assembling markets where traders concentrate purchases made in the vicinity before final evacuation to markets of operation are made. Such markets are usually located in areas of major production. All these markets are under the jurisdiction of a particular District Assembly and have specific days on which marketing activities take place. These markets form part of the complex marketing chain that begins from the farm through various intermediate stages (including processing and storage) before reaching the final consumer.

1.1.2.5 Urban Markets:

These are located in the urban areas and are mainly for consumption purposes. Others act as "transit markets" from which commodities in smaller lots are moved to other outlying markets. Except for the influence of market queens in urban markets in controlling entry to the market, the structure, conduct and performance of these markets approach that of pure competition, and therefore price depends on the forces of supply and demand.

1.1.2.6 Problems

Problems identified to have militated against the effective development of the traditional markets included inadequate market infrastructure and organisation for most agricultural produce resulting in post harvest losses, inadequate market information. Solutions to the above numerated problems was seen as a key to achieving efficiency in marketing in terms of market structure conduct, performance and ensure the transformation of Ghana's food crop sector from being basically subsistence and traditional to be more marketing oriented. In spite of the traditional marketing systems ability to conduct the bulk of the marketing operations, its performance and efficiency has often been criticised. National Development Plan (1970-71) portrays the view of the traditional food market system as being competitive in activity, traditional in its use of technology and characterised by numerous inefficiencies that lower prices to the producer, raise prices to the consumer, cause loses in storage, create uncertainties in the market and result in sharp dislocation in quality and quantity of supply both seasonally and geographically. The activities of private wholesaler and other market participants have been fielded in the press, often being accused of cheating innocent farmers and 'powerless' consumers. These alleged inefficiencies have led

to various studies involving the use of carefully constructed hypothesis to study the structure and efficiency of the traditional marketing system. The findings of these are at variant with most of the stereotypical notions held, but are consistent with a small but growing body of evidence demonstrating that many traditional African wholesale marketing systems of food crops are remarkably efficient and competitive in the face of numerous obstacles. Southworth et al (1978) observed that merchants perform their roles in the economic order effectively in the face of numerous obstacles which limit the capacity of the marketing system. Some barriers to expansion were, shortages and irregularity in the availability of transport for handling crops in markets, inadequate financial support, lack of storage facilities and general mistrust and suspicion of traders by the public.

1.1.3 Vegetable marketing

The vegetable marketing industry is influenced by the highly perishable and seasonal nature of its products. These characteristics cause the price of vegetables to be very volatile. Processing of vegetables which is limited, is undertaken by traditional processors who sun dry onions, pepper and sliced tomatoes (mainly in the North). The main problem of the vegetable market include seasonal gluts with attendant post harvest losses. Bartels (1980) estimated that between 13-17% of the total tomato crop production on the Tono and Vea Irrigation Projects in the 1979/80 year rotted because the marketing system could not adjust readily to absorb increased supplies. This situation is similar all over the country especially during the major harvest.

1.1.4 Marketing Channel

A typical channel is as follows: Farmer/Producer → Wholesaler → Retailer → Consumer. According to Assuming-Brempong et al (1991), two or more levels of wholesalers may exit in such a channel, and this naturally increases the total marketing cost. For example, the first level of wholesaler might be the trader who gathers the produce together from many small farmers scattered over a wide area and sells them in truckloads , etc to a second level of wholesaler who links the rural market to the urban market. There may also exist various levels of processing and storage activities from the farmer to the retailer.

1.2 The Public sector market

The Ghana Food Distribution Corporation (GFDC) is the key institution for the Governments public marketing system and operates strictly in profit motives backed by market determined decisions for all commodities purchased. It operates a fleet of trucks

and have warehouses and storage bins to facilitate their activities. The GFDC handles about 5-10% share of the food market in the country. The major food items it handles are cereals (maize, rice, sorghum and millet) and legumes (cowpeas and groundnuts). These are purchased from buying centres located in the major producing areas and retail in urban centres. Though GFDC sells to the public, it has some government institutions like schools, prison service etc among its clientele. It operates a rice mill at Tamale and also helps the government in promoting her food security objectives in its storage programme.

MARKETING COSTS AND MARGINS ANALYSIS PRODUCER TO CONSUMER (TOMATOES) NKWAESO (B/A NEAR TECHIMAN) TO ACCRA (396KM)

1.0 PRICES

Stages	Cedis (C)/Kg
1. Farmer's (at Nkwaeso) selling price to Market Based Trader at Techiman	76.92
2. Market Based Trader (Nakana) at Techiman to Itinerant Wholesaler at Techiman	91.69
3. Itinerant Wholesaler (Accra) to Retailer (Accra)	208.80
4. Retailers' selling price to Consumer	270.00

2.0 COSTS REPORTED AND LOSSES ESTIMATED

1. Farmer at Nkweaso, a distance of about 6 km from Techiman:	
a. Transport cost at ¢500/52 kg	9.62
b. Market toll at ¢100/52kg	
Losses 2%	1.92
	11.54
2. Market Based Trader (Nakana) at Techiman. Moving produce from point of off-loading to Sales Point	1.92
No Losses	
3. Itinerant Wholesaler at Techiman	
a. Cost of empty crate (@ ¢1,500/3yrs to be used 10 times in a year)	.96
b. Cost of re-packing & handling @ ¢100/crate	
c. Export Levy @ ¢150/crate	1.92
d. Transport Cost to Accra @ ¢1500/crate	2.88
Losses 10%	28.85
	31.73
4. Retailer In Accra	
a. Market Toll @ ¢100/crate	1.92
b. Handling	.50
c. Unspecified Cost	.50
d. Transport Cost @ ¢200/crate	3.85
Losses 15%	6.77

3.0 CONVERSION FACTORS OF 1KG TOMATOES AS SOLD BY FARMER

Stage	Factor
1. Farmer's selling price (Nkwaeso) to Market Based Trader (Techiman) with a loss of 2%.	0.98
2. Market Based Trader (Nakana) to Itinerant Wholesaler (Techiman)	0.98
3. Itinerant Wholesaler (Accra) to Retailer (Accra) with a loss of 10% (0.98 x 0.90)	0.88
4. Retailer (Accra) to Consumer (Accra) with a loss of 15% (0.88 x 0.85)	0.75

4.0 MARKETING COSTS AT DIFFERENT STAGES OF 1KG TOMATOES AS SOLD BY THE FARMER

Stage	C/kg
1. Farmer (0.98 x 11.54)	11.31
2. Market Based Trader (0.98 x 1.92)	1.88
3. Itinerant Wholesaler (0.88 x 31.73)	27.92
4. Retailer (0.75 x 6.77)	5.08
	46.19
i. Total Marketing Cost of 1 kg (Starting Weight) Tomatoes	46.19
ii. Price received for 0.75 kg tomatoes: Consumer price (270) x 0.75	202.50
iii. Farmgate Price (76.92 - 12.50)	64.42
iv. Marketing Cost	46.19
v. Net Margin	91.89

MARKETING COSTS AND MARGINS ANALYSIS PRODUCER TO CONSUMER (OKRA) NEW TECHIMAN TO ACCRA (420KM)

1.0 PRICES

Stages	Cedis (C)/Kg
1. Farmer's (at N.Techiman) selling price to Market Based Trader at Techiman	81.81
2. Market Based Trader (Nakana) at Techiman to Itinerant Wholesaler at Techiman	105.45
3. Itinerant Wholesaler (Accra) to Retailer (Accra)	454.55
4. Retailers' selling price to Consumer	507.00

2.0 COSTS REPORTED AND LOSSES ESTIMATED

1. Farmer at N.Techiman a distance of about 30 km from Techiman		
a. Transport cost at ¢500/22kg		22.72
b. Market toll at ¢100/22kg		4.55
	No Losses	27.27
2. Market Based Trader (Nakana) at Techiman		
Moving produce from point of off-loading to Sales Point		4.55
	No Losses	
3. Itinerant Wholesaler at Techiman		
a. Cost of mini sack (@ ¢100/3yrs to be used 10 times per year		3.33
b. Cost of re-bagging & handling @ ¢100/sack		3.33
c. Export Levy @ ¢150/sack		6.82
d. Transport Cost to Accra @ ¢1000/sack		45.45
	Losses 3%	58.93
4. Retailer In Accra		
a. Market Toll @ ¢50/sack		2.27
b. Handling		0.50
c. Unspecified Cost		0.50
d. Transport Cost @ ¢100/crate		4.55
	Losses 5%	7.82

3.0 CONVERSION FACTORS OF 1KG OKRA AS SOLD BY FARMER

Stage	Factor
1. Farmer's selling price (N.Techiman) to Market Based Trader (Techiman)	1.00
2. Market Based Trader (Nakana) to Itinerant Wholesaler (Techiman)	1.00
3. Itinerant Wholesaler (Accra) to Retailer (Accra) with a loss of 3%	0.97
4. Retailer Accra to Consumer Accra with a loss of 5% (0.97 x 0.95)	0.92

4.0 MARKETING COSTS AT DIFFERENT STAGES OF 1KG OKRA AS SOLD BY THE FARMER

Stage	C/kg
1. Farmer (1.00 x 27.27)	27.27
2. Market Based Trader (1.00 x 4.55)	4.55
3. Itinerant wholesaler (0.97 x 58.93)	57.16
4. Retailer (0.95 x 7.82)	7.43
	96.41
i. Total Marketing Cost of 1 kg (Starting Weight) Okra	96.41
ii. Price received for 0.92kg okra: Consumer price (507 x 0.92)	466.44
iii. Farmgate Price (81.81 - 27.27)	54.54
iv. Marketing Cost	96.41
v. Net Margin	315.49

MARKETING COSTS AND MARGINS ANALYSIS PRODUCER TO CONSUMER (GARDEN EGGS) OFUMAN (B/A) TO ACCRA (420KM)

1.0 PRICES

Stages	Cedis (C)/Kg
1. Farmer's (at Ofuman) selling price to Market Based Trader at Techiman	67.00
2. Market Based Trader (Nakana) at Techiman to Itinerant Wholesaler at Techiman	76.00
3. Itinerant Wholesaler (Accra) to Retailer (Accra)	243.15
4. Retailers' selling price to Consumer	300.00

2.0 COSTS REPORTED AND LOSSES ESTIMATED

1. Farmer at Ofuman, a distance of about 30 km from Techiman	
a. Transport cost at ¢600/27kg	22.22
b. Market toll at ¢100/27kg	3.70
No Losses	25.90
2. Market Based Trader (Nakana) at Techiman. Moving produce from point of off-loading to Sales Point @ ¢100/27kg	3.70
No Losses	
3. Itinerant Wholesaler at Techiman	
a. Cost of mini sack (@ ¢100/3yrs to be used 10 times in a year)	3.33
b. Cost of re-bagging & handling @ ¢100/sack	3.70
c. Export Levy @ ¢150/sack	5.56
d. Transport Cost to Accra @ ¢1000/sack	37.04
Losses 5%	49.63
4. Retailer In Accra	
a. Market Toll @ ¢50/sack	1.85
b. Handling	0.50
c. Unspecified Cost	0.50
d. Transport Cost @ ¢100/crate	3.70
Losses 10%	6.55

3.0 CONVERSION FACTORS OF 1KG GARDEN EGGS AS SOLD BY FARMER

Stage	Factor
1. Farmer's selling price(N.Techiman) to Market Based Trader (Techiman)	1.00
2. Market Based Trader (Nakana) to Itinerant Wholesaler (Techiman)	1.00
3. Itinerant Wholesaler (Accra) to Retailer (Accra) with a loss of 5%	0.95
4. Retailer (Accra) to Consumer (Accra) with a loss of 10% (0.95 x 0.90)	0.86

4.0 MARKETING COSTS AT DIFFERENT STAGES OF 1KG GARDEN EGGS AS SOLD BY THE FARMER

Stage	C/kg
1. Farmer (1.00 x 25.90)	25.90
2. Market Based Trader (1.00 x 3.70)	3.70
3. Itinerant Wholesaler (0.95 x 49.63)	47.15
4. Retailer (0.86 x 6.55)	5.63
	82.38
i. Total Marketing Cost of 1 kg (Starting Weight) Garden Eggs	82.38
ii. Price received for 0.86kg Garden Eggs: Consumer price (300) x 0.86	258.00
iii. Farmgate Price (67.00 - 25.90)	41.10
iv. Marketing Cost	82.38
v. Net Margin	134.52

MARKETING COSTS AND MARGINS ANALYSIS PRODUCER TO CONSUMER (DRIED PEPPER) NSOUKENEE (B/A NEAR TECHIMAN) TO ACCRA (412.40 KM)

1.0 PRICES

Stages	Cedis (C)/Kg
1. Farmer's (at Nsoukence) selling price to Market Based Trader at Techiman	1666.67
2. Market Based Trader (Nakana) at Techiman to Itinerant Wholesaler at Techiman	1754.67
3. Itinerant Wholesaler (Accra) to Retailer (Accra)	3066.67
4. Retailers' selling price to Consumer	3756.00

2.0 COSTS REPORTED AND LOSSES ESTIMATED

1. Farmer at Nsoukenee, a distance of about 22.4 km from Techiman		
a. Transport cost at ¢600/15kg		40.00
b. Market toll at ¢150/15kg		10.00
	No Losses	50.00
2. Market Based Trader (Nakana) at Techiman. Moving produce from point of off-loading to Sales Point @ ¢100/15kg		6.67
	No Losses	
3. Itinerant Wholesaler at Techiman		
a. Cost of jute sack (@ ¢500/3yrs to be used 10 times in a year)		16.67
b. Cost of re-bagging & handling @ ¢200/sack		13.33
c. Export Levy @ ¢200/sack		13.33
d. Transport Cost to Accra @ ¢1500/sack		100.00
	No Losses	143.33
4. Retailer In Accra		
a. Market Toll @ ¢50/sack		3.33
b. Handling		0.50
c. Unspecified Cost		0.50
d. Transport Cost @ ¢100/crate		6.67
	Losses 2%	11.00

3.0 CONVERSION FACTORS OF 1KG DRIED PEPPER AS SOLD BY FARMER

Stage	Factor
1. Farmer's selling price (Nsoukenee) to Market Based Trader (Techiman)	1.00
2. Market Based Trader (Nakana) to Itinerant Wholesaler (Techiman)	1.00
3. Itinerant Wholesaler (Accra) to Retailer (Accra)	1.00
4. Retailer (Accra) to Consumer (Accra) with a loss of 2%	0.98

4.0 MARKETING COSTS AT DIFFERENT STAGES OF 1KG DRIED PEPPER AS SOLD BY THE FARMER

Stage	C/kg
1. Farmer (1.00 x 50.00)	50.00
2. Market Based Trader (1.00 x 6.67)	6.67
3. Itinerant Wholesaler (1.00 x 143.33)	143.33
4. Retailer (0.98 x 11.00)	10.78
i. Total Marketing Cost of 1 kg (Starting Weight) Dried Pepper	210.78
ii. Price received for 0.86kg Garden Eggs: Consumer price (3756) x 0.98	3680.88
iii. Farmgate Price (1666.67 - 50.00)	1616.67
iv. Marketing Cost	210.78
v. Net Margin	1853.43