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**GHANA PRIVATE-PUBLIC PARTNERSHIP FOOD INDUSTRY
DEVELOPMENT PROGRAM**

**Final Report for USAID Associate Cooperative Agreement
No. 641-A-00-03-0003**



Prepared by:
Professor Samuel Sefa-Dedeh, Program Director

Submitted by

Michigan State University
409 Agriculture Hall
East Lansing, MI 48824
Telephone: 517 432 2214

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**GHANA PRIVATE-PUBLIC PARTNERSHIP FOOD INDUSTRY
DEVELOPMENT PROGRAM**

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ACRONYMS

<u>Abbreviation</u>	<u>Full Name</u>
ACDEP	- Association of Church development Projects
ADRA	- Adventist Development Relief Organization
AMEX	- Amex International
AMSCO	- African Management Services Company
APDF	- African Project Development Facility
ASNAPP	- Agribusiness for Sustainable Natural African Plant Products
CCARD	- Consultative Committee on Agriculture and Rural Development
CEPS	- Customs Excise and Preventive Service
CORDIA	- Dutch NGO
EU	- European Union
FAGE	- Federation of Associations of Ghanaian Exporters
FRI	- Food Research Institute
FTE	- Family Traditions Enterprise
GAP	- Good Agricultural Practice
GCDP	- Ghana Cashew Development Project
GEPC	- Ghana Export Promotion Council
GFDB	- Ghana Food and Drugs Board
GHAFTRAM	- Ghana Federation of Traditional Medicine Practitioners Association
GHPPP	- Ghana Private Public Partnership Food Industry Development Program
GMP	- Good Manufacturing Practice
GSB	- Ghana Standards Board
GTZ	- Deutsche Gesellschaft for Technische Zusammenarbeit
HACCP	- Hazard Analysis Critical Control Points
HAG	- Horticultural Association of Ghana
ICCO	- Interdenominational Organization for Development Co-operation
IPM	- Integrated Pest Management
ITFC	- Intergrated Tamale Fruit Company
KNUST	- Kwame Nkrumah University of Science and Technology
LEI	- Landbow Economisch Instituut
MOFA	- Ministry of Food and Agriculture
MOU	- Memorandum of Understanding
MSU	- Michigan State University
NGO	- Non-governmental Organization
OFA	- Organic Farmers Association
OICI	- Opportunities Industrialization Centers International
OMOA	- Organic Mango Out-growers Association
PAMPEAG	- Papaya and Mango Producers and Exporters of Ghana
PFID-F&V	- Partnership for Food Industry Development- Fruits and Vegetables
PSO	- Association for Personnel Cooperation in Developing Countries
PSOM	- Dutch Government Program
SME	- Small and Medium Enterprises
SPEG	- Seafreight Pineapple Exporters of Ghana

SWOT	-	Strengths, Weaknesses, Opportunities and Threats
TA	-	Technical Assistance
TIRP	-	Trade and Investment Reform Program
TNS	-	Technoserve
UGL	-	University of Ghana, Legon
USAID	-	United States Agency for International Development
VEPEAG	-	Vegetable Producers and Exporters Association of Ghana
WAFF	-	West African Fair Trade Fruit Company
WFLO	-	World Food Logistics Organization

1. EXECUTIVE SUMMARY

1.1. Overview

The Ghana Private-Public Partnership Food Industry Development Program (GHPPP) was initiated in October 2002 to create synergy between Michigan State University's (MSU) Partnership for Food Industry Development, Fruits and vegetables (PFID-F&V) program, Royal Ahold a Dutch supermarket and foodservice company, and the NGOs involved in the TIRP, AMEX International, Technoserve Inc. (TNS), and CARE International. The partnership worked under five broad objectives set for the program. These were:

1. Develop logistical chain to achieve products of specified consistency, quality and safety.
2. Develop skills and capabilities of all participants in the horticulture supply chain.
3. Establish a Ghanaian NGO with the capability to lead the horticultural industry in sustainable and profitable development.
4. Provide technical assistance where needed to entities in all segments of the horticultural supply chain.
5. Develop and market commercially viable nutritional products for children and pregnant women and other natural products.

This is the final report of the two year program. It provides information on the partnership and summarizes the activities and accomplishments of the partners in each of the five goals areas set for the program for the period October 2002-September, 2004. The report also covers the no-cost extension period of October 1, 2004 – March 31, 2005

1.2. Develop logistical chain to achieve products of specified consistency, quality and safety.

Several activities were undertaken by the Partners. Predominant among these were a series of studies to 1) understand the supply chain, 2) provide information on post-harvest and logistical practices and their effects on produce quality, 3) elucidate consumer preferences on Ghanaian pineapples 4) do sub-sector studies on the state of the horticultural sector in the "Northern Regions" (Ashanti, Brong Ahafo, Northern, Upper East and Upper West) of Ghana. In addition, the Partners were involved in sending teams to study the Ghanaian, Kenyan and Guatemalan horticultural sector and apply lessons learned to the Ghanaian situation. The development of Fair Trade and Organic produce and training to ensure the compliance of VEPEAG to the production of quality vegetables were undertaken.

Under this objective the Partners provided basic information to the horticultural sector to assist in the development of future plans for growth and improved performance.

1.2.1. Development of Marketing Plans

The fresh pineapple export sub-sector is the most developed of all the non-traditional horticultural export crops in Ghana. It accounts for 20% of revenues from this sub-sector. The smooth cayenne is the main export variety but there is gradual introduction of MD2. The sugar loaf pineapple does not feature much in export due to poor post-harvest outcome on quality. The major threat in the horticultural sector is the poor packaging, lack of adequate storage and cool chain facilities. Similar plans were developed for mango and papaya, vegetables and shea butter.

Accomplishment: The partnership addressed the weaknesses identified by the marketing plans. This was through sensitizing the sector (public and private stakeholders) to the issues, providing training and other support to improve performance. A new government program, the Horticultural Export Industry Initiative (HEII), linked up with the Partners and is addressing the major bottlenecks already identified.

1.2.2. Indicative Consumer Studies on European Consumers' preference for Ghanaian pineapples.

The study showed that European Consumers preference for the three varieties of pineapple (MD2, smooth cayenne and sugar loaf) varied. MD2 was the preferred variety in the Netherlands. For the other 7 countries preference for smooth cayenne and MD2 were similar or showed no significant differences.

Accomplishment: The pineapple sector was provided with additional information on options as the sector grows. The introduction of MD2 should not be done at the expense of the other varieties. , the other varieties should not be abandoned.

1.2.3. Harvesting method and post-harvest changes in sugar loaf.

The sugar loaf pineapple is known to have a short shelf life and therefore has difficulty in maintaining its quality. This has affected how it performs in the export market. Research was done to understand the effects of harvesting method and exposure to high temperature on the quality of sugar loaf.

Accomplishment: Developed a new harvesting method to extend the shelf life of sugar loaf pineapple. This involves harvesting with the stalk and slips on. Field testing by a supermarket demonstrated the efficacy of the method in promoting sales.

1.2.4. Sub-sector studies on the horticulture in the 'Northern Regions'

OICI was subcontracted to assess the status of horticulture in the 'northern regions'. This involved

- Horticultural products sub-sector studies (including detailed SWOT analyses) to demonstrate existing and potential opportunities that could be promoted.
- Identification, organization and cooperative development of participants in each of the selected sub-sectors and creation of linkages with existing exporters.
- Provision of technical training, including, production, harvesting and post-harvest handling techniques of participants operating at various levels of the export chain.

Accomplishments: Information on the status of tomato, pepper, onion, mango and cashew production and marketing in Ashanti, Brong Ahafo, Northern, Upper East and Upper West regions were provided. A total of 925 producers were registered to participate in production cooperatives. Skills training in production planning, production management, post-harvest handling and packaging were given.

To consolidate the gains of this foundation program, there is the need to develop short and long term sustainability activities that could provide a competitive advantage and also provide an opportunity for the people in the northern sector of Ghana to participate efficiently and profitably in the development of export production of horticultural produce

1.2.5. Internal marketing of fruits and vegetables

There is a direct link between the practices associated with the internal market and the export sector. In Ghana a high proportion of produce originally destined for the export market finds their way into the local market. The local marketing of fruits and vegetables is a women-controlled business and their operations range from one to two commodity retail to shops which handle an assortment of produce. GHPPP studied the internal marketing of fruits and vegetables and provided skills training to improve hygiene, safety and quality management.

Accomplishment: It was found that the Agbobloshie market in Accra is the principal source of fruits and vegetables in the city of Accra. It serves as both a wholesale and retail outlet. The market infrastructure is poor; sanitation and the general environment are detrimental to the delivery of safe and quality produce. There is the need for support to improve this sector. Training in safety, hygiene and quality management was offered to women fruit and vegetable vendors. Post training evaluation showed that the vendors were applying their new knowledge in their businesses.

1.2.6. National Strategic and Consensus Meeting on Mango and Papaya.

Apart from pineapples export sector which has the sea freight pineapple exporters of Ghana (SPEG) representing its interest, the other horticultural crops

have either no organized produce association or the existing ones are not functioning optimally. The lack of leadership that seeks to promote the growth of the sector was identified as a weakness. Mango and papaya, the emerging horticultural crops, were found to have no nationally organized produce association. The partnership organized the national strategic and consensus meeting on mango and papaya. This brought together stakeholders from the public and private sectors.

Accomplishment: Mango and papaya interest groups were formed at the stakeholders meeting. With support from the partnership these interest groups grew to form the new Papaya and Mango Producers and Exporters Association of Ghana (PAMPEAG).

1.2.7. Missions and Study Tours

The partnership sought to design effective and efficient logistical horticultural system, benchmarking against other existing effective systems. Three activities were held.

- 2.1.1. The supply chain mission to Ghana in March 2003. This was a joint mission between Michigan State University, Dutch and Ghanaian experts to understand the Ghanaian horticultural system and provide suggestions for identified problem areas.
- 2.1.1. Joint mission between CARE International, MSU and GHPPP to Kenya
- 2.1.2. Mission to Guatemala to understand the horticultural system in general and MD2 production in particular.

Accomplishments: The Ghana Mission provided opportunity for the experts to interact with the industry. Some of the weak links identified were poor package materials and package design, the lack of appreciation for the positive contribution cool chain can make to the delivery of better quality products. The debate on whether cool chain is necessary or not was put on high gear. The Kenyan mission exposed the stakeholders to best practices and reinforced the importance of cool chain. The charcoal cooler was identified as a possible cheap alternative for rural areas. The Guatemalan mission provided first hand information on MD2 production methods which was shared with stakeholders.

1.2.8. Development of Fair Trade and Organic MD2 pineapples

Tongu Fruit Company has a laboratory to produce MD2 plantlets and has been promoting the use of certified planting material for establishing MD2 farms. Royal Ahold and GHPPP collaborated with Tongu Fruits Company and the African Project Development Facility (APDF) on MD2 pineapple production by small-scale out-grower farmers. In addition trial shipments of Fair Trade and/or organic pineapples were planned.

Accomplishments: A proposal was developed for Tongu Fruits to train farmers with APDF support. The training was put on hold whilst funding issues were being sorted out. The trial shipments were skipped due to the unavailability of sufficient volume of organic pineapples. There is potential in the organic sector but a lot needs to be done for Ghana to take advantage of the market opportunities.

1.2.9. Improving the performance of VEPEAG in vegetable production and export.

CARE International worked with VEPEAG on vegetable production protocols and provided support for the development of quality standards, built database on temperature and humidity stress and assessed EurepGAP readiness of exporters.

Accomplishments: 55 farmers benefited from intensive on-farm training on agronomic and post harvest management practices. VEPEAG developed and build data on quality standards of vegetables. Vegetable producers and exporters benefited from EurepGAP training organized by CARE and Amex and initial inspection of farms for their EurepGAP readiness was done.

1.2.10. Culinary Herbs and Packaging

ASNAPP worked with farmers to establish production supply base for culinary herbs and developed package options for herbal teas. The farmers were supported with technical expertise and appropriate post-harvest and drying techniques to produce five selected culinary herbs both fresh and dried for supply to Tacks farms and Praise for export. Technical support was sought to develop a system for packaging local herb teas.

Accomplishments: 40 farmers have skills to produce the culinary herbs, basil, parsley, dill, sage and thyme. UBUNTU range of packaged herbal teas released.

1.2.11. Mango and Papaya Initiative

Technoserve led the Mango and papaya activity group. In addition to the common programs strategic industry plan for mango and papaya sector, management and production manuals and business plans for processing were developed.

Accomplishments: A production and farm management manual was developed and shared with the industry. Business plan was prepared for one company to set up a fruit processing plant.

1.3. Develop skills and capabilities of all participants in the horticulture supply chain.

Skills development through sharing of information, training, short courses, study tours and client specific on-site interventions were undertaken to strengthen the horticultural value chain.

1.3.1. Needs assessment and design of training programs

The needs of small-scale companies were assessed, their processes audited and training mapped out to help them meet requirements of the EU, US and regional markets

Accomplishments: Needs of 8 companies were assessed by GHPPP. On-site training for 40 personnel of Athena Foods and Eden Tree were conducted. 12 women food vendors were trained in food safety and hygiene.

1.3.2. Peer to Peer exchanges

Peer to peer exchanges involving buyers, producers and other stakeholders were undertaken.

Accomplishments: Two farmers participated in the FMI show in Chicago. The experiences at the conference influenced the operations of the companies and one diversified to include value-addition. One of the companies, Dansak Farms is now supplying Albert Heinz with papaya.

Representatives of the South African supermarket chain, Pick 'N Pay and Vroula visited Ghana and interacted with the horticultural sector. Following the visit a request for the shipment of mangoes to South Africa was made. The deal could not go through because of internal problems of the Ghanaian company.

1.3.3. Onsite instruction and business learning

GHPPP organized training using on-site instruction and distance learning methods. Ghanaian participants took courses in cold chain and logistics management, food law and regulations, food safety, grades and standards, ISO 9001:2000 Lead Assessors Audit, Processing of cut fruits and vegetables, organic farming and product quality. Examples of accomplishments are given below.

Accomplishments: Ten Ghanaians participated the World Food Logistics Organization training in cold chain management in Oklahoma City. They formed a 'cold chain interest group' to promote the use of this system in the horticultural sector. To make the application of cold chain extend to a wider segment of stakeholder, a local course was mounted by GHPPP. This had 75 participants. The partnership has created more awareness in the use of cold chain and this has positively influenced the policy direction for this sector.

Online Food Law course mounted by MSU became popular among the Ghanaian stakeholders. Eleven professionals from the regulatory agencies, GSB and

GFDB and others took the course. To extend this facility to a larger audience GHPPP mounted a local 5-day course. This was attended by 55 participants..

Three women professionals participated in the food safety course at MSU. The localization of the course took place in May 2004 when 35 people from three West African countries participated in the first regional food safety course.

1.3.4. Mentoring of Stakeholders

A program to educate and mentor food producers, processors and exporters was mounted by Technoserve.

Accomplishments: A market study report was completed for Processed Foods & Spices Ltd. (PFSL). TNS Client Team assisted client to implement recommendations of market study.. Mr. Tony Ballendon was attached to Coastal Groove during the quarter. He assisted the client in developing process procedures, provided advice in plant installation and training the plant manager

1.3.5. On-farm Training

Amex International had several on-farm training on topics ranging from packhouse operations and hygiene, packaging, GAP for pineapples, mangoes, papaya and vegetables and EUREPGAP awareness workshops.

Accomplishments: These field training were critical in improving the performance of the private sector. For example, Equatorial Ventures, one of the few horticultural enterprises operating an excellent packhouse and cool chain was assisted by Amex

1.4. Establish a Ghanaian NGO with the capability to lead the horticultural industry in sustainable and profitable development.

This objective was attained through consultations and confidence building mechanisms. The partnership of already existing associations was sought and further deepened through participation in joint programs and support. The partnership worked with the following associations:

1. Sea freight pineapple exporters of Ghana (SPEG)
2. The Horticultural Association of Ghana (HAG)
3. Vegetable Producers and Exporters Association of Ghana
4. Organic Farmers Association (OFA)
5. Ghana Citrus Association

Accomplishments: These associations were strengthened through the work of the partners. There were indications that the associations appreciated the importance of working together for the common good.

A new association was formed as a result of the work of the partners. This is the Papaya and mango producers and exporters of Ghana. The partnership nurtured this group and provided support in many ways for the association to grow.

1.5. Provide technical assistance where needed to entities in all segments of the horticultural supply chain.

This objective saw all the partner organizations contribute technical assistance through assessment (audit) of client firms, customized training in EUREPGAP, establishment of grades and standards, industry field trips etc.

Accomplishments: examples are:

6. the development of 8 standards through cooperation with CCARD program with the Ghana Standards Board, USDA and MOFA.
7. The training of members of the Organic farming association in organic farming. This was a requirement for the initiation of the organic certification process.
8. Marketing linkages established for Kakabo farms to purchase over 250 MT of Asian vegetables from small scale growers.
9. Seed development program of CARE leading to the provision of quality seeds through support of the Crops Research Institute.
10. Technoserve's EUREPGAP training and pre-audits assisted Farmapine and 33 members of the cooperative to receive EUREPGAP certificate.
11. The mango initiative of Technoserve and Amex provided training and produced a 4-page fact sheet.
12. Afri Link was assisted by Amex to source tomato processing plant from California.

1.6. Develop and market commercially viable nutritional products for children and pregnant women and other natural products.

Activities under this objective were executed by Royal Ahold and GHPPP (MSU-PFID). Ahold brought its expertise in market development and analysis whilst GHPPP provided technical input for the activities. Product development and marketing processes were set up to find prototypes of food products meeting nutritional, convenience and shelf life indices. Products were formulated and field tested before 8 were identified for further consumer testing. To address the objective of nutritional properties and ease of preparation cowpea-fortified fermented maize dough was selected for intervention in rural area and promotion among food processing entrepreneurs.

Accomplishments: Eight food concepts were developed as potential for further work. Further consumer analysis assisted in the selection of cowpea-fortified fermented maize dough as a nutrition improvement/intervention vehicle.

A two-pronged strategy was developed by GHPPP to extend the nutritional products to rural communities and small-scale food processing entrepreneurs. Six communities were introduced to the high protein product and there was very high acceptance of the product. Some women entrepreneurs in these communities decided to use the high protein fermented maize dough instead of the traditional 100% maize dough. Only one food processing entrepreneur met the criteria set for participating in the program. Family Traditions Enterprises was assisted to learn and produce the cowpea-fortified fermented maize dough.

2. INTRODUCTION

2.1. The Project

Ghana has a growing horticultural sector which contributes significant export earnings for the nation. Many challenges face this sector and these include:

- Weak industry strategic coordination
- Inadequate infrastructure to address critical needs such as cold chain and packaging.
- Low volumes to assure continuity of supply.
- Lack of production norms and a weak system for meeting food safety and traceability requirements. Weak applied research capacity to guide the industry.
- Diversification and product development to meet consumer preferences (MD2, golden papaya).
- Low investments in value-added technologies to take advantage in new consumer trends (minimally processed)

In October 2002 the United State Agency for International Development funded Michigan State University to set up the Ghana Private-Public Partnership Food Industry Development Program to work with the horticultural sector.

USAID/Ghana had supported technical assistance to food producers via the Trade and Investment Reform Program (TIRP), under its Strategic Objective 1:

Increased Private Sector Growth. This TIRP in Ghana was implemented in part by USAID support to AMEX International, USDA, Technoserve Inc. (TNS), and CARE. The strategy under the Ghana Private-Public Partnership Food Industry Development Program was to create synergy between Michigan State University's (MSU) PFID-F&V program, Royal Ahold a Dutch supermarket and foodservice company, and the NGOs involved in the TIRP and to enable them to enhance their current assistance programs. MSU was to provide additional services to partner's clients and others. Specifically, MSU was expected to focus on its areas of expertise:

1. Formal training in food safety and food laws
2. Supply chain analysis, (including planting material, packaging, logistics, etc)
3. Market information and e-commerce technology, and
4. Global links with retailers

From the discussions and agreements, other organizations involved in horticultural production and the food retailing industry could be partners in a more general sense through formal associations and informal meetings. The GHPPP was to be a sounding board to address major obstacles to production and trace within the horticultural sub-sector critical issues affecting performance. The goal was to link Ghanaian producers with global distributors by assisting them in meeting the safety, quality, environmental and labor standards demanded by consumers in these markets

2.2. Project Objectives

Under the partnership each organization was expected to play a role in helping producers understand and meet the requirements of the market. In order to achieve success, Royal Ahold was to work closely with the producers and exporters to ensure that specifications for products are understood and met. The goals and activities of GHPPP were to:

- Develop logistical chain to achieve products of specified consistency, quality and safety.
- Develop skills and capabilities of all participants in the horticulture supply chain.
- Establish a Ghanaian NGO with the capability to lead the horticultural industry in sustainable and profitable development.
- Provide technical assistance where needed to entities in all segments of the horticultural supply chain.
- Develop and market commercially viable nutritional products for children and pregnant women and other natural products.

The project duration was from October 1, 2002 to September 30, 2004. After the period the Ghana Private-Public Partnership Food Industry Development Program was given a 6-month no-cost extension from October 1, 2004 to March 31, 2005 to complete program activities.

2.3. The Partners

The organizations forming the partnership were:

1. Michigan State University Partnership for Food Industry Development (MSU-PFID)
 - Technoserve Inc.
 - Amex International
 - Care International
 - Royal Ahold
 - Agribusiness for Sustainable African Plant Products (ASNAPP)
 - African Project Development Facility (APDF)
 - Producer/Export/Marketing Associations and Public sector institutions

Apart from Royal Ahold, funding for the program activities was provided by USAID to the major partners as shown in Figure 1. Coordination of the Partnership was done by the Ghana Private-Public Partnership Food Industry Development Program (GHPPP).

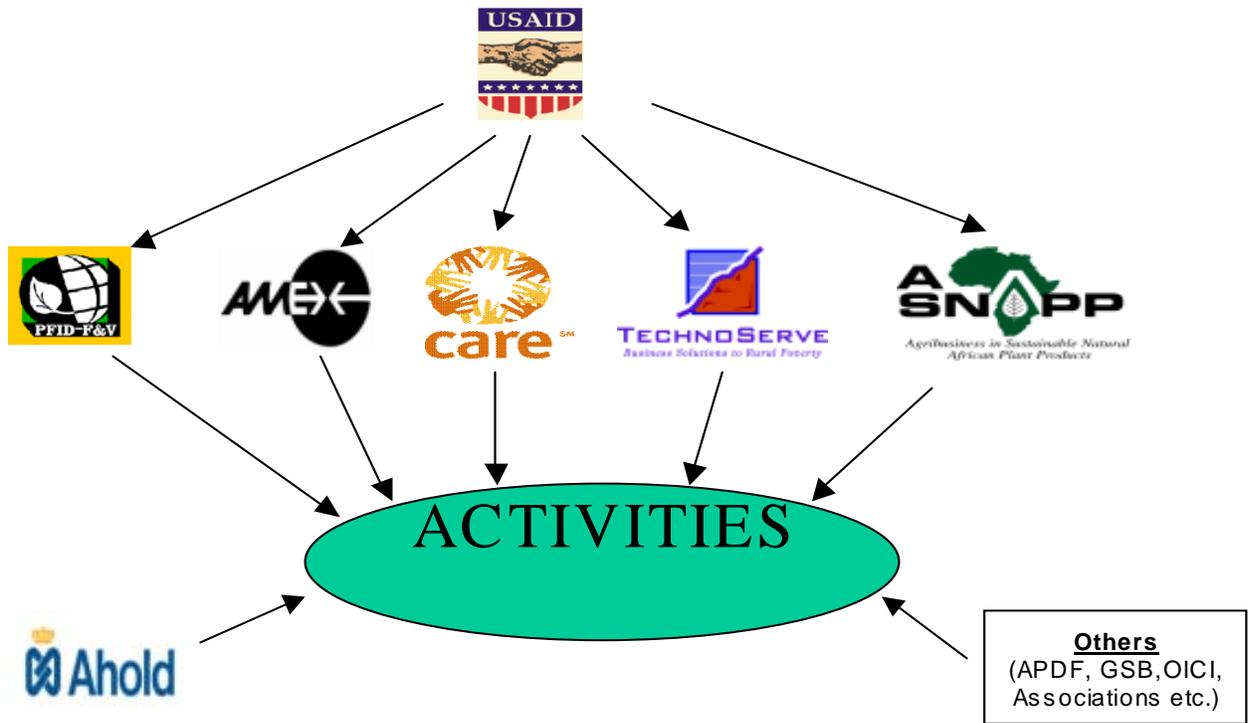


Figure 1. Funding and program relationships in the partnership

2.4. Performance Indicators

After much discussion and consultations, the partners developed indicators for each of the five goals set for the program.

GOAL/OBJECTIVE	Performance Indicators
A. Develop logistical chain to achieve products of specified consistency, quality and safety.	<ul style="list-style-type: none">▪ No of foreign buyers▪ Sales of enterprises to Domestic and Foreign markets.▪ Number of enterprises adapting best practices▪ Value/volume of exports meeting specifications.
B. Develop skills and capabilities of all participants in the horticulture supply chain	<ul style="list-style-type: none">▪ Number of enterprises adapting GAP, GMP, ISO, HACCP▪ Number of enterprises certified
C. Establish a Ghanaian private organization with the capability to lead the horticultural industry in sustainable and profitable development.	<ul style="list-style-type: none">▪ Number of industry associations supported to provide services to its members.▪ Number of members accessing services from association.▪ Number of members in good standing.
D. Provide technical assistance where needed to entitles in all segments of the horticultural supply chain	<ul style="list-style-type: none">• Number of enterprises pre-audited and recommended for certification.• Number of enterprises adopting recommended new and or improved technologies
E. Develop and market commercially viable natural products and/or nutritional products for children and pregnant women	<ul style="list-style-type: none">▪ Number of new products developed and marketed.

2.5. Report Format

The report covers activities undertaken from October 1, 2002 to September 30, 2004. In addition activities for the no-cost extension period executed by GHPPP are covered.

The report is in three parts.

1. Composite final report for all partners for the period October 1, 2002 to September 30, 2004
2. Final report for the no-cost extension period, October 1, 2004 to March 31, 2005
3. The detail program activities for GHPPP.



Michigan State University

apdf

**3. COMBINED FINAL REPORT.
October 1, 2002 to September 30, 2004**

3.1. Develop Logistical Chain To Achieve Products Of Specified Consistency, Quality And Safety.

Objective/Activity	Detail Activity	Results/Output	Performance Indicator Attained
A . Develop logistical chain to achieve products of specified consistency, quality and safety.			
A.1 Conduct analysis of current value chain including marketing and consumer studies. (GHPPP/AHOLD)	<p>Prepare Marketing Plans for pineapples, mango, papaya, vegetables and shea butter</p> <p>Indicative Consumer Studies on Pineapple preference by Ghanaian and European Consumers (AHOLD/GHPPP)</p> <p>Effects of harvesting, temperature and handling on quality of two varieties of pineapples (GHPPP/UGL/GSB)</p> <p>National Consensus and Strategic Meeting on mango and papaya (ALL PARTNERS)</p>	<p>Reports on Marketing plans were completed and discussed with industry players and the partners. From these plans activities were drawn by the Partners to guide their joint work.</p> <p>In an attempt to promote the sale of Ghanaian pineapples in the EU market consumer studies were conducted in 8 countries on sugar loaf, smooth cayenne and MD2 pineapples. Whilst MD2 was found to be the preferred variety in one country, the smooth cayenne variety was preferred at the same rate as MD2 in 6 countries. In one country smooth cayenne was preferred over MD2. The study showed that whilst Ghana looks at the introduction of MD2, the other varieties should not be abandoned.</p> <p>Research showed that exposure of fruits to direct sun has detrimental effects on vitamin C and other quality attributes. Modified method of harvesting through slip retention appears to extend the shelf-life of the sugar loaf pineapple. Results have been shared with farmers and industry. One supermarket tested the results and very pleased with the outcome.</p> <p>Meeting held and its deliberations led to the formation of the association of papaya and mango producers and exporters (PAMPEAG). This Association has become the focal point for promoting performance in the mango and papaya sector.</p>	<p>Analysis of the state of the horticulture industry at the start of the project provided a basis for drawing up some of the activities of the Partnership.</p> <p>Industry was provided with additional information on options to follow in the pineapple sector. There was increase government support of two million dollars to the sector.</p> <p>Provided vital information to industry on the critical role of handling and cold chain in ensuring quality.</p> <p>One Association formed for the mango and papaya sector</p>

Objective/Activity	Detail Activity	Results/Output	Performance Indicator Attained
	<p>Assess the status of horticulture (fruits and vegetables) in Upper East, Upper West, Northern, Brong Ahafo and Ashanti Regions and determine the export market opportunities. (GHPPP)</p> <p>Internal Marketing of fruits and vegetables: improvement of infrastructure, performance, packaging nutrition and health (GHPPP)</p>	<p>A subcontract was given to Opportunities Industrialization Center International (OICI) for these sub-sector studies. Draft reports on the baseline studies on tomato, pepper, onion, mango and cashew were issued. These provided the basis for offering technical training for identified producers and exporters.</p> <p>Preliminary report on the study on the internal marketing showed the poor infrastructure and weak systems for maintaining quality. Training was offered to market women and fruit vendors to improve skills on handling, packaging and processing. The tomato traders association of Ghana showed interest in improving performance.</p>	<p>Tomato Traders Association sensitized to adopt handling, packaging and marketing methods that enhance quality.</p> <p>12 Fruit and Vegetable Vendors and 14 Staff of Supermarkets trained in safety and handling.</p>
<p>A. 2 Design effective and efficient logistical horticultural system, benchmarking against other existing effective systems or desired models. (MSU)</p>	<p>Plan and implement a multi-country, multi-organization mission to Ghana. Analyze data using SPSS and do cold chain management analysis (MSU)</p> <p>Organize Missions to Kenya and Guatemala and share the outcome with industry</p>	<p>Through the Mission of March 2003, the critical issues on the need for cold chain and other infrastructure have been shared with industry. There is a greater awareness for investment in this sector for efficient performance.</p> <p>Both the Kenyan and Guatemalan Missions were very successful as it exposed Ghanaian industry to other systems. Two workshops were held to share the outcome of the Missions.</p>	<p>Industry and Public sector sensitized on the need for a cold chain. There new initiatives to address the cold chain problem</p>
<p>A. 3 Convene meetings of the Partners to assess progress</p>	<p>Bimonthly Meetings of Partners(GHPPP)</p>	<p>Meetings were held to discuss critical issues on the program. The bimonthly meetings of key representatives on the partnership were very useful. Attendance was generally satisfactory. In the last 3-6 months of the program the cohesiveness of members began to break down as plans and activities for bidding in the new program went into high gear.</p>	<p>90% of planned meetings were held.</p>

Objective/Activity	Detail Activity	Results/Output	Performance Indicator Attained
	<p>Meetings of Activity Groups</p> <p>Pineapple Industry Strategic Plan (TNS)</p>	<p>The formation of Activity Groups within the partnership contributed positively to addressing some of the initial problems. Under this arrangement Technoserve was in charge of mango and papaya activities, Amex was assigned pineapple and CARE was assigned vegetables. The activity groups provided focus and direction in these sectors and in the case of mango and papaya contributed to the formation of the new association.</p> <p>The pineapple industry strategic plan was prepared and presented by Technoserve. This report was discussed with industry stakeholders and strategies developed for future actions.</p>	
A. 4 Send teams of experts to propose corrective action (MSU)	Experts from MSU/USA sent on request to assist in solving identified problems	A combined Mission of Ghanaian, U.S.A. and Dutch Experts was organized in March 2003. This major activity culminated in the study of the horticultural sector as at March 2003 and the delineation of critical activities for industry growth. The Partners used the results of this study to develop other activities	Mission provided additional information on the horticultural sector. The Partners used the report to refocus its activities
A. 5 Development of Fair Trade/Organic MD2 pineapple production. (CORDAID/AHOLD/GHPPP/APDF)	<p>Tongu Fruit Proposal on MD2 and training of farmers.</p> <p>Feedback European consumer studies</p> <p>Discussion MD2 at European operating companies</p> <p>Trial Shipments</p> <p>Finalize APDF involvement</p> <p>Start schooling</p>	<p>This was a collaborative effort between Ahold, APDF, Tongu Fruits and GHPPP. A proposal for training farmers and producing pineapple was prepared by Tongu Fruits for support from APDF. Funding was a problem and the project was put on hold.</p> <p>Industry moving to MD2</p> <p>MD2 preferred choice of buyers</p> <p>Samples delivered</p> <p>Final proposal now discussed</p> <p>Started</p>	<p>Proposal was on hold at the time of this report.</p> <p>All the major pineapple exporters set out to plant MD2 in addition to the traditional varieties.</p> <p>Shipment commenced</p>

Objective/Activity	Detail Activity	Results/Output	Performance Indicator Attained
A.6 Work with WAFF/Agro Fair to introduce organic fair trade fruits at European operating companies (AHOLD/GHPPP)	<ol style="list-style-type: none"> 1. Bi-weekly discussion on progress 2. Trial shipments when volume is available 3. Discuss introduction at European operating companies 4. Start shipments 	Skipped due to unavailability of Organic Pineapple. Even though Ghana can produce organic pineapple the volumes available do not make it a viable option. There is the need to develop the organic sector if Ghana is to take advantage of existing opportunities	Organic pineapple produced not adequate for export market
A. 7. Support the Standard Compliance of VEPEAG of fresh vegetable production and export. (CARE)	<ol style="list-style-type: none"> 1. Conduct workshops on Quality procedures for fresh vegetable 2. Support VEPEAG to push for a legislative instrument on standard compliance 3. Conduct monitoring visits to pack houses to ascertain compliance 	<p>4 on farm workshops were conducted for Producers at Gomoa Ojobi, Nsuadzi, Ayensuadzi, and Okyereko. 1 major dissemination workshop for industry stakeholders was conducted.</p> <p>VEPEAG has been supported to develop and build up data on Quality Standards. Copies of these standards have been made available to Ghana Standards Board which is the National statutory Body for the development and promulgation of Standards.</p> <p>Monitoring visits were conducted to TACKS FARMS pack house to ascertain compliance.</p>	<p>55 farmers benefited from intensive on-farm training on agronomic and post harvest management practices. A total of 120 participants attended the workshop</p> <p>VEPEAG is currently serving on the technical committee of Ghana Standards Board, A memorandum of understanding has also been signed with the Ghana Standards Board for future collaborative work with VEPEAG.</p> <p>CARE supported TACKS FARMS to provide sanitary facilities at the Pack House, as part of the standard compliance protocol.</p>
A. 8 Build data base on Temperature and Humidity Stress (CARE)	<ol style="list-style-type: none"> 1. Conduct weekly quality assessments on vegetable produce 	Assorted vegetable produce were collected/purchased and assessed for different parameters of quality, results have been collated and built up.	A total of 20 weekly assessments to build up data on Vegetable Produce was carried out over the period.

Objective/Activity	Detail Activity	Results/Output	Performance Indicator Attained
	<ol style="list-style-type: none"> 2. Record temperature and humidity fluctuations on vegetable produce from farm to pack house 3. Build Capacity of VEPEAG to continue 1) & 2) with MOFA 	<p>Temperature and Humidity readings have been recorded during the vegetable produce assessment.</p> <p>Technical officers of VEPEAG were involved in the assessment process in close collaboration with the Post Harvest unit of MOFA</p>	<p>A copy of the Temperature and Humidity fluctuations recorded over the assessment period has been handed over to VEPEAG members</p> <p>3 Technical officers worked with the Post Harvest unit of MOFA during which they were trained in handling all the equipment and instruments used for the analysis.</p>
A.9 Assessing the EUREP-GAP readiness of exporters (CARE)	<ol style="list-style-type: none"> 1. Farm visits to follow up on EUREPGAP readiness 2. Carry out series of educational seminars on EUREP-GAP protocols for vegetable producers and exporters 	<p>Initial inspection of farms for their EUREPGAP readiness has been done.</p> <p>Vegetable Producers and Exporters benefited from educational training programs jointly organized by CARE and Amex</p>	<p>Initial inspection of farms for their EUREPGAP readiness has been done.</p> <p>Vegetable Producers and Exporters benefited from educational training programs jointly organized by CARE and Amex</p>
A.10 Comparative Analysis of vegetable exports (CARE)	<ol style="list-style-type: none"> 1. Conclude work on comparative analysis studies of Ghanaian vegetable exports. 2. Workshop for stakeholders disseminate finding of the study and other related quality issues 	<p>Work on the comparative analysis of Ghanaian Fresh produce on the UK Market has been carried out</p> <p>The workshop for industry stakeholders was held. Findings of the study and other matters were discussed.</p>	<p>A final report has been presented and is available at the VEPEAG secretariat.</p> <p>120 participants made up of producers, exporters, and industry stakeholders attended the dissemination workshop.</p>

Objective/Activity	Detail Activity	Results/Output	Performance Indicator Attained
A11. Work with private sector companies and existing producing communities to establish production and supply base for culinary herbs and local spices such as Grains of Paradise and shea butter (ASNAPP)	<p>Farmers were supported with technical expertise and appropriate post-harvest and drying techniques to produce five selected culinary herbs both fresh and dried and supply to Tacks farms and Praise for export.</p> <p>Selected women groups in Northern region were supported in their shea butter processing business and quality certification initiated with the Ghana Standards Board and Ghana Food and Drugs Board</p>	<p>Forty farmers cultivated basil, parsley, dill, sage and thyme at Mafi-Aklamador in the Volta Region and Apeguso in the Eastern Region. Appropriate drying systems were investigated</p> <p>Assisted a small-scale woman enterprise, Sommm Naturals, to register company and register products with the Ghana Standards Board</p>	<p>40 farmers have skills to produce culinary herbs</p> <p>One company adopted best practices in Shea production and processing</p>
A.12 Develop appropriate packaging options for herbal teas and selected spices (e.g. Lippia, Grains of Paradise Rooibos, etc). (ASNAPP)	Seek technical support and develop a system for packaging local herb teas	ASNAPP developed a range of African herbal teas and spice under the brand name UBUNTU. This is to promote a range of high quality African products on the international market. The tea is offered as 20 bagged teas shrink wrapped in aluminium foil and in a box and the spice as a table spice in a glass bottle with a grinder. Samples sent to US (Ahold)	UBUNTU range of packaged herbal teas released
A13. Trial production of specialty vegetables under hydroponics in University of Ghana (ASNAPP)	Conduct commercial trials on growing specialty vegetables in modified hydroponics systems at UG.	This activity could not be executed because of some logistics challenges.	
A14 Work with the mango and papaya farmers (TNS)	1. Develop Strategic Industry Plan for Mango & Papaya (TNS)	Preparation of strategic industry plan for mango and papaya is on-going.	50% of work completed

Objective/Activity	Detail Activity	Results/Output	Performance Indicator Attained
	<p>2. Develop management and production manual for Mango and Papaya farmers (TNS)</p> <p>3. Develop business plans with selected mango & papaya farmers (TNS)</p> <p>4. Attend Fruit Logistica Expo in Holland (TNS/MSU)</p>	<p>A production and farm management manual for mango and papaya developed.</p> <p>Prepared a business plan Tayco Agro Limited (a mango client) to source funding to set up a fruit processing plant. The business plan was submitted to the Merchant Bank.</p> <p>Through the sponsorship of GHPPP and other donors SPEG attended</p>	<p>A copy given to PAMPEAG</p> <p>Client awaiting funding from Merchant Bank</p>
A15. Develop vegetable seeds (TNS/CARE)	1. Work with private sector to develop local vegetable seed program (TNS/CARE).	CARE and CRI concluded the first phase of the Seeds development program for three lines, Okra, eggplant and Chilies.	To date, 40 kgs of MI2 chillie seeds capable of planting 222 acres have been sold out to farmers. In addition, seeds of Okra and eggplant developed are also available.
A. 16. Collaborate with stakeholders and partners to improve processing and marketing of shea butter. (TNS/GHPPP/AHOLD)	<p>1. Management, marketing and technical support to assisted shea clients: Juaben Oil Mills, Haymour Cosmetics, Van Woods (TNS/GHPPP/AHOLD)</p> <p>2. Organize industry forum on shea butter (TNS/MSU/ASNAPP/AHOLD)</p>	<p>Assisted Haymor to develop TV adverts for its shea butter products. The adverts would be running on the TV by the end of October.</p> <p>Assisted Haymor to undertake market survey in selected regional capitals of Ghana to assess the acceptability of the shea butter products and also identify wholesalers and distributors.</p>	Three companies adopt improved processing.

Objective/Activity	Detail Activity	Results/Output	Performance Indicator Attained
	3. Develop cosmetic market for shea butter (TNS/MSU/ASNAPP/AH OLD)	Samples sent to USA and Holland. Etos to introduce shea butter line. Interest from Malaysia	
A. 17 Introduce Papaya to Ahold Network (Ahold/GHPPP/MSU)	Work with Dansak and other producers to define quality and other logistics requirements and introduce company to the European market to increase market opportunities.	AH and ICA is selling papaya from Dansak	One company exports papaya to EU
A.18 Work with industry leadership to consolidate and explore benefits of establishing a Produce marketing organization (PMO) to meet the requirements of and to take full advantage of EUREGAP certification and inspection. (AMEX)	<p>EUREPGAP training was given to industry players and group certification encouraged.</p> <p>Discussions were continued to explore the benefits of establishing a PMO with industry leadership and individual farms.</p>	<p>Increased awareness on EUREPGAP and its requirements for market access.</p> <p>GEPC and SPEG held a forum on MD2 pineapple, with stakeholders; AMEX and PFID partners participated. This is the first time the industry called a meeting that was not donor supported or donor driven.</p>	<p>78 participants at EUREPGAP training</p> <p>Five firms certified</p>

3.2. Develop Skills And Capabilities Of All Participants In The Horticulture Supply Chain.

Objective/Activity	Detail Activity	Results/Output	Performance Indicator Attained
B. Develop skills and capabilities of all participants in the horticulture supply chain			
B.1 Develop training plan for participants in the horticultural sector (GHPPP/MSU)	In cooperation with Partners develop the training plan for year 2	Training plan was developed and discussed with Partners. Suggestions were made for the localization of training in Cold Chain and Logistics and training in Food Law and Food safety.	
B.2 Assess the needs and design training and development programs for small-scale producers, exporters, certifiers of grades and safety standards, logistics & cold chain providers, importers/wholesalers and retailers/foodservice operators to help them meet requirements of the EU, US and regional markets (MSU)	Interact with small-scale entrepreneurs, audit operations and map out training and interventions programmes	GHPPP interacted with Eden Tree, Dansak Farms, Tongu Fruits, Equatorial Ventures, Family Traditions, Ideal Providence Farms, Nkulenu Industries, Athena Foods, Fruit and vegetable vendors, Supermarkets on operations. Training on safety and hygiene was conducted to Eden Tree, a small-scale minimally processed vegetables processor. Details of training are summarized in other sections of this report. A second batch of women vendors were trained on food safety and hygiene in a program involving the Ghana Food and Drugs Board	Needs of 8 companies assessed On-site training for one company 12 Women Vendors trained in food safety and hygiene
B.3 Communicate successful training experiences; work with government to institutionalize (GHPPP)	Prepare information packs on successful programs and share. Produce Newsletter on Partnership Work with GFDB, GSB, GEPC , MOFA on training programs	The cooperation with Ghana Standards Board, Food and Drugs Board, the Ministry of Food and Agriculture, Export Promotion Council and FAGE increased. These and the producer Associations were involved in all the training programs planned. Two Partnership Newsletters were issued summarizing some of the results of the work.	Two newsletters issued
B.4. Create peer-peer exchanges (GHPPP/MSU/AHOLD)	Promote exchange of visits between buyers, producers and other stakeholders	Two farmers participated in the FMI Conference in Chicago. After the conference, the farmers resolved to expand and diversify operations to include value addition. Dansak Farms, one of the participants, has improved its operations and planned value-added activities. The company is currently supplying Albert Heinz with papaya.	Two farmers introduced modern operations in the horticultural sector of the USA.

Objective/Activity	Detail Activity	Results/Output	Performance Indicator Attained
		<p>Representatives of the South African supermarket chain, 'Pick 'N Pay', and Vroula (Fresh Produce Pty Ltd.) visited Ghana through GHPPP/AHOLD and interacted with the industry to initiate and develop opportunities to source for produce.</p> <p>The first request came through Pick 'N Pay, which was for the supply of mangoes from Ghana. GHPPP worked with a local production company to take advantage of the opportunity. GHPPP facilitated the issuance of permit to ship Ghanaian mangoes to South Africa. Whilst the local company showed interest in the opportunity the deal could not go through because of some internal problems of the local company.</p> <p>Johann De Visser, Operations Manager of Albert Heijn visited in December 2003 and shared his expertise in a presentation to the industry. In addition Gerard-van Breen, CEO of Ahold Spain visited Ghana and made a presentation on 'Market Trends' to a cross section of the industry. Both activities were targeted at the Supermarkets and other private sector operators. Participants learned about the complex nature of operations and the need to plan and follow market trends.</p> <p>Farmers working with ASNAPP on organic herbs were linked to a large scale farmer/exporter.</p>	<p>First request for shipment of mangoes to South Africa made.</p> <p>The supermarket industry introduced to Ahold's operations in Europe.</p>
B. 5 Joint support of WAFF, ACDEP and other organizations (ICCO/AHOLD)	<ol style="list-style-type: none"> 1. Evaluate input Ahold 2. Discussion on future cooperation 	<p>Discussed</p> <p>ICCO hired staff</p>	
B.6 Provide training and development. Methods to include: on-site instruction, distance learning and on-campus programs of MSU and other universities. Topics and subject matter includes: Grades & standards,	<ol style="list-style-type: none"> 1. WFLO Institute for training in cold chain management 	<p>Ten Ghanaians were sponsored through MSU to the Cold Chain Training at the World Food Logistics Organization in Oklahoma, USA. The trainees formed a "Cold Chain Interest Group" and were encouraged to develop a proposal to construct a demonstration charcoal cooler. The Akramang Cooperative Farmers were identified as potential</p>	<p>10 Ghanaians exposed to Cold Chain and Logistics Management</p>

Objective/Activity	Detail Activity	Results/Output	Performance Indicator Attained
<p>USDA instruction in grading, food safety and marketing & sales program development. Other topics to be added as needed (MSU/HPPP)</p>		<p>collaborators. Follow on the status of the Cooperative and the proposed land for the first charcoal cooler indicated that they did not have documents backing their use of the land. GHPPP plans to have a local training in “Cold Chain and Logistics”</p>	
	<p>2. On-Line Food Law Course mounted by MSU</p>	<p>A total of eleven (11) Ghanaians had opportunity to take the online International Food Law course and one person too the Codex Alimentarius course in addition. The participants were from GSB, GFDB, University of Ghana, Farmers and Processors. As suggested by the Partners a local training on “Food Laws and Regulations” is being planned. The preparatory work on the local training of food law has been initiated and a Resource Person identified.</p>	<p>11 professionals trained in International Food Laws and Regulations.</p>
	<p>3. International Food Safety Course (MSU/GHPPP)</p>	<p>Three women were sponsored to participate in the International Food safety Course at the Michigan State University. The first two were to learn about the MSU program and later serve as resource persons for the local training. In partnership with the CEPS, one of its officers also participated in the food safety course at MSU.</p>	<p>3 women professionals trained in food safety.</p>
	<p>4. Regional Food Safety Course</p>	<p>Regional Food safety Course was planned and the syllabus developed in cooperation with the Institute of International Education of MSU. The training was held from May 10-14, 2004 for 35 participants from Ghana, Nigeria and Benin. Instructors from MSU and Ghana took participants through several topics with demonstrations and field trips.</p>	<p>35 participants trained in food safety</p>
	<p>5. Grades and Standards (MSU/USDA/CCARD)</p>	<p>Following the development of the eight (8) standards for pineapple, fresh hot peppers, sweet pepper, papaya, mango, sweet potato, sweet cassava and ginger, a Stakeholders meeting was organized on June 29, 2004 on the theme “Standards: a tool for market access for fresh Ghanaian produce”. This collaborative effort between GHPPP, GSB, USDA under CCARD proved very fruitful even though some Partners initially had strong objections to the funding</p>	<p>Eight (8) standards developed. 85 participants exposed to the new standards developed for the horticultural sector.</p>

Objective/Activity	Detail Activity	Results/Output	Performance Indicator Attained
		<p>of the activity. 85 participants from the horticultural industry, public and private sectors and the Donor community participated. One of the outcomes from the workshop was the development of a non-technical version of the standards for wide use.</p>	
	<p>6. ISO 9001:2000 Lead Assessors Course/seminar (MSU/GHPPP)</p>	<p>One female professional was sponsored to participate in this course which exposed participants to quality audit. The trainee is to serve as a Resource Person to the industry, especially SME sector.</p>	<p>1 person trained as an auditor.</p>
	<p>7. Training in Minimally Processed fruits and vegetables (MSU/GHPPP)</p>	<p>The GHPPP in collaboration with the University of Ghana, Department of Nutrition and Food Science conducted research on “Effects of Processing and Handling on the Quality of Minimally Processed Pawpaws (<i>Carica papaya</i>) in Accra”. This work, which is part of an MPhil Thesis, looked at the quality attributes of the cut-papaya sold on the streets of Accra. The study revealed very interesting results of Public Health concern. As a follow-up to this study, a training program was drawn to educate Cut-papaya processors of better ways of handling their produce.</p>	<p>Need-based information for the informal cut fruit sector provided.</p>
	<p>8. Client-specific training. (MSU/GHPPP)</p>	<p>Following and audit an on-site training in food safety and plant hygiene was given to 24 personnel of Athena Foods. This has resulted in improved performance of staff on the production floor.</p> <p>Eden Tree supplies fresh and minimally processed fruits and vegetables (pre-cut, salad mixes, vegetable salad, ready-to-eat vegetables) to the supermarkets (Koala, Maxmart, Evergreen etc). Training of Eden Tree in good manufacturing practices, hygiene of produce, personnel and facilities has resulted in improved, safer and well-labeled products to the supermarkets. Evaluation of Eden Tree after training indicated that they had adopted the principles of processing impacted by the GHPPP and hence business was better.</p>	<p>24 personnel of Athena Foods trained in Plant hygiene and safety.</p> <p>One (1) company adopt GMP</p>

Objective/Activity	Detail Activity	Results/Output	Performance Indicator Attained
	<p>9. Training in Organic Farming and Quality Issues</p> <p>10. Training of supermarket staff on handling and quality management</p>	<p>In cooperation with the Organic Farming Association of Ghana, a training workshop was held at Akim Akroso in the Eastern Region for 59 members of the Association between the 7th and 9th of September 2004. The aim of the workshop was to train the farmers on the principles of organic farming to enable them meet required quality standards. The farmers were taken through principles of organic farming, soil fertility and plant nutrition, pest, disease and weed management, farm economy and farm management</p> <p>A special hands-on training on safety and handling of fruits and vegetables was held for 12 staff of the major supermarkets in Accra. They were exposed to good hygienic practices, quality attributes of perishables and management of stocks</p>	<p>59 farmers trained in organic farming</p> <p>12 staff of supermarkets trained in good hygienic practices</p>
<p>B. 7 Educate private sector producers, processors and exporters on market developments and retail & food serve requirements in Europe (TNS)</p>	<p>Employees of these companies will be trained in the food safety, grades and standards of the markets they serve, as well as in collaborating with customers</p>	<p>A market study report was completed for Processed Foods & Spices Ltd. (PFSL). TNS Client Team assisted client to implement recommendations of market study.</p> <p>Flokan Company Limited participated in a Foodex Fair in Japan. Lessons learnt would be applied to improve the business.</p>	
<p>B.8 Mentoring program using Technoserve's partners in the USA for leading firms in the sector farmers, producers and processors (TNS)</p>	<p>Identify potential mentors and link them with the Ghanaian Entrepreneurs</p>	<p>Mr. Tony Ballendon from BESO was attached to Coastal Groove during the quarter. He assisted the client in developing process procedures, provided advice in plant installation and training the plant manager.</p>	
<p>B. 9 Build capacity of the farmers in the area of enterprise development, basic accounting, marketing skills, etc. (ASNAPP)</p>	<p>Conduct enterprise development and group management training for 70 farmers</p> <p>Conduct training workshop for herb farmers at Apeguso in composting, post-harvest and drying techniques and herb production</p>	<p>Enterprise development and group management training workshops were organized for 70 farmers from Asesewa, Obakrowa, Begoro and Aklamador</p>	<p>70 farmers trained in enterprise development</p>

Objective/Activity	Detail Activity	Results/Output	Performance Indicator Attained
	Conduct training on group dynamics for 40 farmers at Asesewa		
B. 10 Design and conduct five (5) field training workshops in on-farm packaging and risk. (AMEX)	On-farm and general training to improve farm packaging	Four field training was organized for 74 participants. On-farm training conducted for two farms, Equatorial Ventures and Ikon Farms	74 participants trained in on-farm packaging. 2 farms assisted in on-farm packaging
B . 11 Design and conduct (5) field training workshops for pack house workers in basic food hygiene awareness (100) participants (AMEX)	Improve packhouse performance through training.	Two field training and two workshops were organized for 139 participants. Workshop on GAP for 12 farms in collaboration with PPRSD/MOFA. Incorporated basic food hygiene Conducted 4 trainings for 3 farms and a group farmers from Kumasi	!39 participants trained in hygiene at the packhouse 15 farms introduced to GAP and packhouse hygiene
B. 12 Design and conduct three (3) GAP workshops in pineapples, mangoes, papaya and vegetables (AMEX)		Workshop on GAP for 12 pineapple producers/exporters Another general workshop was organized for 60 participants	12 pineapple producers and exporters and 60 farmers exposed to GAP.
B. 13 Conduct two (2) EUREPGAP awareness workshops focused on Northern sector of Ghana (AMEX)		Eight (8) EUREPGAP awareness workshops held in Sunyani Kumasi and other locations for 106 participants. Five firms trained for EUREPGAP certification 31 Farmapine outgrowers were audited for EUREPGAP certification 39 farmers of Farmapine and Equatorial Ventures trained in pesticide use	106 participants sensitized to EUREPGAP 31 outgrowers audited for EUREPGAP certification 39 farmers trained in

Objective/Activity	Detail Activity	Results/Output	Performance Indicator Attained
B. 14 Organise Study Tours (CARE/MSU/GHPPP/TNS)	<ol style="list-style-type: none"> 1. Conduct a study tour to Kenya with three vegetable producers and exporters on a cost sharing basis (CARE) 2. Organise a sharing workshop to share information and insight gained from for other exporters and producers who did not participate in the tour (CARE) 3. Organize a study tour for selected pineapple farmers to Costa Rica to learn about MD2 (MSU/GHPPP/TNS) 4. A study tour for mango and papaya producers (MSU/GHPPP) 	<p>Successful study tour was undertaken to Kenya. Two producer/exporters and the senior technical officer of VEPEAG participated in the tour together with two smallholder specialists from CARE. MSU collaborated with CARE to undertake the trip.</p> <p>A one-day workshop was organized to share information gained from the study tour</p>	<p>pesticide use</p> <p>Two major exporters, Kakabo and Bersch Farms were part of the study tour to Kenya</p> <p>120 participants, producers and exporters and industry stakeholders attended the workshop</p>

3.3. Establish a Ghanaian NGO with the capability to lead the horticultural industry in sustainable and profitable development.

Objective/Activity	Detail Activity	Results/Output	Performance Indicator Attained
<p>C. Support the development of a Ghanaian private organization with the capacity to lead the horticultural industry in sustainable and profitable development.</p>			
<p>C.1. Develop management and leadership capacity by offering assistance as needed. (GHPPP)</p>	<p>Interact with produce organizations and provide support through informal meetings.</p> <p>Initiate fruit and vegetable seminars on a bi-monthly basis</p>	<p>The partnership was key to the formation of the PAMPEAG. Through the provision of various support to the association the partnership contributed to the growth of the new association. Some of the leaders in PAMPEAG participated in training in cold chain and food safety organized by GHPPP/MSU to help them provide focused leadership to their members.</p> <p>Support was also given to SPEG and VEPEAG to participate in Fruitlogistica and strengthen their local activities.</p> <p>A national consensus and strategic meeting on the horticultural sector was mounted to bring the major associations together to discuss common challenges, define possible solutions and build on the leadership</p> <p>GHPPP provided support to the Organic Farming Association (OFA) through a series of meetings and evaluation. This culminated in the agreement to organize a training program for the members of OFA as a preliminary step to the group receiving certification next year. The training came off at Akim Akroso.</p>	<p>One (1) produce association formed</p> <p>Strengthened the Organic farmers Association to improve production methods</p>
<p>C.2 Create sales & marketing programs. Improve performance of internal markets of fruits and vegetables. Make outreach to non-affiliated growers (AHOLD/GHPPP/MSU)</p>	<p>Identify potential buyers and link with producers in Ghana.</p> <p>Study fruit and vegetable marketing and processing by SMEs</p>	<p>Through the interaction of Royal Ahold and GHPPP Blue Skies sold cut fruit salad to Albert Heijn in the Netherlands</p> <p>The GHPPP visited Adom Orchards in the Eastern Region. Outgrower farmers working with Adom Orchards in the cultivation and processing of oranges were identified. An evaluation of the current processes used for dehydrated</p>	<p>Export of cut fruits increase. Specific volumes not available.</p>

Objective/Activity	Detail Activity	Results/Output	Performance Indicator Attained
		<p>orange peels was done and recommendations on alternative processing of citrus and other fruits were made. The company is expanding into fruit processing.</p> <p>Discussions were held with Nkulenu Industries to determine what collaboration can be developed to improve the company's lines of processed fruits.</p> <p>Ideal Providence Farms' operations in Eastern and Volta Regions were visited. From the recommendations from GHPPP, IDF is going to construct solar driers to improve the dehydration of chilli peppers.</p> <p>GHPPP had several interactions with the Organic Farmers Association in the Eastern Region. An assessment of their needs was made through a participatory approach.</p> <p>In April 2004 GHPPP worked with Shoprite Freshmark to introduce to the company to sugar loaf farmers in Central region. The company bought pineapples from the farmers using the suggested harvesting method. GHPPP provided Technical Assistance in harvesting.</p> <p>Ahold/GHPPP established links with the Integrated Tamale Fruit Company (IFTC). This was to pave the way for the purchase mangoes from IFTC when they are available.</p> <p>Two MPhil Food Science students were involved in thesis on marketing of fresh and processed fruits in Accra. The theses are yet to be completed and the information will be shared with MOFA and Development Partners</p>	<p>Supermarket adopts harvesting and handling method to enhance quality delivery of sugar loaf.</p>
<p>C.3. With the partners, MSU will explore strengthening a produce marketing organization to facilitate EUREPGAP Certification for producer members. (ALL PARTNERS</p>	<p>A review of the EUREPGAP and other certification among the Ghanaian producers and development of a strategy to ensure that the industry is on track.</p>	<p>Through the instrumentation of GHPPP, the Ghana Standards Board/CCARD prepared a policy document guide for presentation to the parliamentary Committee on Agriculture, Trade, Science and Technology. This was to sensitize the lawmakers on issues on grades and standards.</p>	<p>Sensitize parliament and policy makers on grades and standards</p>

Objective/Activity	Detail Activity	Results/Output	Performance Indicator Attained
C. 4 Analyze and organize farmers (PSO/AHOLD)	Go / No go decision	Skipped	
C. 5 Cooperate with Tacks to introduce vegetables (AHOLD)	Define right quality variety with traders Trial Shipments Start Shipments	Done In preparation	
C.6 Source for reference material (CARE)	Develop with VEPEAG source of diverse information for its membership on horticultural quality standards. Develop links with bodies such as Environmental Protection Agency, Plant Protection and Regulatory Services Department, Ghana Standard Board and the Ghana Export Promotion Council to obtain information for VEPEAG membership.	Final copies of Bancroft's work and various linkages developed including the recently developed VEPEAG website are available for the entire membership of VEPEAG A MOU has been signed with Ghana Standards Board for future collaborative work.	All available information on the Quality standards were burnt on CD's for easy referencing by the members of VEPEAG and industry stakeholders. VEPEAG is currently working in close collaboration with Ghana Export Promotion Council to identify more export marketing outlets for its members.
C.7 Prepare Case Study (CARE)	<ol style="list-style-type: none"> 1. Write case studies to respond to EUREP-GAP requirements. 2. Develop a package of protocols to assess member's practice relative to standards demanded by the external market. 	A draft copy of the code of production practice by VEPEAG members is yet to be finalized . Technical assistance training and study tours have been provided to support the operational activities of VEPEAG.	This document would be sold to members of VEPEAG as a cost recovery measure

Objective/Activity	Detail Activity	Results/Output	Performance Indicator Attained
	3. Assist VEPEAG staff to provide on-the-job assistance and supervision to members		A services profile list provided by VEPEAG to its members has been drawn up, As membership drive effort, members of VEPEAG are required to pay less for these service than non members
C.8 Provide logistical Support (CARE)	1. Assist VEPEAG secretariat to enable them undertake field work and field visits on a regular basis. This includes ; a. Vehicle maintenance cost b. Operating cost c. Others		A total of \$22,000 was made available to VEPEAG as operational support.
C.9 Improve performance in the citrus association (TNS)	1. Work with Ghana Citrus Association to strengthen their leadership and managerial capacity to provide better services to members (TNS) Study tour to Florida to study citrus industry (TNS/MSU)	On-going Two association members attend Florida Fruit Festival	
C. 10. Support industry leadership in SPEG and HAG (AMEX)	1. Support industry leadership to move forward on the quality control and quality seal program and benefits		

Objective/Activity	Detail Activity	Results/Output	Performance Indicator Attained
	<p>arising.</p> <ol style="list-style-type: none"> <li data-bbox="658 323 981 411">2. Support SPEG and HAG to activate work on the merger talks. <li data-bbox="658 448 981 659">3. Assist the pineapple industry to consolidate products and continue to explore the benefits of establishing a Product Marketing Organization (PMO). <li data-bbox="658 695 981 751">4. Provide TA to develop business plan for PMO 		

3.4. Provide technical assistance where needed to entities in all segments of the horticultural supply chain.

Objective/Activity	Detail Activity	Results/Output	Performance Indicator Attained
D. Provide technical assistance where needed to entities in all segments of the horticultural supply chain.			
D.1. Assess the technical and other needs of industry to promote efficiency and the manufacture of good quality products. (GHPPP)	Prepare audits on safety and other quality-related activities in Client operations. Offer suggestions for improvement.	<p>Athena Foods was assisted with to improve hygiene and food safety at the plant. This followed an audit of the plant and proposals developed for implementation.</p> <p>An audit of Family Tradition Enterprises was done to establish a baseline n the process and quality of the products currently under production.</p> <p>Other companies visited and assisted include Dansak farms, Tongu Fruit Farms, Tacks Farms, Adom Orchards and Ideal Providence Farms</p> <p>Dansak Farms is supplying papaya to AH in the Netherlands. The company faced some challenges in meeting the supply schedule and volumes required. Through consultations the company was advised to consider other strategies to make up for the shortfalls. The company is now back on track with its supplies. GHPPP introduced Dansak Farms to dehydration (solar drying) systems of fruit and vegetables at the request of Dansak Farms.</p> <p>Tacks Farms has been working with Ahold and GHPPP to supply various commodities to Ahold. Tacks Farms indicated its readiness to supply chilli peppers. An audit was done to assess the Farm’s readiness to supply the chillies taking into account both quality and volumes expected. Unfortunately Tacks farms could not supply the peppers</p> <p>Tongu Fruits is in pineapple production, processing and tissue culture laboratory. GHPPP in conjunction with APDF</p>	Already stated above (B6)

Objective/Activity	Detail Activity	Results/Output	Performance Indicator Attained
		<p>visited Tongu Fruits Ltd. to study their operations and plans. GHPPP identified assistance needed by Tongu for training of staff and processing of pineapples. In addition an evaluation on the value addition component of their operations was done. The company is expanding its value addition operations. GHPPP has provided technical inputs to the development of an outgrower school by Tongu Fruits.</p> <p>Sensory evaluation of some products of Mixed Fruits Ventures, Nsawam was organized. This was followed by a visit to the factory, where the GHPPP identified areas of operation, which needed to be improved to assure quality.</p>	
D.2 Customize training appropriate to needs on such topics/functions as EUREPGAP, production of organic produce and Fair Trade programs, processing etc. (GHPPP/MSU)	Work with farmer groups and associations on specific raining needs to ensure compliance and quality delivery	Organic Farmers Association in collaboration with GHPPP discussed training needs to meet market requirements. Training was held at Akim Akroso. The training placed OFA members in a position for audit and certification in 2005.	Already stated above (B5/C1)
D.3 Introduce Ghanaian producers to market trends in fresh produce sector of USA(MSU/GHPPP)	Identify programs/trade shows which can be of benefit to Ghanaian producers and encourage them to participate	<p>Mr. Bill Gerlach of Mellissa’s gave a presentation to industry on “Diversifying income through agriculture”. This provided opportunity to share information on some of the quality requirements of the USA market and also explore opportunities for export of Queen Victoria Pineapples. Following this visit Georgefields Farms showed interest and initiated discussions for the supply of QVP to Melissa’s. A business deal could not be clinched.</p> <p>As part of the strategy to sensitize the Ghanaian Industry to the requirements of the global market, Prof. Larry Busch of MSU gave a presentation ‘Using Standards Strategically’. This highly attended program</p>	
D.4 Initiate discussions with University of Ghana on curriculum for packaging. (GHPPP)	Consult with the University of Ghana on the introduction of packaging modules in their programs (Food Science, Food Process Engineering and Agricultural Engineering)	University of Ghana agreed to include a packaging module n the Food Process Engineering Course. The Institute of Packaging Ghana also has showed interest and commitment to see to the development of a packaging course at Legon. The MSU School of Packaging expressed willingness to assist in these efforts	Formal training n packaging instituted

Objective/Activity	Detail Activity	Results/Output	Performance Indicator Attained
D.5. Organize industry field trips to the U.S and Europe to learn about best practices and establish industry links (MSU/GHPPP)	With the input of Partners identify programs in USA and EU for the Industry to	Two farmers and the Marketing Manager attended the FMI Food Fair in Chicago	2 Farmers exposed to best practices
D. 6 Establish a grading system and safety programs to achieve progress towards quality certification	GHPPP provided support to the USDA/GSB/MOFA/CCARD for the development of grades and standards for selected horticultural products.	<p>Lack of grades and standards is a major drawback for the horticulture industry in Ghana. To sustain Ghana's edge in horticulture and help stakeholders meet domestic and international quality standards, the GHPPP worked with the Ghana Standards Board, USDA and MOFA under the CCARD to develop standards for Mango, Papaya, Pineapple, Ginger, Sweet Pepper, Sweet potato, Sweet Cassava and Hot pepper (Chillies). A stakeholders meeting, with 85 participants, was held at La Palm Royal Beach Hotel on June 29, 2004. The GHPPP believed that the implementation of these grades and standards will open many business opportunities for Ghanaian businessmen globally, and promote the consumption of safer and better quality horticultural produce. One of the outcomes of the meeting was the request for the standards to be recast in simple language. GHPPP took the lead in this. In addition, a Parliamentary brief on grades and standards was prepared through the instrumentation of GHPPP. This is to be presented to Parliamentary Committees on Agriculture, Trade, Science and Technology.</p> <p>Following the publication of these standards, Inspection Manuals are being prepared by GSB to facilitate the supply of good quality produce to the market.</p>	8 standards developed and adopted by industry
D. 7 Bring in commercial experts for knowledge transfer (AHOLD/GHPPP)	<ol style="list-style-type: none"> 1. Workshop with P2P 2. Workshop with Ahold Spain 3. Create video coverage from farm to fork 	<p>A presentation on Ahold operations in Europe was made to the Supermarket Industry.</p> <p>Ahold initiated discussions and agreed in principle to shoot the video. A short version was prepared with the cooperation of a TV station</p>	Industry sensitized

Objective/Activity	Detail Activity	Results/Output	Performance Indicator Attained
D.8. Provide technical assistance to lead firms (CARE)	1. Develop market linkages between outgrowers and lead firms.	Marketing linkages have been developed between two lead firms, Kakabo and Bersch Farms and 150 small scale producers.	To date Kakabo Farms has purchased over 250 MT of fresh Asian vegetables from small scale outgrowers.
	2. Assist lead firms to access financial resources from banks.	Kakabo and Bersch farms have been linked to Merchant Bank and also the EDIF fund.	The two exporters benefited from a ¢800,000,000 export support loan from the EDIF fund.
	3. Support lead firms in development low cost farm gate packing sheds	Two lead firms, Kakabo and Bersch farms have been introduced to the Low tech packing sheds	Kakabo farm has constructed one farm gate packing shed at the cost of ¢7,000,000. The farm gate packing facility for Bersch Farms is under construction
	4. Assist producers of trial materials to market their produce locally	CRI is marketing some of the chillie seeds produced.	To date 40kg of seeds valued at ¢ 32,000,000 have been sold locally.
	5. Coordinate samples development and trials	Dry chillie samples to MSU were successfully prepared and delivered. Varietal trial of seed brought in by MSU are still on-going.	5 packet of the dried chillie samples were delivered to MSU. Two members of VEPEAG are currently conducting trials of the MSU chillie seeds.
	6. Coordinate seed development by CRI	The first phase of the seed development program with CRI has been concluded. Currently EDIF is funding some components of the program.	

Objective/Activity	Detail Activity	Results/Output	Performance Indicator Attained
			A total of ₪168,000,000 (\$19,000) was invested into the seed program.
D. 9 Work with producers to meet certification standards (TNS)	<ol style="list-style-type: none"> 1. EUREPGAP training and pre-audits for assisted clients in the fruits and vegetables sector (TNS) 2. Introduce integrated pest management practices to assisted vegetable clients (TNS) 3. Introduce fruit producers to organic certification (TNS) 4. Ensure maintenance of organic integrity by certified producers (TNS) 	<p>EUREPGAP training conducted for Farmapine and pineapple coops. Villa Dev also introduced to EUREPGAP.</p> <p>Villa Dev trained in IPM</p> <p>Pineapple and orange farmers were prepared for organic certification.</p> <p>Regular visits to organic farmers.</p>	<p>Farmapine and 33 members of the coops receive EUREPGAP certificate.</p> <p>231 organic pineapple and orange farmers receive certification in March 2003</p> <p>Led to renewal of organic after the yearly verification visit in February 2004. Additional 91 farmers added to certificate.</p>
D. 10 Organize certification programs and ensure compliance with organic and Fair Trade regulatory standards, using consultants to provide technical and specialized training where required (TNS)	<p>Conduct EUREPGAP pre-audits for assisted clients</p> <p>Follow-up on training in organic best practices</p>	<p>An Ecocert International organic inspector conducted a verification visit which covered pineapples and oranges producing farmers in Kwahu-Bepong, Mumuni Camp and Assin.</p> <p>SGS conducted the final EUREPGAP pre-audit for the first batch of farmers totaling 30 submitted for the audit by Farmapine. The final audit was conducted in August 2003</p>	
D. 11 Facilitate introduction of a grading system to achieve progress towards quality certification (TNS)	Work with farmers to ensure quality standards	Contract negotiated with Rutgers University to develop trade grades and standards for shea butter	

Objective/Activity	Detail Activity	Results/Output	Performance Indicator Attained
D.12. Mango Initiative: Anthracnose control program (TNS/AMEX)	<ol style="list-style-type: none"> 1. Conduct studies to determine the anthracnose line in Ghana (TNS). 2. Conduct training on effective control of anthracnose (TNS/Amex) 	<p>Initial study on state of northern mango industry undertaken</p> <p>Training conducted in Dodowa and Somanya for mango farmers.</p>	76 mango farmers participated in the 2 training sessions.
D.13 Control of mango stone weevil to enhance fruit quality (TNS/AMEX)	<ul style="list-style-type: none"> – Consolidate current knowledge on control of mango stone weevil into a manual for dissemination to farmers. (TNS) – Training in effective control of mango stone weevil for mango farmers. (TNS) 	<p>A 4-page fact sheet produced.</p> <p>Training conducted in Dodowa and Somanya for mango farmers.</p>	76 mango farmers participated in the 2 training sessions.
D.14 Increase productivity of mango (TNS/AMEX)	<ol style="list-style-type: none"> 1. Training on appropriate pruning methods for mango farmers (TNS). 2. Conduct trials to establish fertilizer regimes for mango (TNS) 3. Conduct trials to establish varietal responses to flower induction. (TNS) 	<p>Training conducted in Dodowa and Somanya for mango farmers.</p> <p>On-going</p> <p>On-going</p>	76 mango farmers participated in the 2 training sessions.
D.15. Papaya initiative (TNS/AMEX)	<ol style="list-style-type: none"> 1. Conduct trials to establish appropriate agronomic practices for golden papaya variety. (TNS) 2. Introduce golden papaya variety to farmers on pilot basis (TNS) 	<p>On-going</p> <p>Two small scale papaya farmers were introduced to the golden papaya variety.</p>	2 farmers introduced to golden papaya

Objective/Activity	Detail Activity	Results/Output	Performance Indicator Attained
D. 16. Provide TA to producers, processors to improve market performance	<ol style="list-style-type: none"> 1. Continue to work with industry based on client requests. (AMEX) 2. Organize 2 tours and/or 2 seminars for producers, processors and shop owners from 4 (north and south) regions and expose them to business/marketing opportunities outside their localities. (AMEX) 	<p>Amex assisted AfriLink to source for tomato processing equipment from California. In addition the company was assisted to prepare business plans, MIS and training in GAP to its tomato growers.</p> <p>Amex coordinated visits by Georgefields Farms, Koranco Farms and Milani Farms to Bomart, for board members of Bio Plantlet Ltd. To assess status in plant multiplication for MD2 and the state of art in Ghana</p> <p>Tour was organized for mango farms from the northern regions to he south. This brought some of the farmers for the first time to the south and to experience marketing and processing options.</p>	1 company assisted in tomato processing
D. 17. Work with Tongu Fruits to improve pineapple MD2 production through training and establishment of Outgrower scheme. (GHPPP/AHOLD/APDF)	<ul style="list-style-type: none"> ▪ Develop training modules and set up Outgrower scheme ▪ Training in MD2 production, management and group formation 	This program was stalled because of lack of funds	

3.5. Develop and market commercially viable nutritional products for children and pregnant women and other natural products.

Objective/Activity	Detail Activity	Results/Output	Performance Indicator Attained
E. Develop commercially viable nutritional products for children and pregnant women and other natural products			
E.1. Institute product development and marketing processes to develop local business and entrepreneurial skills (GHPPP/AHOLD/APDF)	Market and Consumer Research prototypes	GHPPP worked in cooperation with Royal Ahold and APDF on both the desk research, development and evaluation of product concepts, pilot production of the selected products and focus group evaluation. The major outcome was the selection of 4 food concepts for field evaluation	4 products developed and introduced to rural communities and one (1) small-scale enterprise.
	Extension of products to rural communities	As part of the goals of the GHPPP to develop and market commercially viable nutritional products for children and pregnant women and other natural products, the GHPPP introduced nutritional food products to 6 rural communities in the country. The communities included Okitsew, Obosomase, Amanfrodo (Central region), Kwamoso and Yensiso (Eastern region) and Kordiabe in the Greater Accra region. Communities were educated on the nutritional benefits of the food products and were encouraged to use it in the production of traditional products such as <i>Kooko</i> , <i>Kenkey</i> , <i>Banku</i> , <i>Moree</i> and <i>Kaklo</i> . Communities reported that products had special organoleptic properties including nicer taste and flavour, higher elasticity, satiety and higher swelling capacities of cooked products. Small-scale entrepreneurs who were encouraged to use cowpea-fortified maize dough in place of traditional maize dough indicated they were making higher profits due to the higher swelling capacity of the nutritious product. GHPPP has thus offered these communities, higher income in addition to good nutrition.	Six communities introduced to a high protein cowpea-fortified fermented dough

Objective/Activity	Detail Activity	Results/Output	Performance Indicator Attained
	Introduce products to small-scale industry	<p>The GHPPP/Ahold/APDF held a workshop for Small-scale entrepreneurs on 'New Food Product Development and Business Opportunities' in the on June 10, 2004. The results of the market research, product development and selection of the food concepts were shared. Participants were asked to develop a simple business plan for consideration at the next phase of the program. Only Family Traditions, based in Elmina, submitted the business plans. They were selected for field evaluation and planning of support to improve operations and introduce new products. A visit was paid to the company in Elmina and training activities are being planned to help improve operations and expand product lines.</p> <p>As a result of the information shared at the workshop, Elsa Foods has taken the lead to develop the products further for certification by Ghana Standards Board and approval from the Food and Drugs Board</p>	One (1) company adopts one of the food concepts for production.
E. 2 Product Development for Export (AHOLD/APDF/GHPPP)	<p>Research on product concept.</p> <p>Create broader range based on market research and analysis</p>	Research revealed a high opportunity and availability of ingredients in Ghana. Major constraints were in the quality of products especially packaging and the availability of the volume required for export business. There was a shipment of shea butter to the USA.	
E.3. Provide promotional assistance, advertising and product presentation. (GHPPP/AHOLD)	In conjunction with advertising and packaging professionals identify products and initiate discussions on package design and promotion for effective marketing.	Ahold and GHPPP interacted with Athena Foods and among the issues of interest was the development of appropriate packaging for fruit juices. Concepts were collected from Athena Foods but the package design process was stalled, possibly from Athena's loss of interest.	
E.4. Track impact of the project initiatives on women for reporting on impacts by gender (GHPPP/MSU)	Examine the impacts reported and delineate impact on women	The involvement of women was found to be dependent on the objective/activity. Objective 5 which involved product development had 100% input and impact on women. The other activities had 10-20% involvement of women. The women involvement were in the areas of marketing and processing.	



Michigan State University

4. FINAL REPORT ON NO-COST EXTENSION TO GHPPP

October 1, 2004 – March 31, 2005

4.1. EXECUTIVE SUMMARY

Introduction

The Ghana Private-Public Partnership Food Industry Development Program ended on September 30, 2004. Through consultations, USAID granted a six month no-cost extension to allow the program to conclude its activities. During the extension period GHPPP continued to provide synergy between Michigan State University's (MSU) Partnership for Food Industry Development, Fruits and vegetables (PFID-F&V) program, Royal Ahold a Dutch supermarket and foodservice company, and Stakeholders in the horticultural industry. The period saw the breakup of the Partnership as members decided to enter into the new USAID TIPCEE with other Lead Organizations. GHPPP continued to do its work in collaboration with Ministries, Departments and Agencies and the wider business community. This report covers the period October 1, 2004 to March 31, 2005. The main objectives of the original program was followed. These are:

6. Develop logistical chain to achieve products of specified consistency, quality and safety.
7. Develop skills and capabilities of all participants in the horticulture supply chain.
8. Establish a Ghanaian NGO with the capability to lead the horticultural industry in sustainable and profitable development.
9. Provide technical assistance where needed to entities in all segments of the horticultural supply chain.
10. Develop and market commercially viable nutritional products for children and pregnant women and other natural products.

Highlights on accomplishments:

- Thesis report issued to the University of Ghana. Felicia Adams of Ghana Standards Board to be awarded MPhil degree. Initiation of discussions with farmers of sugar loaf pineapple and women vendors in Central Region to extend harvesting and handling methodology to improve quality and increase income
- Increased collaboration of GHPPP with GFDB, GSB, GEPC, MOFA on training programs and other activities. GHPPP is actively participating in the national Horticultural Task Force, National Codex Alimentarius, GSB Grades and Standards and the development of Inspection Manuals.
- The successful organization of the first training in Cold Chain and Logistics management for Seventy-five (75) participants to build capacity along the supply chain to meet required quality and cold chain management standards in agri-business.
- A study of Supermarkets in Accra-Tema metropolitan Area to determine their mode of operation and involvement in the marketing of fruits and vegetables.
- Follow-up visits to all 6 communities to which nutritional food have been introduced. Training in simple business management with emphasis on record keeping was organized in all communities.

- Visit to Family Tradition Enterprises (FTE) to assess condition of facilities processes. Training of FTE to upgrade its manufacturing processes, and introduce HACCP, GMPs and record keeping in their work plan.
- The successful development and delivery of localized training in Food Laws and Regulations. This activity saw the participation of 55 Ghanaians in the course which brought together staff of Ghana Food and Drugs Board, Ghana Standards Board and several public and private sector organizations interested in standards.
- OICI submitted the final reports on the sub-sector studies on horticulture in the Northern Regions (Ashanti, Brong Ahafo, Northern, Upper East and Upper West). These reports are very useful documents for further work in these regions. OICI further organized Technical Skills and Capabilities Training for producers in the horticultural supply chain.
- The sponsoring of 11 Ghanaians to participate in Fruit Logistica 2005 in Berlin. This was followed by a Stakeholders workshop to receive report from the delegation which attended the trade fair and map out a strategy to give Ghana horticulture a better representation at the fair. Through the workshop it was agreed that the Ghana Export Promotion Council should serve as the coordinating point to plan Ghana's participation at the 2006 Fruit Logistica.
- The linking of the National Tomato Traders Association to Tacks Farm's Cold Storage facility which is underutilized. Negotiations are going on for the use of the facility to improve the handling and management of tomato quality in Accra.

4.2. Develop Logistical Chain To Achieve Products Of Specified Consistency, Quality And Safety.

ObjectiveActivities	Detail Activity	Results/Output	Performance Indicator Attained
A. Develop logistical chain to achieve products of specified consistency, quality and safety.			
<p>A.1 Conduct analysis of current value chain including marketing and consumer studies. (GHPPP/AHOLD)</p> <p>Indicative Consumer Studies on Pineapple preference by Ghanaian (GHPPP)</p> <p>Effects of harvesting, temperature and handling on quality of two varieties of pineapples (GHPPP/UGL)</p> <p>Assess the status of horticulture (fruits and vegetables) in Upper East, Upper West, Northern , Brong Ahafo and Ashanti Regions and determine the export market opportunities. (GHPPP)</p>	<p>Arrange with farmers to source materials for sensory evaluation of sugar loaf</p> <p>Complete the first phase and issue thesis; interact with farmers and women traders on strategies to test and adopt method of harvesting. Initiate further field and laboratory investigations.</p> <p>Complete the analysis and hold workshops with stakeholders in the South and Northern sectors. Technical skills and capabilities training for producers in the horticultural supply chain</p> <p>Analyze results of studies and complete report</p>	<p>This was combined with the study on the effects of harvesting and handling on quality of sugar loaf. An Mphil Food Science student is continuing the work at the University of Ghana under the supervision of the Program Director</p> <p>The Mphil thesis of Felicia Adams of Ghana Standards Board issued to the University of Ghana. Farmers of sugar loaf and women vendors in Central Region contacted and discussions held. Follow up meetings set up to do testing from farm to market</p> <p>Several interactions were held with sugar loaf farmers in the Ekumfi area of the Central region. Field testing and validation of the method of harvesting and its acceptance/effects on the market was initiated through a second MPhil thesis work. This study will be continued at the UG</p> <p>OICI submitted first draft reports on the sub-sector studies. Comments were issued to OICI for consideration and issuance of final report. Two Bridge-Building workshop on Horticultural Crops and Agribusiness Development were held on in Accra and Rev. Leon Sullivan Food Security and Nutrition Training Center, Kumbungu in the Northern Region. The final reports were issued by OICI. Five crops (mango, cashew, tomato, pepper and onion) were selected as the top horticultural crops in these regions for further work</p>	<p>1 MPhil Graduate in Food Science</p> <p>Production cooperatives established with 925 registered members.</p> <p>74 participants in the bridge-building workshops</p>

ObjectiveActivities	Detail Activity	Results/Output	Performance Indicator Attained
Internal Marketing of fruits and vegetables: improvement of infrastructure, performance, packaging nutrition and health (GHPPP)		<p>Reports should be made available to industry, MOFA and other development partners.</p> <p>Report on fruit and vegetable vending in Accra was completed. It showed the important fruits as banana, pineapple, oranges, mango papaya and cabbage, carrots, tomato and green pepper as important vegetables. The Agbobloshie market is an important market where the vendors source their produce.</p>	
A. 2 Convene meetings of the Partners to assess progress	<p>The Partnership ceased to meet regularly after September 30, 2004. Activities in some organizations were severely curtailed and cooperation reduced as a result of bidding for the new contract. Cooperation with Ahold continued.</p>	<p>GHPPP Program Director continued to meet with Royal Ahold Program Director on a weekly basis to strategize on program and other issues. Through these meetings we were able to address problems of local farmers in respect to export orders and quality management. In one such situation it was found that some of the producers who have export potential do not have in place a good system to monitor what they do and are not able to respond promptly to queries on their shipments</p>	Two farms assisted to reorganize operations

4.3. Develop Skills And Capabilities Of All Participants In The Horticultural Supply Chain

ObjectiveActivities	Detail Activity	Results/Output	Performance Indicator Attained
B. Develop skills and capabilities of all participants in the horticultural supply chain			
<p>B.1 Communicate successful training experiences; work with government to institutionalize (GHPPP)</p> <p>Prepare information packs on successful programs and share.</p> <p>Produce Newsletter and share</p> <p>Work with GFDB, GSB, GEPC, MOFA on training programs and other activities</p>	<p>After the completion of the standards for the 8 crops one of the recommendations at the stakeholders meeting was the simplification of the documents to make easy reading and application. GHPPP undertook to prepare the simplified documents.</p> <p>The final newsletter for the Partnership was to be issued.</p> <p>Continue collaboration with these government agencies</p>	<p>Draft simplified grades and standards documents prepared for some commodities. It was difficult to find pictures reflecting the various quality standards were sought. Activity could not be completed</p> <p>Members did not provide inputs as requested. This is partly linked to the transitional nature of the period. Some partners were closing down and others were in the middle of a new bid.</p> <p>Newsletter prepared on the training workshop on “Cold Chain and Logistics Management”</p> <p>All the organizations were involved in training programs held during the quarter. In addition GHPPP was invited to serve on various committees of the organizations</p>	<p>Draft simplified grades and standards document</p>
B.2. Create peer-peer exchanges (GHPPP/MSU/AHOLD)	Promote exchange of visits between buyers, producers and other stakeholders	No visits were scheduled	
<p>B. 3 Provide Training to all sectors of the horticultural chain (GHPPP/MSU)</p> <p>- WFLO Institute Training in Cold Chain Management in Ghana</p>	Workshop planned for December 2004 to sensitize stakeholders in Ghana for the need to improve the application of refrigeration	Seventy-five (75) participants attended the workshop which provided suitable platform for interesting discussions and an opportunity to	75 participants introduced to cold chain and logistics

ObjectiveActivities	Detail Activity	Results/Output	Performance Indicator Attained
<ul style="list-style-type: none"> - Food Law Course (on-line) - Food laws and regulations training in Ghana - Exposure to best practices (USA and EU) 	<p>technology for preservation and distribution of temperature sensitive commodities</p> <p>Follow-up meetings with stakeholders</p> <p>Candidates enrolled for the online course to complete the fall semester</p> <p>Workshop planned for March 2005 to sensitize stakeholders in Ghana on the need to have a thorough understanding and appreciation of the Domestic and International Food Laws and Regulations and how these impact on the competitiveness of Ghanaian produce in the market place.</p> <p>Sponsor stakeholder to participate in Fruit Logistica 2005. Organize a stakeholders workshop to share experiences</p>	<p>reach many stakeholders and help the country to build capacity along the supply chain to meet required quality and cold chain management standards in agri-business.</p> <p>Consultations were held with identified Stakeholders on the application of Cold Chain In the Ghanaian Horticulture Industry. The Tomato Traders Association at Makola market in Accra, having understood the important contribution of Cold Chain in their business were linked with an Accra-based Company which has Cold Store facilities currently underutilized. The two are in discussions on how to work together.</p> <p>A staff of the GHPPP took the distance learning course in International Food Laws and Regulations</p> <p>Fifty-five (55) participants attended the workshop which provided suitable platform for interesting discussions and an opportunity to reach many stakeholders and help the country to build capacity along the supply chain to meet required domestic and international food laws and regulations standards in agri-business.</p> <p>An 11-member delegation was sponsored to participate in the 2005 Fruit Logistica in Berlin. The objectives were for the participants to: Learn and see current state of the horticultural industry globally; Learn about market trends as required by EUREPGAP; Interact with other fresh produce professionals from other parts of the world and make contacts with buyers of fruits and vegetables for export</p>	<p>10 Executives sensitized on cold chain application</p> <p>1 trainee in food law</p> <p>55 Participants trained in food law and regulations</p> <p>11 stakeholders exposed to best practices</p>

ObjectiveActivities	Detail Activity	Results/Output	Performance Indicator Attained
<ul style="list-style-type: none"> - Food safety and quality management for women retailers and processors (informal sector) - Client-specific training 	<p>Initiate and plan training program for women retailers and processors</p> <p>Visit identified small scale processor, initiate audit and plan training)</p>	<p>The way forward for the Ghanaian horticulture industry was discussed at the stakeholders workshop. It was suggested (1) that Ghana Export Promotion Council take up the challenge of organizing Fruit Logistica 2006 with support from the Horticultural Export Industry Initiative. (2) all produce associations in Ghana including SPEG, VEPEAG, PAMPEAG, and HAG work together to ensure a successful Fruit Logistica 2006 participation by Ghana.</p> <p>First training on minimal processing of papaya for the informal sector was given at Matti House with great difficulty. Only 3 of the women attended. The women could not spare a day for the training due to their business and family commitment.</p> <p>Family Tradition Enterprise (FTE based in Elmina was visited. This was a joint effort of Royal Ahold and GHPPP. Conditions of facilities and personnel were evaluated.. Training on safety and hygiene was given.</p>	<p>Horticultural Industry sensitized to have effective national plan for trade shows.</p> <p>3 women trained</p> <p>2 Senior staff trained</p>
<p>B. 4 Organise Study Tours (MSU/GHPPP)</p>	<p>A study tour for mango and papaya producers (MSU/GHPPP)</p>	<p>Discussions were initiated with the Executive of Papaya and Mango Producers and Exporters Association of Ghana. The tour could not materialize because we could not find a local host in South Africa.</p>	

4.4. Support The Establishment Of A Ghanaian Private Organisation With The Capability To Lead The Horticultural Industry In Sustainable And Profitable Development

Objective/Activities	Detail Activity	Results/Output	Performance Indicator Attained
<p>C. Support the establishment of a Ghanaian private organization with the capability to lead the horticultural industry in sustainable and profitable development</p>			
<p>C.1. Develop management and leadership capacity by offering assistance as needed. (GHPPP)</p> <p>-</p>	<p>Interact with produce organizations and provide support through informal meetings.</p>	<p>GHPPP interacted with the Organic farmers Association and supported one of the leaders to participate in trade show and Eurepgap benchmarking workshop. Two leaders handling organic produce were supported to participate in organic trade show (Biofach 2005) in Europe. The National Tomato Traders Association and the Freight Forwarders Association consulted with GHPPP and participated in the Cold Chain and Logistics training.. In addition one of the leaders of the National Tomato Traders Association and Manager of a small-scale fruit and vegetable processing organization (Eden Tree Ltd) were also supported to attend Fruit Logistica 2005. These activities have led to the introduction of new ideas in the organizations including improved packaging systems</p>	<p>3 managers exposed to best practices in organic business.</p> <p>2 women leaders exposed to best practices in horticultural trade</p>
<p>C.2 Create sales & marketing programs. Improve performance of internal markets of fruits and vegetables. (AHOLD/GHPPP/MSU)</p> <p>.</p>	<p>Complete data analysis on the Accra-Tema Supermarkets study</p> <p>In cooperation with government and other partners introduce fruit stands in Accra. Provide information on handling, storage and marketing. Promote sales of fruits and vegetables through healthy eating.</p> <p>The National Tomato Traders</p>	<p>Report was completed. It was also observed that 70% of the supermarkets retailed fruits and vegetables, which form between 1% and 5% of the total stock of goods in the supermarket. Some of the challenges in the fruits and vegetables section include; poor quality of fruits and vegetables received from producers, limited variety of fruits available, difficulty in maintaining freshness of produce and the continuous cleaning sorting and re-merchandising before produce gets to the shelf.</p> <p>The process was started with interaction and training of the fruit and vegetable vendors. Information on handling and marketing has been shared with vendors. A study of Supermarkets in Accra-Tema metropolitan Area has been completed to determine their mode of operation and involvement in the marketing of fruits and vegetables. These activities were a prelude to the promotion activity</p> <p>The Women in Agriculture Development introduced GHPPP to the National Tomato Traders Association. The Association was linked to</p>	

Objective/Activities	Detail Activity	Results/Output	Performance Indicator Attained
	Association and other fruit and vegetable vendors are interested in the application of good practices to preserve quality and increase profits. A special training will be held to share information with these Stakeholders.	Tacks Farm's Cold Storage facilities (see Section B3 of this report.) This was to offer a business opportunity for both parties for the use of the cold room facilities to extend the shelf life of tomato especially during the glut period.	
C.3. Explore strengthening produce marketing organizations to facilitate Eurepgap Certification for producer members.	A review of the Eurepgap and other certification among the Ghanaian producers and development of a strategy to ensure that the industry is on track.	In cooperation with Royal Ahold continued to support the Organic Farmers Association with information on the EU markets. One of the members, Ideal providence farms, has taken initiative to lead in the certification process. GHPPP Director worked through the National Horticultural Task Force to promote quality in the Ghanaian Produce Industry. He is leading the process to develop GhanaGAP	1 farm certified

4.5. Provide Technical Assistance Where Needed To Entities In All Segments Of The Horticultural Supply Chain

Objective/Activities	Detail Activity	Results/Output	Performance Indicator Attained
D. Provide technical assistance where needed to entities in all segments of the horticultural supply chain			
D.1. Assess the technical and other needs of industry to promote efficiency and the manufacture of good quality products. (GHPPP)	<p>Prepare audits on safety and other quality-related activities in Client operations. Offer suggestions for improvement</p> <p>Follow up and evaluation on the vendors/ processors trained to assess if the training had any impact on operations</p> <p>Work with Ahold to assist identified companies currently exporting to the EU markets</p>	<p>Follow-up visits were paid to Eden Tree Ltd to assess impact of training and find out challenges being faced. The operations at the processing site have been influenced by the training given to improve quality and safety</p> <p>Audit was completed at Family Tradition Enterprises, the small-scale food processing company in Elmina. Suggestions were made in respect of layout , hygiene and use of facilities.</p> <p>Trained fruit and vegetable vendors have been evaluated. Observation of operations and interview on impact of training on their businesses indicated lessons learnt were being applied hence promoting food quality and safety</p> <p>GHPPP worked with Ahold to assist Dansak Farms with the management of its quality of papaya being exported to Albert Heinz. Issues on documentation for quality management and audit were discussed and suggestions made for improvement</p>	<p>1 company applying GMP in operations</p> <p>1 company audited</p>
D.2 Introduce Ghanaian producers to market trends in fresh produce sector of USA(MSU/GHPPP)	Identify programs/trade shows which can be of benefit to Ghanaian producers and encourage them to participate	Consultations done. Decided that trade shows in the EU will be of immediate benefit since this is where most producers have their buyers. Recommend attendance at Fruit Logistica by a strong Ghanaian Team.	
D.3. Introduce business to business e-commerce (GHPPP)	Establish a website for GHPPP and promote the use of ICT in the horticultural business- provide	It was found that FAGE has a website for Ghanaian Exporters. This site is still being developed. In collaboration with Royal Ahold the	

Objective/Activities	Detail Activity	Results/Output	Performance Indicator Attained
	market information to improve access.	use of a Web Authorizing System for Windows was explored .	
D.4 Initiate discussions with University of Ghana on curriculum for packaging. (GHPPP)	Consult with the University of Ghana on the introduction of packaging modules in their programs (Food Science, Food Process Engineering and Agricultural Engineering)	Discussions were initiated. GHPPP Program Director visited MSU School of Packaging and received commitment of support. The programs in Engineering at the University of Ghana have started with a commitment to introduce packaging in the Senior Year.	
D.5. Organize industry field trips to the U.S and Europe to learn about best practices and establish industry links (MSU/GHPPP)	Identify programs in USA and EU for the Industry to participate to improve performance	Same as what is reported under D2	
D.6 Organize trips for buyers/foreign importers to Ghana (MSU/GHPPP)	Identify buyers and link them to the industry in Ghana	No trips were organized	
D. 7 Bring in commercial experts for knowledge transfer (AHOLD/GHPPP)	Create video coverage from farm to fork	Discussions initiated and a script to be written by GHPPP	.
D. 8. Work with Tongu Fruits Farms to improve pineapple MD2 production through training and establishment of Outgrower scheme. (GHPPP/AHOLD/APDF)	Develop training modules and set up Outgrower scheme Training in MD2 production, management and group formation	Activity suspended due to funding problems	

4.6. Develop Commercially Viable Nutritional Products For Children And Pregnant Women And Other Natural Products

Objective/Activities	Detail Activity	Results/Output	Performance Indicator Attained
E. Develop commercially viable nutritional products for children and pregnant women and other natural products			
E.1. Promote and train rural communities and small-scale entrepreneurs on the processing and use of high protein foods developed from maize and cowpeas. (GHPPP)	<p>Rural community food processing and extension to improve nutrition and income</p> <p>Business development and implementation for marketing high protein foods by small-scale entrepreneurs</p>	<p>Follow-up visits were paid to all 6 communities to which nutritional food have been introduced. Training in simple business management with emphasis on record keeping was organized in all communities.</p> <p>Further visits showed that some entrepreneurs continued to use cowpea-fortified maize dough in their commercial food processing operations. Some entrepreneurs indicated they keep records of their businesses now.</p> <p>Visited Family Tradition Enterprises to assess condition of facilities processes. Training of FTE to upgrade its manufacturing processes, and introduce HACCP, GMPs and record keeping in their work plan was developed and executed FTE was introduced to 3 methods of dehulling cowpeas for the production of cowpea-fortified maize dough in January.</p>	6 communities introduced to high protein food
E.3. Provide promotional assistance, advertising and product presentation. (GHPPP/AHOLD)	In conjunction with advertising and packaging professionals identify products and initiate discussions on package design and promotion for effective marketing.	Cooperate with the Institute of Packaging Ghana (IOPG) to assist Entrepreneurs to improve package design.	
E.4. Track impact of the project initiatives on women for reporting on impacts by gender (GHPPP/MSU)	Prepare for the evaluation of the program	Develop SOW and do the evaluation . In discussion with Association of Evaluators to identify Consultants.	

5. GHPPP DETAIL PROGRAM ACTIVITIES
(October 1, 2002 – March 31, 2005)

5.1. DEVELOP LOGISTICAL CHAIN TO ACHIEVE PRODUCTS OF SPECIFIED CONSISTENCY

One of the objectives for the Ghana Private-Public Partnership Food Industry Development Program was to develop a logistical chain to achieve products of specified consistency, quality and safety. Under this goal the program conducted analysis of current logistical chain including marketing and consumer studies. Marketing plans on selected produce were prepared, indicative consumer studies were organized on preferences for Ghanaian pineapples. Below are summaries on work done under this objective.

5.1.1. Marketing plans

This was one of the first activities executed by MSU-PFID's Ghana Private-Public Partnership Food Industry Development Program (GHPPP) and Royal Ahold, immediately after signing the contract in October 2002. It was to serve as a baseline especially for GHPPP and Royal Ahold. The Partners who had been supported by USAID through TIRP had indicated that they had done work on various aspects of the fruit and vegetables industry. To allow the new partners, GHPPP and Royal Ahold to have a better grasp of the current situation a baseline work (marketing plans) to review what has been done and link it to the situation on the ground was initiated.

The marketing plans covered both the external and internal markets. On the external market the issues of interest were available markets, preferred varieties, competition, packaging requirements and pricing. Issues such as production practices, varieties available, supply chain issues and human resource base were of interest for the local market. The objective was to identify areas requiring attention to enable the partnership provide the necessary assistance.

Marketing plans were prepared for pineapples¹, vegetables², mango and papaya³ and sheabutter⁴ with recommendations for implementation. Following an initial resistance by some Partners on the need to the marketing the reports were adopted by the Partners and some of the action points suggested in the reports were used in developing some activities the Partnership.

¹ Marketing Plans for fresh pineapple exports in Ghana, GHPPP, April 2003

² Marketing plans for fresh vegetable export in Ghana, GHPPP April 2003

³ Marketing plans for papaya and mango export in Ghana, GHPPP, April, 2003

⁴ Marketing plans for sheabutter exports in Ghana, GHPPP, April, 2003

5.1.1.1. Pineapples

The report focused on the export of fresh pineapple to the European Union (EU) concentrating on the large-scale farms although issues concerning small and medium scale farms were addressed.

The fresh pineapple export sub-sector is the most developed of all the non-traditional horticultural export crops in Ghana. It accounts for 20% of revenues from this sub-sector. The two main varieties exported are sugar loaf and smooth cayenne and the main export destination is Europe. The main markets for Ghana are the UK, Germany, Netherlands, Belgium, Switzerland, France, and Italy. The pineapples are both air and sea-freighted to Europe. Ghana produces about 60% of the EU's airfreight pineapple market. The sea freight industry has also expanded recently.

Two varieties of pineapples are commonly grown in Ghana they are smooth cayenne and sugar loaf. Smooth cayenne is the variety that is widely exported, Sugar loaf has a shorter shelf life and is more easily bruised hence is not typically exported. A few large-scale farms are producing Queen Victoria and Maja Gold.

For the year 2000, Ghana had 6% share of the pineapple market in EU. The main suppliers of pineapples to the EU in 2000 were Cote d'Ivoire (29%), Costa Rica (24%), France (16%), Belgium (9%).

Costa Rica is Ghana's main competitor because she targets the same markets that Ghana supplies to. She has tremendous competitive advantage because her industry is made up of few large firms (Dole and Del Monte) who have vast experience in the production and export of fresh fruits. Export volumes are large and quality control programs are well developed and fruit attract a higher price than Ghana's produce.

Although Cote d'Ivoire exports the same variety as Ghana, the exports are not to the same countries. She sends her produce mostly to France and Belgium. Whilst Ghana and Cote d'Ivoire are involved in the production of smooth cayenne, Costa Rica produces MD2 which is increasingly becoming the preferred consumer choice (Table). Ghana will have to reexamine its strategy on pineapples and diversify to include the production of MD2.

Table 5.1 : Competitive analysis of main pineapple exporters to the EU

	Cote d'Ivoire	Costa Rica	Ghana
Market shares	29%	24%	6%
Products and packaging	Smooth Cayenne	MD-2	Smooth Cayenne
Destination	France, Netherlands, Spain	Belgium, Germany, UK, Switzerland, Italy, Spain	Belgium, Netherlands, Switzerland, Germany

The fresh fruit sector had two distinct groups of participants. These are identified as large-scale farmers and small-scale farmers and they produce 70% and 30% respectively of the total export volume. 67 firms form the total export market. The top six firms produce about 70% of the total market and the break down of their export sums and volumes is given in Table 4.2

Table 5.2 Export volumes and sums of fresh pineapples for 2001

Farm	Quantity (Tonnes)	Value (\$)	Percentage
Jej River Farms	5995.790	2,347,536.00	18
Farmapine Gh Ltd	5865.800	2,236,907.71	17
Milani Export-Import	3576.160	1,382,608.11	10
Koranco Farms	3863.270	1,366,824.49	10
Prudent Export and Import	3002.510	1,071,191.83	8
Georgefields Farms	2516.730	1,002,250.55	8
Small and Medium Scale Farms (60 farms)	10354.000	3,909,140.79	29
Total Industry Output	35173.900	13,316,459.48	100

Source: Ghana Export Promotion Council Data

It is important to note that 30% of Ghana's pineapple production comes from a large number of small-scale farms with poor infrastructure, low technical knowledge in pineapple production, poor human resource bases and low quality standards. Improving volume and quality and strengthening the management of these firms is a great opportunity for expansion in the industry. This study is however focused on the large-scale farms.

Pineapple exporters in Ghana belong to either or both of two exporter associations namely Horticultural Association of Ghana (HAG) and Sea-Freight Pineapple Exporters of Ghana (SPEG). SPEG is the strongest pineapple association and Sea-Freight pineapples continue to grow in volume. SPEG members account for 50% of all pineapple exports.

SWOT analysis (Table 4.3) was done on the commodities selected for the marketing plans. In general there were strong similarities for fruit (pineapple, mango and papaya) and vegetable sectors. The reports made suggestions on action points and proposed activities. Those for pineapples and vegetables are summarized below.

Table 5.3 SWOT Analysis for fruits, vegetables and shea butter

Commodity	Strengths	Weaknesses	Opportunities	Threats
Pineapple Mango and Papaya Vegetables	<ul style="list-style-type: none"> • Favourable climate • Geographical position and low freight charges • Low labour costs • Qualified human resources • Stable political and social system • Availability of Technical Assistance - Increased interest of financial institutions to assist • 	<ul style="list-style-type: none"> • Irregular supply and low volumes • Absence of EUREGAP certification • Low quality produce • High cost and difficulty in obtaining packaging • Poorly organized industry • Lack of unified marketing strategy • Lack of cold chain facilities • Low yield per hectare • Poor communications to and from farm. • Poor land tenure system • Poor organization of industry, no mouthpiece • Inexperience in commercial farming 	<ul style="list-style-type: none"> • Instability in Cote d'Ivoire • Large number of small and medium sized farms • Available sea freight capacity • Increased link of health and nutrition with consumption of fruits - Increased demand for organics - Options for value-addition - Increased association with health and nutrition • Liberalized EU policy on developing country exports 	<ul style="list-style-type: none"> • Introduction of Maya Gold (MD2 variety) - increased food safety and quality issues - poor packaging and transportation • inadequate storage and cool chain facilities
Sheabutter	<ul style="list-style-type: none"> - Available labour force - Abundance of shea trees - Favourable climate - Increased output - Access to sea port - Entrepreneurial spirit 	<ul style="list-style-type: none"> - Poor implementation of research results - Long gestation period of shea butter tree - Poor infrastructure - Labour intensive processing method 	<ul style="list-style-type: none"> - Increase world demand - EU resolution to allow the use of shea butter as cocoa butter equivalent - Availability of technical assistance 	<ul style="list-style-type: none"> - frequent bush fires - overharvesting and felling of trees - displacement of women by men as industry grows - Industry dominated by older women

Proposals for strengthening the pineapple sector

1. The main engine for growth in the industry should be a stronger more market-oriented organization with structures in place to check quality and provide assistance to its members. In the short term existing HAG and SPEG should be strengthened so that they perform their functions efficiently. Divisions amongst farmers on the strategy to use to secure a more frequent reefer service and ensure increases in volume to fill this new service should be addressed. The differences between the various farmers and SPEG about the Tema Fruit Terminal (TFT) in particular must be resolved.
- Before any meaningful organization can be done, there must be rebuilding of trust amongst all stakeholders; farmers, members of the partnership, HAG and SPEG executives and the management of the TFT. Issues of conflict must be raised and discussed especially issues concerning the fruit terminal and an attempt must be made to resolve all the misunderstandings or to collectively agree to close the chapter on them and make a new attempt to move forward. The Partnership should continue to dialogue with all parties and act as catalyst for change.
 - Problems identified include lack of a cold chain and poor shipping arrangements leading to reduction in shelf life and lower market value. The problem of pre cooling of produce and port cooling facilities can be resolved if the TFT project can be implemented. The partnership must ensure that this project is functional within the next two years
 - Consumer analysis to find out the perceptions of consumers in the EU about Ghana's Pineapples and also perceptions about other varieties.
 - Some farms are EUREPGAP certified and have good quality assurance programs. However many farms especially the small and medium scale players do not have quality control programs. There must be sharing of knowledge between farms who have excellent programs and other farms. It is important for the partnership to draw up program of action to assist farms to obtain certification. This program should have strategies for the various groups of farms and must state clear deadlines for the certification of the various groups of farms.
 - Packaging infrastructure to support the sector is weak. Work in this area will be of help to the industry. Assessment of current package designs and materials with associated training on package design and optimal use of materials should be organized for the packaging industry in Ghana..
 - Developing of website for marketing of Ghana's pineapple with information on, product profiles, farm profiles and other relevant information. The website should be developed by the partnership and should be updated regularly. There should be hyperlinks to it from other trade sites so that buyers in the EU will be able to find it easily.

5.1.1.2. The Vegetable Sector

The main vegetable exporters from Ghana are Tacks farms, Sweat farms, Vitanova farms, Indgha Agro farms and Villawoe farms. There are however out-growers who supply about 35% of total output from Ghana. There are many small volume exporters (>100) whose activities are characterized by poor quality produce, packaging and unreliable supply.

In all the exporters are over a hundred. Indgha Agro farms alone contribute about 25% of Ghana's total export, with 60% of their supplies coming from their own farms and 40% from out-growers.

The main concentration of vegetable farms are in Ablekuma, Weija and Tuba in the Greater Accra region, Kpong Irrigation project, Adeiso, Nsawam and Kwamoso in the Eastern region, Swedru in the Central region and Denu and Anloga in the Volta region.

Vegetables production and export from Ghana is now a major non-traditional export with a FOB value of €2.8million in year 2000. Major vegetables exported include the local vegetables (chillies aubergines and okra), and the Asian vegetables (tinda, marrow and guar).

Chillies are the most popular on the export market with supplies rising from 2,088MT (valued at €0.879 million) in 1998 to 2,819MT (valued at \$1.26 million) in 2000, an increase of 25.9% in volume and 30.2% in value.

Trends in the EU markets points to growing opportunities for exported and processed vegetables. Ghana has less than 1% of the market share and there is room for growth in this sector.

Proposals for strengthening the vegetable sector

For this sector to overcome its problems and penetrate the EU market, there is the need for proper organisation of the industry. The various associations under this sector, VEPEAG and HAG must be revived and made to play their roles efficiently. They should come together to see to the price fluctuation and also speak with one voice so they could be taken seriously. The associations should establish long-term contracts and vertical integration and downstream activities between members and their buyers.

Research must be undertaken to understand consumer perceptions on Ghana's vegetables in relation to vegetables from other countries and corrective measures put in place to increase market share. Other activities to support to boost production and export of vegetables include:

- Develop more varieties of the chillies, which is Ghana's most exported vegetable.

- Add value to the vegetables by processing them into other forms, chillies being processed in powdered form, okra cut and bagged for export.
- Draw an over all expansion plan for the sector. Partners to assist the various farms to draw up individual expansion plans
- All existing research and reports done on this sector of the industry must be compiled into one volume for easy reference by any investors and other stakeholders.
- Draw up a training program for EUREPGAP specification.
- More emphasis must be placed on the production techniques to help boost production. Extension officers must be engaged in the training of farmers especially the small-scale farms to educate them on how efficiently they should handle their techniques of production, improve quality standards and increase output.
- Engage the use of extension officers to train the farmers on proper treatment and handling of vegetables, pest and disease control.
- Address the inadequate supply and quality of raw materials used for packaging.
- The sector should put in place a plan to develop each product under one brand name to make the products well known on the EU market.
- Various logistics like communication, transport, cooling facilities at exit point since are needed in the production, post harvest handling and distribution.
- Improve on conditions at pack houses.

5.1.2. Positioning Ghana's pineapple in the European market.

One of the objectives of the MSU Ghana Private-Public Partnership Food Industry Development Program (GHPPP) was to promote the export and sale of Ghanaian fruits and vegetables. Pineapple production and export form the bulk of Ghana's fruit trade on the international market. The main variety of pineapple traded is smooth cayenne. Small quantities of Queen Victoria and sugar loaf are exported. Even though only a small fraction of the sugar loaf is traded on the international market, there appears to be some preference of some consumers for this variety.

With the introduction of MD2 pineapple variety into Ghana's agriculture and its possible effects on the production of smooth cayenne and sugar loaf, GHPPP was interested to provide data on consumer's preferences for pineapples from Ghana. The information was to allow the industry to map an effective strategy for increasing market share in the EU countries and beyond.

GHPPP posed the following research questions:

- ✓ Which variety of fresh pineapple is preferred by consumers in selected European countries (The Netherlands, United Kingdom, France, Italy, Sweden, Switzerland, Germany and Spain).
- ✓ To what extent are consumers willing to pay more for pineapples that are grown and/or traded 'fair'? (The Netherlands and United Kingdom only)

The work was a collaboration between Michigan State University. Partnerships for Food Industry Development (F&V). MSU-PFID, the Ghana Private-Public Partnership Food Industry Development Program and Agrotechnology and Food Innovations BV of the Netherlands

The study involved 405 Consumers in eight countries (ca. 50/country). The inclusion criteria was that the panelist must consume fresh pineapple at least 2 –3 times / year. Three pineapple varieties from Ghana, MD2, Smooth Cayenne and Sugar Loaf (Netherlands and United Kingdom only) were tested.

Consumers conducted three different tasks:

- Preference test for the different pineapple varieties.
- Ranking procedure with 3 varieties (Netherlands & UK)
- Pairwise comparison (other countries)
- Evaluation of liking and sensory attributes per variety
- Semi-monadic testing
- Liking measured on nine point scale
 - An evaluation of outer appearance of the whole fruit (attractiveness on a 9-point scale)

5.1.2.1. Summary on Preference Ranking⁵

- In the 6 countries where two varieties were tested the MD2 and smooth cayenne were equally preferred
- In the Netherlands MD2 was most preferred
- In the UK the consumers preference for all three varieties were equal
- The Swedish consumers appeared to have a preference for smooth cayenne (p=0.09)

⁵ Report on preferences of European consumers for Ghanaian pineapples.

Table 5.4.

Preference ranking

Mean preference ranking per variety

Country	MD2	Smooth Cayenne	Sugar Loaf	Signi ficance
Sweden ¹	1.62	1.38		Ns
Germany ¹	1.57	1.43		Ns
France ¹	1.58	1.42		Ns
Switzerland ¹	1.49	1.51		Ns
Italy ¹	1.54	1.46		Ns
Spain ¹	1.48	1.52		Ns
UK ²	2.04	1.96	2.00	Ns
Netherlands ²	1.65	2.02	2.33	***

¹Two varieties were tested: 1=most preferred, 2=least preferred

²Three varieties were tested: 1=most preferred, 3=least preferred

*** = $p < 0.005$

5.1.2.2. Summary on degree of liking

- In Germany, France, Switzerland, Italy and Spain MD2 and smooth cayenne were equally liked.
- In Sweden Smooth cayenne was liked more than MD2
- In the UK MD2 and Smooth cayenne were liked equally.
- In the Netherlands MD2 was liked most

Table 5.5.

Liking

Mean liking score per variety

Country	MD2	Smooth Cayenne	Sugar Loaf	Signi ficance
Sweden ¹	5.36	6.50		*
Germany ¹	6.49	6.71		Ns
France ¹	5.63	4.98		Ns
Switzerland ¹	6.55	6.00		Ns
Italy ¹	4.72	4.86		Ns
Spain ¹	6.26	5.52		Ns
UK ²	5.04	5.46	3.64	***
Netherlands ²	6.15	5.20	4.83	**
Total	5.78	5.65	4.28	

¹Two varieties were tested: 1=most preferred, 2=least preferred

²Three varieties were tested: 1=most preferred, 3=least preferred

* = $p < 0.05$; ** = $p < 0.005$; *** = $p < 0.001$

5.1.2.3. Summary of Sensory Attributes

The pineapple varieties have quite a different sensory profile (Table 4.6). Compared with Smooth

Cayenne, MD2 is more yellow and uniform in appearance, is sweeter and easier to swallow. MD2 is less sour and less firm than Smooth Cayenne. There are no differences in the intensity of pineapple aroma and juiciness. Sugar Loaf is the least yellow in appearance and has the least pineapple taste. It is less firm than Smooth Cayenne. In colour uniformity, sweet, sour, juicy and ease to swallow Sugar Loaf is quite comparable to Smooth Cayenne. The outer appearance of Smooth Cayenne was liked most. Only in the United Kingdom, Smooth Cayenne and MD2 were liked equally for outer appearance.

Table 5.6

Summary of sensory attributes ratings

Sensory attribute	MD2 (n=405) ¹	Smooth Cayenne (n=405) ¹	Sugar Loaf (n=103) ²	Signi ficance
Yellow appearance	7.46 ^a	4.35 ^b	2.36 ^c	***
Uniform appearance	6.47 ^a	5.41 ^b	5.12 ^b	***
Sweet	6.11 ^a	5.15 ^b	5.27 ^b	***
Sour	3.41 ^b	5.16 ^a	4.88 ^a	***
Pineapple taste	5.58 ^a	5.74 ^a	3.97 ^b	***
Firm	5.43 ^b	6.13 ^a	5.16 ^b	***
Juicy	6.74 ^a	6.70 ^a	6.38 ^a	Ns
Ease to swallow	7.19 ^a	6.60 ^b	6.49 ^b	***

¹Based on results from eight countries

²Based on results from two countries (Netherlands and United Kingdom)

a,b,c Products with different letters differ significantly

*** = p<0.001

5.1.2.4. Implications of study

The study results suggest that the strategy to be taken by Ghana for the introduction of MD2 must be informed by what the European consumers expect.

1. MD2 and Smooth Cayenne are not significantly different in most countries, therefore other factors such as production and shipping costs should be considered when deciding on varieties to grow and export.
2. Providing the markets with both MD2 and Smooth Cayenne is also an option. More research has to be done under this strategy.
3. Sugar Loaf may have potential on some niche markets. Research to improve post-harvest characteristics and promotion of its good attributes must be undertaken.
4. Even though the decision to introduce MD2 into the Ghanaian horticultural system is a good one and provides a means for Ghana to continue to have a market share, the local varieties must also be supported for improved market access.
5. The development of new varieties that meet consumer demands should continue.

6. We should not forget the varieties, smooth cayenne and sugar loaf. Research into improving their production and post-harvest management will ensure that Ghana continues to have a good market share

5.1.3. Ghana Supply Chain Mission

Ghana Supply Chain Mission was conducted March 1- 8, 2003. Participants included members from Michigan State University, Royal Ahold, LEI in the Netherlands, Amex International, TechnoServe, CARE, and other Ghanaian collaborators, including VEPEAG, University of Ghana and farmers.

Specific objectives of the mission were as follows:

- i. Conduct extensive supply chain analysis to further improve the cost, quality, and safety of fresh/processed fruits and vegetables for final consumers.
- ii. Respond to technical assistance requests from Ghanaian partners and producers in cold chain, packaging and logistical issues. Provide formal training and technical support in food safety and food laws to companies, farms, and associations to better meet international market requirements by providing workshops to sensitize the industry on the importance of international food laws.
- iii. Develop benchmark analysis and farmer classification tools to make a country comparison with Costa Rica and others nations producing and marketing like products.

5.1.3.1. Key accomplishments and impact

There were several findings and recommendations from the Mission some of which were:

1. Important insights were gained into the Ghanaian horticultural situation, especially the pineapple industry and vegetables.
2. There are relatively inexpensive steps growers/shippers can take to cool fruit, recognizing that science demonstrates that cooling practices at any and all steps in the supply chain are beneficial. Post harvest suggestions include: Harvest early in the day; provide shade at every opportunity; provide protection from the elements in unloading areas at shipping terminals; and cool produce prior to loading on transports.
3. Shipping containers are in need of improvement in order to achieve lower packaging cost, improved product
4. protection and more effective merchandising appeal when displayed in stores. There are important benefits that may accrue to the creation of a packaging school or institute to assist the industry in advancing the state of packaging of

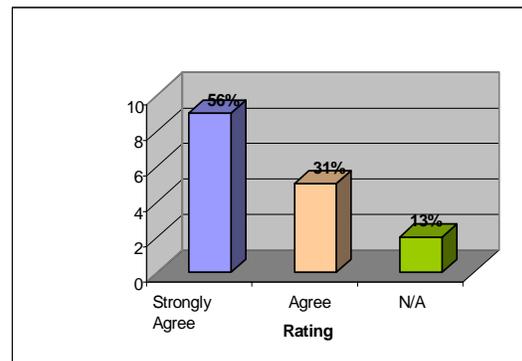
shipping containers as well as consumer packages, especially for cut fruit operations, where extended shelf life would provide the profitable expansion of markets. Such a packaging institute could be established by a coalition of the University of Ghana, Michigan State University's School of Packaging and packaging companies in Europe and the US.

5. That the Ghanaian horticultural industry was fragmented.

5.1.3.2. Impact

Figure 5.1: Rating of Supply Chain Workshops

During the Midterm evaluation, horticultural industry leaders were asked to rate the impact of the workshops that have been held on the supply chain management. As illustrated in Figure 4.1 over 86% of the respondents strongly agreed or agreed that the workshops were very beneficial in increasing their awareness of the importance of supply chain management.



5.1.4. **Assess the status of horticulture in ‘Northern regions’ and determine the export opportunities.**

Until recent times several programs aimed at the promotion of production and export of fresh and processed horticultural products have been and continue to be implemented in the southern and middle parts of the country. Very little effort has been expended to extend these facilities to the northern sector of the country namely; the Ashanti, Brong Ahafo, Northern, Upper East and Upper West regions for the development of fruits and vegetables that have export or export substitution potential and for which the regions offer a comparative advantage in terms of product quantity, quality and other key indicators.

There are, however, several reasons that make it compelling for the agricultural export development assistance to be targeted at the northern regions. These regions are the only ones that do not enjoy the same ‘blessings’ that are available to the southern regions that produce pineapples, papaya and several other crops that have brought some opportunities and wealth to their people. The three northern regions, for example, are the very poor compared to most of the other seven regions of the country and export development of horticultural products have not attracted much attention due to the poor road and other infrastructure and the long distance from the ports. Traditionally, horticultural export development has been promoted in areas that are in close proximity to the ports, where

the roads are travelable and the level of investment in infrastructure meets the required minimum for doing profitable export-driven business.

OIC International (OICI) was contracted by the MSU-PFID project in March 2004 to implement a part of the USAID-funded horticultural crops development and promotion program in the Northern Regions of Ghana. The program was intended to complement and build on the successes of the current work of the Ghana Private-Public partnership Food Industry Development Program (GHPPP) in the southern regions of Ghana by expanding the coverage area of the partnership to the northern sectors of Ghana where not much work has been done to tap into the specific horticultural development opportunities that exist in those areas.

OICI implemented the program with the aim of improving the performance of operators in the small and medium scale horticultural sector in the Northern sector (Brong Ahafo, Ashanti, Northern, Upper East and Upper West regions) and promote their export potential through group identification, organization and training. The goal of the project was to improve the performance of operators in the small and medium scale horticultural sector in the Northern sector (Brong Ahafo, Ashanti, Northern, Upper East and Upper West regions) and promote their export potential through group identification, organization and training

The goal of the program was achieved through the implementation of various sequential activities including the following:

- ✓ Horticultural products sub-sector studies (including detailed SWOT analyses) to demonstrate existing and potential opportunities that could be promoted.
- ✓ Identification, organization and cooperative development of participants in each of the selected sub-sectors and creation of linkages with existing exporters.
- ✓ Provision of technical training, including, production, harvesting and post-harvest handling techniques of participants operating at various levels of the export chain.

Prior to the Baseline surveys and sub-sector studies, OICI developed a list of the potential products and selection criteria that would allow decisions to be made in a non-prejudicial manner. A decision analysis technique developed by Dr. John Azu, OICI, was employed for evaluating the multiple crops. The information generated was used to rank the crops and select the top 5 crops (Mango, Cashew, Tomato, Pepper and Onion) that best met the goals and objectives of the PFID project.

Baseline surveys and sub-sector studies on Mango, Cashew, Tomato, Pepper and Onion were conducted in 63 communities in 17 districts to gain an in-depth knowledge of horticultural crop sub-sector in the northern sector of Ghana. The baseline surveys and sub-sector studies were intended to assist GHPPP design appropriate programs to increase the export potential and incomes of small and medium-scale producers through the establishment of sustainable horticultural production and export businesses in the northern sector of Ghana.

Objective 1 was to provide detailed SWOT analyses of 5 selected exportable fruit and vegetables from the Northern sectors through sub-sector studies.

Accomplishment:

In order to start a ground-breaking promotion effort in new areas of the country there was an urgent need to examine and understand the current status of horticulture in the regions identified, what is grown, current production levels, who the key participants are, the current and future marketing options that include a detailed SWOT analysis of the industry. The range of technical, institutional and other measures that can counter the incentive, risk, transaction cost and logistical problems raised by the intrinsic and economic properties of food commodities must be understood. Many of these counter measures are essentially market or quasi-market responses on the part of private firms and individuals, others entail government interventions that stimulate, redirect, constrain or supplement private activity.

The second objective was to increase the productivity of producers of selected high-value non-traditional horticultural products. This was expected to lead to the identification of associations of producers/exporters and trained for successful linkage to the export chain. A team of experts from OICI held a number of farmer organization, sensitization and technical training programs in all the five regions (Ashanti, Brong Ahafo, Northern, Upper East and Upper West) in order to develop the producer groups of the five selected horticultural crops into formidable cooperatives. A total number of 925 producers were registered to participate in the cooperative development training.



Figure 5.2 Organization and training cooperative development

Accomplishment:

The future does not bode well for an export-oriented industry that is largely dependent on the production and output from poorly trained and ill-equipped and risk-averse cadre of outgrowers who produce for established and profitable exporters. This situation underscores the necessity for organizing them into production alliances or cooperatives to

allow for the rationalization of training in both group dynamics and management as well as in the technical details of their daily production and management activities to raise the level of quality production.

OICI organized producers of selected products into production cooperatives. The producers were registered to participate in the cooperatives/associations. A total number of 925 producers were registered. Out of the total number of producers that were registered for the program 75.35% were males and 24.65% were females. Furthermore, the groups were trained in the concepts of cooperative business and management so as to increase the level of their business performance.

OICI organized bridge-building workshops/conferences to improve linkages

Accomplishment:

As part of the overall effort to link growers and exporters of the southern and northern sectors, two bridge-building workshops were held in Accra and Tamale to provide the platform for experience sharing, networking and the establishment of business relationship among producers of the selected horticultural crops (Pepper, Tomato, Onion, Mango and Cashew) and to facilitate the development of the business of the various participants. A total number of 36 and 38 participants attended the Accra and Tamale workshops respectively.

The topics treated at the two workshops include the following:

- ◆ Networking and Establishment of Business Relationships
- ◆ Cooperative Business
- ◆ Transforming the Process of Marketing Horticultural Crops
- ◆ Integrated Crop Management Practices: Production of Mangoes and Chillies as Models for the Export Oriented Horticultural Industry
- ◆ Cooperative Principles and Practices
- ◆ Transforming the Process of Logistics Management in the Horticultural Industry

OICI was tasked to develop the skills and capabilities of participants in the horticultural supply chain through training

Accomplishment:

OICI dealt explicitly with the provision of skills training in production planning, production agronomy, production management, post-harvest handling and packing of participants. The provision of training at the enterprise level was expected to increase productivity and improve supply chain quality and market servicing and also to lower the cost of production through adaptation and adoption of improved technologies.

OICI provided locally-tested, field-level training of selected production, post-harvest handling staff of the selected cooperatives (small and medium-scale operators in the horticultural sector), a total 717, in order to sharpen their skills in handling commodity constraints at each operational stage of production. The training provided producers with the basic know-how that will enable them to satisfy the quality, quantity and market servicing needs of the export market

To consolidate the gains of this foundation program, there is the need to develop short and long term sustainability activities that could provide a competitive advantage and also provide an opportunity for the people in the northern sector of Ghana to participate efficiently and profitably in the development of export production of horticultural produce.

5.1.4.1. Summaries of the findings for each of the horticultural crops studied

5.1.4.1.1. *Cashew*

World demand for cashews is estimated at just over 1,200,000 MT valued at \$600 million based on traded raw cashews on the international market. The rest is mostly consumed in the countries where they are produced. Traded cashews convert to some 250,000 MT of cashew kernels valued at \$1.2 billion.

West Africa is slowly becoming an important supplier of good quality raw cashew nuts producing about 30% of the world's traded raw cashew nuts. Together, the West African states produce about 220,000 MT of raw nuts annually. The major players in the sub-region are Guinea Bissau (80,000MT), la Cote d'Ivoire (60,000MT), Nigeria (30,000), Benin (30,000MT) and Ghana (6,400MT).

Currently, over 15,000 small scale farmers have an estimated 18,000 acres of mature trees that supply some 3,500 MT of raw nuts for exports and another 20,000 acres that have immature trees or over-aged plants that do not fruit. The Ghana Cashew Development Project which was initiated by MOFA in July 2002 has to date assisted 1,485 groups and cooperatives to cultivate over 6,100 acres (2,469 Ha) of high yielding cashews. Over ₵5.1 billion have already been given out as credit to rural farmers. The project has so far disbursed only 15% of the total budget of \$15.54 million.

The first export of cashew nuts from Ghana was done in 1991 when 15MT of raw nuts were exported by Cashpro Ltd. The total production was estimated at 75MT. Since then production and exports have grown steadily to about 6,400MT in 2003. About 6,400 MT of nuts were exported at \$410/MT in 2003.

Virtually all of Ghana's cashew production (over 96%) is exported as raw nuts to India. About 8 major exporters in Ghana are responsible for over 90% of all raw nuts exports. Only 2% (120 MT) of the total production of 6,338 MT is processed. The benefits of value addition therefore evade Ghanaian farmers.

In terms of processed nuts, Ghana's volumes are currently not sufficient to meet minimum requirements of about 1 container (18 MT) per month. The relatively low volumes processed (about 120MT of raw nuts converts to 24MT of kernels) are all consumed locally.

It takes 3 years from planting of cashew seedlings to the first fruits and within the period the investment cost will reach ₵2.7 million per acre cultivated. Since the activities, especially for small-scale farmers are labour-intensive, actual cost may differ depending on the cost of labour in a selected area. The major cost incurred in cashew production is weed control, which accounts for 51% of the total costs. The venture breaks even by the 5th year if it is established as pure cashew stand without intercropping. The project viability increases with the introduction of other short-gestation staples or vegetables. By the 7th year the one-acre farm will generate a profit of ₵1.2 million and profitability increase to over ₵2.9 million per year by the 10th year. Return on investment is calculated at 57% over the 10-year period.

In Ghana, cashews survive in most areas except the forest and high rainfall areas. Therefore the savanna areas in the northern fringes of Ashanti and Brong Ahafo regions and the whole northern and Upper East and Upper West regions are generally suitable for cashew cultivation. In fact, cashew and mangoes belong to the same plant family and therefore the two can be cultivated in the same zones.

There are two processing plants that are gearing up to produce for export as from 2005. Each of these plants will be processing over 500 MT each and will scale up to over 1,000 MT of raw nuts in the next few years.

Three forms of land ownership systems can be identified. These are communal ownership, private/individual ownership and state ownership. Usage rights can be obtained through purchase, long-term lease arrangements or sharecropping agreements.

Large tracts of land (500 acres and more) are easily obtainable in the Northern and Upper West Regions and in the northern parts of the Brong Ahafo region and the Afram Plains of Ashanti region.

About 55.9 percent of the total population in the five regions falls within the potential labour force. Farm labour is generally available provided a farmer has the means to pay. The daily labour rate in Ashanti and Brong Ahafo ranges between ₵12,000 and ₵15,000 while in the three northern regions it ranges between ₵10,000 and ₵12,000.

Several institution and regulatory bodies control as well as support activities in the cashew industry. The prominent ones are Ghana Export Promotion Council (GEPC), Ministry of Food and Agriculture (MOFA), Ghana Standards Board, Customs Excise and Preventive Services (CEPS), Ghana Federation of Associations of Ghanaian Exporters (FAGE), Horticulturists Association of Ghana, TechnoServe, ADRA and Amex.

The area has fairly good roads which are motorable most parts of the year. The feeder roads in the main cashew producing areas are in good conditions and linked to the trunk roads, accessibility is easy.

Interest rates are still high (between 25% and 32%) in Ghana as compared to most countries in the West African sub-region despite the efforts by government to reduce

inflation. This makes borrowing for agriculture very unprofitable especially if the money is secured for the cultivation of tree crops such as cashews with long gestation period. Credit is a major constraint in the development of agriculture in Ghana. Many small to medium size enterprises (SMEs) in the agricultural sector are faced with difficulties when accessing credit from the financial institutions. The problems SMEs encounter include demand of collateral by banks to secure the loan request and high interest rates. The northern sector of Ghana provides ideal soil and climatic conditions for the production of high quality cashews. The area receives adequate rainfall, lots of sunshine and a marked dry season and these conditions enhance the fruiting of cashews. The Ghana Cashew Development Project is well funded to give technical, financial and marketing assistance to rural farmers' groups. Out of the credit budget of \$5.6 million the project has only disbursed \$802,000. A balance of \$4.8 million is still available to cashew farmers and processors.

Many opportunities are available in the cashew subsector especially in value addition. The challenge usually lies in aggregating farmers and/or entrepreneurs to work together to exploit the advantages of critical mass. The establishment of the Ghana Cashew Development Project should be a catalyst to expand and streamline cashew production, processing and marketing in Ghana. Here are some of the opportunities.

The numerous groups (1,485) set up by GCDP offer the opportunity for any NGO to adopt and nurture some of them as MOFA does not have the capacity to sufficiently handle these clusters. Such collaboration will add tremendous value to the initiative taken by Government. Farmers umbrella associations should be encouraged to create critical mass required for cost-efficient processing and significant market presence.

Total quality assurance should be the key to creating healthy, sustainable markets on both the local and international markets. Training and assistance should therefore cover the entire production/supply/marketing chain. All stakeholders from research through to retailers and exporter should be part of a total quality assurance training.

Seed and seedlings should be standardized and certified to improve the stock of cashew trees in Ghana. Seed farmers, seed dealers and nursery operators need to be trained and empowered to manage this vital link in the cashew sub-sector.

5.1.4.1.2. Mango

Mango production as a commercial venture started some 4-5 years ago in the northern sector of Ghana. The varieties under cultivation are Jaffna, Keith, Kent Amelie, Zill, Haden, Julie, Palmer, and Irwin. However, the local mango variety is a common tree found around most towns and villages. It also grows in the wild and is not cultivated. An estimated total acreage of 1,389 (562 hectares) of mango has been put under cultivation in the northern sector, of which some 297 acres are yielding 2,027 tons.

Marketing of mango in the northern sector is currently controlled by traders who buy the fruits in bulk, package in wooden crates and sell in the main marketing centers such as

Kumasi, Ejura, Wenchi, Techiman, Tamale during the harvesting season. There is no export company operating from the northern sector since there is no significant production and the few farms which are bearing are scattered and it does not make economic sense to move resources around to source a few tons of fruits. However, the West Africa Fair Fruits (WAFF) use refrigerated trucks to transport mangoes from Burkina Faso to the Tema Port an indication that if the right volumes are attained logistics could be mobilize for export of fruits from the north.

Integrated Tamale Fruit Company Ltd. (ITFC) was identified as the only large-scale producer operating an outgrower scheme. The Company operates an organic outgrower program involving 200 registered farmers in communities such as Diare, Dipale, Dinga, Tigla, Tunayilli, Sogo-Tampia, Gushie, Nabogu, Gbanga and Nakpanzo in Savelugu Nanton district of the Northern region. Members of the ITFC outgrower scheme have been assisted to form an association known as Organic Mango Outgrowers Association (OMOA). In the Kintampo district, mango farmers have just started organizing themselves into a cooperative. The study did not identify any other organized farmers cooperatives or associations involved in mango production in the northern sector apart from these two groups.

In the Ashanti and Brong Ahafo regions, the total investment required to establish an acre of mango farm during the first five years is estimated at ₵11.7 million. An acre of mango farm is estimated to produce 7.28 tons of fresh fruits and generate revenue of ₵16.38 million in the fourth and fifth year. Mango farmers on the average make an annual profit of ₵4.64 million per acre and the return on investment is 40%. The farm is estimated to generate annual revenue of ₵25 million after the eighth year. However, in the three northern regions, ₵9.4 million is required to establish an acre of mango farm. An acre of mango farm is estimated to produce 6.7 tons of fresh fruits and generate revenue of ₵15.12 million in the fourth and fifth years. It is estimated that mango farmers will make a profit of ₵5.66 million per acre and a return on investment of 40%. The farm is estimated to generate annual revenue of ₵22.5 million after the eighth year.

The driving forces of the mango sub-sector in northern Ghana include the following:

- Good soil and climatic conditions prevailing in the northern sector. The soils have sufficient nutrients to support tree crops such as mango and the rainfall amounts are adequate to ensure plant growth, flower induction and fruit set. The area is less prone to the usual diseases, which affect fruit quality in the south and provides ideal conditions for large-scale cultivation of mangoes.
- The prevailing land tenure system in the northern sector. Large tracts of land (500 acres and more) are easily obtainable in the Northern and Upper West Regions and also in the northern parts of the Brong Ahafo region and the Afram Plains of Ashanti region. The acquisition process is not as cumbersome as pertains in the south where an investor will necessarily have to deal with multiple owners to access a contiguous land for plantation establishment. This has influenced the drift to the northern sector for the establishment of new mango plantations.

- ◆ Relatively cheap and available labour. The Brong Ahafo and Ashanti regions experience migration of labour from the north during the cropping season. In the three northern regions, labour is generally available. The common practice in the three northern regions is the “nnoboa system” where a group of people agree to provide labour to undertake farming activities on members’ farm on rotational basis. There is no cash payment. The daily labour rate in the five regions ranges between ¢12,000 and ¢15,000. This compares favourably with the average daily labour rate of ¢15,000 in southern Ghana.
- **Increasing demand for mango in the EU Market. The EU market for mangoes experienced an average growth rate of 40% for the last five years and this growth is expected to increase. The growth is mainly due to the fact that mangoes have now become an everyday fruit in most European countries and have lost their exotic tag. This has fuelled local demand for high quality mangoes by exporters.**

The major constraints identified during the study are:

- ❖ Lack of certification of mango seedling producers. Currently, nursery operators in the northern sector, like their counterparts in the south, are not regulated and there are no established standards to regulate their operations;
- ❖ Bush fire, a common occurrence during the dry season in the northern sector especially in the Northern region, pose a major threat to the development of the mango industry in the northern sector;
- ◆ Poor agronomic practices with respect to field practices including pest and disease control, fertilization and pruning methods and post-harvest management by small-scale producers;
- ◆ Mango production in the northern sector is mainly rain-fed and only one large-scale producer has irrigation facilities. Lack of irrigation is a key constraint to producers to maximize yield especially since the fruiting period coincides with the dry season;
- Limited research in mango production to address production challenges to help improve productivity especially increased yields per acre;
- ❖ Lack of pack-houses with cool storage facilities and associated cool vans/trucks for the transportation of produce from the northern sector to the port.

Several opportunities were identified for the growth of the mango sub-sector in the northern sector. These are:

- ❖ Pests and diseases such as anthracnose and mango stone weevil are less prone in areas above Kintampo in the Brong Ahafo region. Hence the area provides ideal environment for promotion of organic mangoes for export;

- ❖ Availability of large tracts of land in the Northern region, the northern parts of the Brong Ahafo region and the Afram Plains of Ashanti region for plantation development. The cost of land is comparatively lower and the acquisition process is less cumbersome;
- ❖ Organization of existing small-scale farmers into out grower schemes by large-scale farmers will ensure transfer of technology leading to production of quality produce;
- ❑ Introduction of processing technologies for the production of juice, concentrates and fresh pre-cuts or ready-to-eat products;

There are many areas in the sub-sector that activities of the GHPPP/PFID could be focused to enhance the role of various participants especially the small-scale producers along the value chain. Interventions in the sub-sector could be focused in the following areas:

- Training of small-scale producers in improved production techniques including EUREPGAP to increase farm productivity and reduce cost of production. Most of the producers have not received any training in modern agronomic practices.
- Strengthening of product cooperatives or association. This includes the organization of small-scale producers into cooperatives to constitute production and marketing units for channeling technical assistance, market linkage and training in management and organization to strengthen their capacities.
- Standardization of the operations of nursery operators producing mango seedlings for sale through certification.
- Introduction of quality assurance as an integral part of the production/marketing chain. All players such as farmers, exporters, workers and transporters must be trained to comply with standards set for the industry.
- Assistance to research institutions such as Crop Research Institute and Savannah Agricultural Research Institute to focus research efforts in areas such as appropriate irrigation methods, fertilization regimes, appropriate pruning methods, control of various pests and diseases.
- Establishment of pack-houses with cold storage and associated transport facilities to deliver top quality produce to the market.
- Introduction of small-scale value added processing to address post-harvest losses due to the perishability of mangoes.

5.1.4.1.3. *Pepper*

Pepper is produced in every part of the country and is one of the most important vegetables grown in Ghana in terms of production areas, consumption and income generation. Ghanaians are noted for consuming large amounts of pepper per meal per head. Peppers of the variety *Capsicum annum* or the cayenne type grow well on a wide range of soils in the transitional and savanna zones, provided drainage is

good. The varieties under cultivation in the northern sector are the MI 2, Legon 18, Slim Cayenne, Jubilee, Passion, Bird's Eye and Local Hot. The crop is normally grown with other crops as part of a mixed cropping system or as a sole crop. An estimated total acreage of 13,573 (5,429 hectares) of pepper is under cultivation in the northern sector with an annual output of 38,182 MT.

In the northern sector, pepper is grown under rain-fed conditions but in certain parts of Northern and Upper East regions, especially in communities with dams, production is supplemented by irrigation. The savanna areas found in parts of Ashanti and Brong Ahafo regions and most parts of the three northern regions enjoy competitive advantage in the production of dry pepper because of the low humidity which pertains during the harvesting season.

Marketing of pepper is through one of the following channels, namely -- village markets, rural town markets, roadside markets, and large urban markets. Market forces and the time of the year determine prices of fresh and dry pepper on the local market. Over the last three years, the prices of dry pepper have witnessed an average annual increase of 32% in most markets in the northern sector during the lean season. There is no company exporting fresh pepper from the northern sector because of the logistics constraints.

In the Ashanti and Brong Ahafo regions, the total production cost for an acre of pepper farm is estimated at ₵2.9 million. An acre of pepper farm is estimated to produce 3.6 tons of fresh pepper and generate revenue of ₵5.4 million. Pepper farmers on the average make a profit of ₵2.5 million per acre and a return on investment is 84%. However, in irrigation sites in the Upper East region, ₵3.0 million is required to establish an acre of pepper farm. An acre of pepper farm is estimated to produce 4 tons of fresh pepper and generate revenue of ₵6 million. Pepper farmers on the average make a profit of ₵2.98 million per acre and a return on investment of 99%.

The major constraints identified during the study are:

- ❖ Lack of a credible seed company producing pepper seeds for farmers. Farmers obtain seeds from questionable sources. The result is that the seed is fraught with several problems such as poor viability, varietal mixtures, virus and other diseases.
- ❖ High cost of agro-chemicals such as fertilizers and pesticides resulting in high production cost.
- ❖ Poor agronomic practices with respect to field practices including pest and disease control, fertilization and post-harvest management by small-scale producers.
- ❖ Production of pepper is mainly rain-fed, but the rainfall pattern in the northern sector is erratic. Though, some farmers produce pepper around small irrigation dams, majority of pepper farmers has no access to irrigation facilities.
- Limited knowledge on the part of most vegetable farmers including pepper producers

on the safe use of agro-chemicals such as pesticides and weedicides.

- Lack of cool storage facilities and cool vans/trucks for the transport of fresh and highly perishable produce from the northern sector to the port may reduce the shelf life of produce and hence affect quality.
- Cost of compliance of EUREPGAP requirements by producers and exporters of fresh vegetables to EU. Small-scale producers are at a disadvantage in accessing the mainstream export market since cost of EUREPGAP compliant is beyond their means.

Several opportunities in the pepper subsector identified during the study include:

- ❖ The high demand for fresh green pepper, fresh red pepper or dried red pepper in the domestic market and external markets such as EU and other neighbouring countries.
- ❖ Availability of large tracts of land in the Northern and Upper West Regions and in the northern parts of the Brong Ahafo region and the Afram Plains of Ashanti region at a comparatively low cost. The acquisition process is less cumbersome.
- Availability of simply processing technologies in the production of pepper into pepper sauce (shito) and pepper powder.
- ❖ Closeness of Ghanaian ports to the EU markets compared to other competing countries. It takes only about seven hours by air to the heart of the market in the EU.
- Low freight rates, about US\$ 0.78 to US\$ 1.00 per kg compared to a range of US\$1.00 and US\$1.2 per kg in Kenya and US\$ 2.3 per kg in South Africa.

The following areas were identified as points of leverage to focus activities to enhance the role of small-scale producers in the sub-sector.

- Development of vegetable seed program to produce high quality seeds including pepper seeds to address the perennial seed problem faced by most vegetable producers.
- Targeting small-scale pepper producers for the introduction of improved production techniques including good agricultural practices to increase farm level productivity.
- Construction of small irrigation dams in strategic locations for dry season farming especially in the three northern regions to increase production output.
- Provision of central pack houses with pre-cooling facilities around high volume production areas such as irrigation dams to support export of fresh pepper and other vegetables.

- Quality assurance is an integral part of the production/marketing chain and all players such as farmers, exporters, workers and transporters must be trained to comply with standards set for the industry and must be willing to carry their share of the quality image-building responsibility.
- Organization of farmers into cooperatives to constitute production and marketing units for channeling technical assistance and also linkage to market.
- Introduction of low technology village level processing of fresh pepper to dry forms.

5.1.4.1.4. *Tomato*

Tomato is the most important vegetable grown in the country and many geographical areas are suitable for its production. Tomato grows well on a wide range of soils. Ideal soils for tomato production are deep, well-drained loamy soils, clay-loamy soils with adequate organic matter content and soils with a pH of 5.5 to 6.5. The crop requires medium amounts of rainfall ranging between 900mm to 1,200 mm uniformly distributed throughout the growing season. However, tomato grows well under irrigation and can therefore be cultivated in areas of inadequate rainfall. The varieties under cultivation in the northern sector are both the exotic and local varieties. The exotic varieties include Roma VF, Laurano, Raki, Choco TP and Petomech in the Northern, Upper East and Upper West regions. In the Ashanti and Brong Ahafo regions, noted varieties are Power Reno, Rasta, Italy Heinz and Petomech. Farmers obtain certified seed through importation or use seed saved from a previous crop. In 2003, an estimated output of 613,000 tons of tomato was produced in the five regions.

In Ghana there are two market segments in the tomato industry namely fresh tomatoes and tomato paste. The demand for tomato in Ghana is estimated at 964,782 tons. Demand for tomato paste is all-year round, with peaks at festive occasions (Easter, Christmas and Ramadan) and surges in the months when fresh tomatoes are out of season. Produce marketing is currently fragmented and carried out on individual bases resulting in farmers' inability to earn high and stable prices from buyers. The formation of cooperative groups will ensure a well coordinated business activity and this will be vital to ensure access to markets and better prices.

There is limited processing of local tomatoes. Afrique Link Ltd. has started process fresh tomatoes into paste at Wenchi after refurbishment of the former TOMACAN factory. A small tomato-processing factory has also been installed at Tuobodom in the Brong Ahafo region.

Analysis of small holder farm budgets prepared during the study suggests that tomato production is potentially profitable for small holders. Gross revenue per acre is ₵4,669,615 whilst net margin per acre is ₵2,020,040. Net margins show returns of between 131%. Unit production cost as a percentage of total production cost is as follows; Land preparation 21.89%, Nursery Operation 4.34%, cost after transplanting

18.49%, Harvesting 24.15%, Land rent 3.02%, Variable input 17.55% and tools & equipment 6.04%.

The driving forces of the tomato sub-sector in the northern Ghana include the following:

- ✚ Good soil and climatic conditions prevailing in the northern sector. The soils have sufficient nutrients to support tomato production.
- ✚ The availability of large tracts of land with flexible tenure arrangement. Large tracts of land (500 acres and more) are easily obtainable in the Northern and Upper West Regions and also in the northern parts of Brong Ahafo region and the Afram Plains of Ashanti region with less cumbersome acquisition process.
- ✚ Relatively cheap and available labour. The common practice in the three northern regions is the “nnoboa system” where a group of people agree to provide labour to undertake farming activities on each member of the group’s farm on rotational basis. The daily labour rate is averagely ₵12,000 and compares favourably with the average daily labour rate of ₵15,000 in southern Ghana.

The major constraints identified during the study are:

- ❖ Lack of a credible seed company, producing tomato seeds for farmers. Farmers obtain seeds from questionable sources. The result is that the seed is fraught with several problems such as poor viability, varietal mixtures, virus and other diseases;
- ❖ High cost of agro-chemicals such as fertilizers and pesticides resulting in high production cost;
- ❖ Poor agronomic practices with respect to field practices including pest and disease control, fertilization and post-harvest management by small-scale producers;
- Limited knowledge on the part of most tomato farmers on the safe use of agro-chemicals such as pesticides and weedicides;
- Lack of cool storage facilities and cool vans/trucks for the transport of fresh and highly perishable produce from the northern sector to the port/market may reduce the shelf life of produce and hence affect quality.

Several opportunities in the tomato sub sector identified during the study are:

- Provides employment to many rural peasant people;
- Reduces poverty among the production farmers and their families;
- Large number of water bodies for dry season tomato crop production in the northern sector of Ghana;

- Good land tenure system. The cost of land in the tomato production communities is comparatively low and acquisition process is less cumbersome;
- The soil types suited for tomato production have not been fully exploited and there is ample opportunity to increase the volume of production by some extension of the current area under cultivation;
- An opportunity exists for the processing of fresh tomato into paste in the context of import substitution. The global tomato paste processing capacity has been estimated as being some 30 per cent over capacity, which, if utilized without additional demand, would depress prices. Accordingly, any local processing facility would effectively have to compete with the prices set by a global industry.

The following areas were identified as points of leverage for MSU/PFID to focus its activities to enhance the role of small-scale producers in the sub-sector.

- Development of vegetable seed program to produce high quality seeds including tomato seeds to address the perennial seed problem faced by most farmers.
- Targeting small-scale tomato producers for the introduction of improved production techniques including good agricultural practices to increase farm level productivity.
- Construction of small irrigation dams in strategic locations for dry season farming especially in the three northern regions to increase production output.
- Provision of central pack houses around high volume production areas such as irrigation dams to improve product quality and ensure longer shelf life of fresh tomato.
- Quality assurance is an integral part of the production/marketing chain and all players such as farmers, exporters, workers and transporters must be trained to comply with standards set for the industry.
- Organization of farmers into cooperatives to constitute production and marketing units for channeling technical assistance and also linkage to market.

5.1.4.1.5. Onion

Onions are produced in at least 175 countries world-wide, however the leading producers by FAO statistics are United States, China, India, Turkey and Pakistan. These countries in 2002 exported a total of 1.35 million tons of onions. In Africa, the leading producers are Egypt, Morocco, Nigeria, Algeria, South Africa and Niger.

In Ghana, onion production is concentrated in the Upper East region mainly in the Bawku East and Bawku West districts. However, production of onions has picked up in areas such as Pwalugu in the Bolgatanga district, Veve in the Bongo district and Irrigation

Company of Upper Region (ICOUR) in Kassen-Nankana district as well as Bontanga in the Northern region. In 2003, estimated area cropped to onions was 8,102 hectares yielding an estimated output at 102,907 tons.

Ghana is a net importer of onions. Statistics from the Ministry of Trade, Industry and Presidents Special Initiatives (MOTI/PSI) and Customs, Excise and Preventive Service (CEPS) indicate that Ghana's cross-border trade in onions has increased from 33,609MT in 2001 to 60,549MT in 2003. The domestic trade in onions involves traders from Niger, Mali, Burkina Faso and Côte d'Ivoire.

Domestic market prices of onions are highly variable, averaging about ¢150,000 per 73kg bag between March and May each year which is the harvesting period. However, from May onwards, prices soar up to about ¢200,000 and ¢650,000 per bag leading to speculative trading. The price of imported onion from Niger for instance is always higher than the local onions.

The major constraints identified during the study are:

- ❖ Lack of a credible source of onion seeds and the high cost of seed. Farmers obtain seeds from questionable sources. The result is that the seed is fraught with several problems such as poor viability, pest and disease infections.
- ❖ High cost of agro-chemicals such as fertilizers and pesticides resulting in high production cost.
- ❖ Poor agronomic and husbandry practices with respect to pest and disease control, fertilization and post-harvest management by onion farmers.
- ❖ Lack of irrigation facilities to ensure all year round production of onions. Majority of onion farmers has no access to irrigation facilities.
- Limited knowledge on safe use of agro-chemicals such as pesticides and weedicides.
- ❖ Inappropriate onion storage methods used by farmers leading to high post-harvest losses.

The following areas were identified as points of leverage for appropriate interventions to enhance the role of small-scale producers in the sub sector. The proposed interventions include but not limited to:

- ❖ *Improving Production Infrastructure:* By ensuring efficient use of existing irrigation facilities and providing new facilities, Ghana can increase production level. Enhancing farmers' access to simple irrigation technologies and equipment and improving the feeder road network will go along way to boost onion production.

- ❖ *Seed Program:* Development of vegetable seed program to produce high quality seeds including onion seeds to address the annual seed problem faced by most vegetable producers.
- ❖ *Improvement of Production Technologies:* Targeting onion producers for the introduction of improved production techniques including good agricultural practices to increase farm level productivity.
- ❖ *Enhancing Access to Credit:* The weak value of the cedi in relation to the major currencies gives rise to the high cost of agricultural inputs which affects farmers' ability to afford them. Interest rates charged by the financial institutions are comparatively high. There is the need to develop innovative credit schemes for farmers and also encourage the formation of cooperatives and the strengthening of the capacity of such cooperatives to enhance their access to credit.
- ❖ *Providing post-harvest support:* Most credit schemes are short-term in nature and do not support the development of long-term infrastructure such as storage facilities. There is ample evidence that farmers in the Upper East region for instance suffer losses up to 50% of their harvest. Support in the form of developing storage infrastructure and loans for inventory credit programs (ICP) for onion storage is required to improve the benefits accruing to farmers, their families and their communities.
- ❖ *Enhancing Access to Markets and Market Information:* Farmers' lack of adequate knowledge of markets and inability to access market information serves as a weakness. Traders, mainly market women take advantage of the situation to exploit farmers. The creation of a market databank for agricultural produce including onions and a platform for dissemination of information to target beneficiaries will enhance their bargaining power.
- *Investment in Processing:* There is the need to explore opportunities for value addition. The Food Research Institute (FRI) and other stakeholders such as Nestle Ghana Limited will do well to invest in processing onions into powdered onions for the local and sub-regional markets.

5.1.5. Marketing of fruits and vegetables in Accra.

The safety and quality of fruits and vegetables on the local market in Ghana are influenced adversely not only by the method of production but also by the method of handling and marketing. As part of its goal of capacity building of entrepreneurs in the horticultural supply chain, the Ghana Private-Public Partnership Food Industry Development Program surveyed fruits and vegetable vendors in the Accra metropolis. This was to obtain basic information on the industry and about the vendors' knowledge of the appropriate food safety and hygienic issues and the proper handling practices of their produce.

One hundred and thirteen (113) vendors with the Accra – Tema metropolis were involved in the survey on marketing of fruits and vegetables. Respondents were drawn from forty-four (44) suburbs in the city of Accra. Questionnaires were used to find out the profile of their business, mode of acquisition of the produce, handling, market infrastructure, processing and adding value and their knowledge attitude beliefs practices (KABP) in fruit and vegetables.

Fruit and vegetable vending is predominantly a women business. Ninety-eight percent of the respondents were women, 64.5% were in the age group 20-39. Most of these vendors (58%) sell their produce everyday of the week. Thirty-five percent (35%) did business on Monday to Saturday.

Most of those interviewed (45.3%) had been in the business for close to 5 years. This indicates that fruit and vegetable marketing has been on the rise in the last 5 years. Only a few (3.5%) had been in it for 30years. Majority of them sold everyday of the week.



Figure 5.3 Display of fruits and vegetables in Accra (open air under shade (1) and in container (2))

The women handled multiple fruits and vegetables. Pineapple was handled by many (19%) this was followed by mango (17%), banana (17%), oranges (17%) and papaya (14%) whilst cabbage was handled by 17% of the respondents, carrots (16%), green pepper (15%), cucumber (15%), lettuce (14%) and tomato (11%). The type of produce handled was informed by consumer preference and the rate of sale. According to the women banana, oranges, onions and carrots are the commodities that have the highest rate of sale.

The Agbobloshie market in Accra is the most important source for fruits and vegetables and 50-100% of the stocks of the vendors are sourced from this market. Agbobloshie market is not ideal for fruit and vegetable marketing as it does not have the proper

infrastructure. The produce is dumped on the ground exposed to the open sun, the sanitary conditions are poor and can negatively affect the quality of produce.



Figure 5.4 Oranges dumped on ground at the market

- Grading or sorting of produce was a routine amongst some vendors before selling out to customers. This was carried out the basis of size, colour, market pricing, variety, and freshness.
- A greater number of vendors operated under trees (41.5%), on tabletops with shade (35.4%) or without shade (15%) and in open, dusty and partially cemented environments. Generally the point of sale and storage are different necessitating the movement of produce after a day's sales to storage centers in sacks, wooden cabinets etc. This contributes to bruising and spoilage.
- The quality of commodities such as pineapples, papaya, banana, green pepper, tomatoes and cucumber deteriorate after 7days according to the vendors. In order to reduce losses some vendors (7-40%) lower the prices of such commodities, some vendors throw produce of reduced quality away (30-100% of respondents depending on the commodity) or use them in preparing food.
- Washing, peeling, cutting and packaging in polyethylene bags were the major processing steps employed by some vendors at adding value to the fruits and vegetables they sold.
- The knowledge attitude beliefs practices of some of the respondents can be described as satisfactory, except that 40% did not think the exposure of their produce to dust negatively affected their the quality of their produce.
- Improving the internal marketing of fruits and vegetables should include
 - Education of fruits and vegetable farmers, transporters and marketers on proper handling and storage of produce
 - Provision of cold chain facilities and logistics by government and stakeholders

5.1.6. Harvesting method enhances the quality of sugar loaf pineapple⁶.

The Sugar Loaf variety of pineapple is popularly grown in the Central Region of Ghana. The important characteristic of this variety is its sweetness, acceptable to most Ghanaian consumers. The down side for this variety is the short shelf life and its vulnerability to tissue (flesh) deterioration after harvest. There seem to be very little research done on this variety of pineapple. To address these problems the Ghana Private-Public Partnership Food Industry Development Program (MSU-PFID) and the Department of Nutrition and Food Science of University of Ghana collaborated to study the influences of postharvest handling, cooling and storage time on the quality of pineapples in Ghana. The research done by Mrs. Felicia Adams for her Mphil degree in Food Science under the supervision of Professor Samuel Sefa-Dedeh, Program Director. Harvesting the fruit with about 6 centimeters of the peduncle attached to the fruit with slips allows the fruit to remain fresh over a three week period. The testimony from field trials by one of the supermarkets in Accra-Tema, Freshmark, is (Box 1) Further work to optimize the process and extend the technology to the farmers to improve fruit quality on the market is going on at the University of Ghana.

⁶ Newsletter Vol.2. Ghana Private Public Partnership Food Industry Development Program. 2004



Figure 5.5. Pineapple harvested with stalk and slips

Other Research results

1. Weight loss

- Fruits exposed to the sun and high temperature had higher weight loss.
- In produce marketing this can be an economic loss to the farmer/trader.
- Low temperature storage (pre-cooling?) reduces the weight loss.

2. Vitamin C content

- Exposure to sun(high temperature) caused rapid reduction of Vitamin C
- Low temperature (pre-cooling?) storage (8°C) stabilized Vitamin C content of the fruit

3. Internal browning

- When fruits were kept at low temperatures internal browning was minimized.
- Internal browning Increased at temperatures of 20°C and above

- Low ascorbic acid content may increase internal browning

IMPROVING THE STORABILITY AND SHELF LIFE OF THE SUGAR LOAF PINEAPPLE-A TRIAL CONDUCTED BY FRESHMARK FOR U\$AVE STORES.

It is common knowledge that Ghanaian pineapple consumers prefer sugar loaf pineapple to the Smooth Cayenne-the main reason being its sweetness. However, the Sugar loaf pineapple has a short shelf life and is very susceptible to mishandling compared to the Smooth Cayenne, hence making its management in a supermarket a bit problematic, especially if a backup stock has to be kept for a considerable length of time. It is in this view that I eagerly agreed to conduct a trial in the U\$ave stores for a research work carried out by Prof Sefa-Dedeh on improving the shelf life of sugar loaf pineapple.

PROCEDURE

The basic principle behind the research was that when pineapples are harvested with a stalk and slips attached; it stores longer and remains fresher as long as the slips are attached. Together with Prof Sefa-Dedeh, I went to a farmer in Mankessim in the Central Region (where Sugar loaf pineapple is widely grown). I ordered 100 pieces to be harvested for me-with the stalk and slips attached, and I bought 300 other pineapples from the roadside market (harvested without stalk and slips).

On return to Tema, I kept the trial pineapple (slips and stalk attached) at the warehouse (which has a temperature of about 30 °C) for three days because I wanted it ripen to a certain degree before sales. I then transferred it to a refrigerated container and maintained the temperature of +8 °C till I finished selling it. As a stock control measure I decided to sell the three hundred roadside pineapples first before I sold the trial ones.

RESULTS

After three weeks (the time taken to sell the road side pineapples) the trial pineapples were also sold after the slips had been removed and the stalk shortened. It was observed that the pineapples looked as fresh as the day they were harvested. So clear was the freshness that customers actually bought it in a relatively shorter time and kept on asking for more.

CONCLUSION

It has therefore been concluded from this trial that sugar loaf pineapples harvested with their slips and stalk in place can last for at least 3 weeks without any physical damage and would look very fresh when properly handled. This research will contribute immensely to helping supermarket operators like U\$ave to stock fresh pineapple in the stores at all times.

*Bernard Amponsah (Operations Manager-Freshmark).
Shoprite Ghana Ltd. Accra.*

4. Cooling

- Delay in cooling (12 hours after harvest) significantly affected acidity and astringency.
- Delay in cooling caused rapid degradation of vitamin C.
- Cooling the sugar loaf or keeping it away from direct sun is can contribute to retention of its optimal qualities.

5. Harvesting method

- Study sought to establish the effect slip retention during harvesting on fruit quality.
- Harvested fruits with slips and without slips
- Samples were stored at 8°C, in the open sun and under shade and quality monitored over a four week period
- Fruits harvested with slips tend to have an extended storage life, even when stored at ambient temperatures in the shade.
- Low temperature storage increased the shelf life of fruits irrespective of the presence of slips.
- Fruits should be harvested carefully without bruises and with the slips on to extend their storage life if refrigeration is not possible.

From this preliminary work several issues of concern were raised

- There appears to be no guidance to the farmers in respect of maturity indices. The determination of when to harvest is more of an art and experience. The maturity indices must be established for sugar loaf.
- The sugar loaf is a temperature sensitive fruit and the time of day harvesting is done can contribute to the deterioration associated with post-harvest period. Early morning (e.g. 5.30 a.m. - 7.30 a.m.) or late afternoon (4.30 p.m. – 6.30 p.m.) with associated good handling and cooling will contribute to retention of optimal quality.
- Current handling practices for sugar loaf through out the value chain is not satisfactory. These lead to bruising of the fruits and initiates deteriorative reactions. Examples include throwing of the fruits, heaping in piles at the farm, road side and markets and exposure to direct sun.
- The harvesting method proposed requires the retention of slips on the fruit and this has implications for the farmers. The slips are normally allowed to mature after harvest and serves as a source of additional income and planting materials.
- The application of cool chain principles in the management of quality of fruits and vegetables on both the local and export markets is long overdue.
- Local market conditions especially the lack of simple infrastructure such as sheds to protect fresh fruits and vegetables from direct sun shine needs to be improved.

5.2. DEVELOP SKILLS AND CAPABILITIES OF ALL PARTICIPANTS IN THE HORTICULTURAL SUPPLY CHAIN

This objective involved capacity building through training. The Ghana Private-Public Partnership Food Industry Development Program offered both local and external courses on cold chain management, food safety, food laws and regulations etc. with emphasis on how these impinge on the performance of the horticultural sector. In addition client specific training were held at the premises of identified companies. Table 5.7 and 5.8 are summaries on beneficiaries in the training program of GHPPP

5.2.1. Summary on Participation in Training

The GHPPP training program attracted 805 participants (Table 5.7). Of these 42.6 % were women. The total attendance for in-field training was 400 which is about 50% of the total participants. The breakdown of the training programs showed that the rural community interactions attracted more participants (Table 5.8)

Table 5.7 Education, Training and Outreach Activities – Number of Beneficiaries*

Degree training completed	Total	Male	Female
PhD			
MS	1		1
BS			
Degree training in progress			
PhD			
MS	2		2
BS			
Non-degree training			
Professional training**	187	109	78
In-field training/workshops	400	185	215
Conferences/other outreach	215	168	47
Total	805	462 (57.4%)	343 (42.6%)
** Professional training includes post doctoral studies, short courses, and technical workshops/conferences. *** In-field training/workshops include farmer field schools, community training, farmer field days, and other training that does not build on professional studies. ****Conferences and other outreach are those events that do not fall into the above categories.			

Table 5.8. Breakdown: Education, Training and Outreach Activities – Number of Beneficiaries

Non-Degree Training

Male	Female	Total	Activity
<i>Professional Training</i>			
56	19	75	Cold chain and logistics training workshop
9	16	25	Training of staff of Eden Tree Ltd
6	-	6	Participants to Guatemala
8	2	10	WFLO training Oklahoma
16	19	35	Regional Food Safety Workshop
6	4	10	On-line International Food Law and Regulations
-	2	2	International Food Safety course - MSU
8	3	11	Training in Safety and Handling in the Supermarket
-	12	12	Women food vendors training in safety and hygiene
-	1	1	Marketing Management course
109	78	187	Total
<i>In-field training/ workshops</i>			
-	62	62	Rural community women trained in business management
40	110	150	Rural community members trained in usage of cowpea-fortified maize dough preparation
20	5	25	Athena Food Training on Food Safety issues
41	6	47	Roundtable on Guatemala horticultural industry
36	5	41	Training on improved production methods for mango
1	14	15	Training of Fruit and Vegetable vendors
47	13	60	Organic Farming Training Workshop
185	215	400	Total
<i>Conferences/ other outreach</i>			
9	13	22	New Food Product Development. & Business Opportunity
68	17	85	Stakeholders workshop-Grades & Standards
91	17	108	Horticultural Industry Round Table
168	47	215	Total

5.2.2. World Food Logistics Organization Training in Cold Chain Management

Ghana grows a lot of horticultural products, which are sold both in the domestic and international markets. These foods are one of the fastest growing on the export market. Continued success relies upon effective management of the 'cold chain', a term used to describe the series of interdependent operations in the production, distribution, storage and retailing of chilled and frozen foods. Control of the cold chain is vital to preserve the safety and quality of refrigerated foods and comply with legislative directives and industry 'codes of practice'.

The Ghana Private-Public Partnership Food Industry Development Program and MSU-PFID planned and facilitated the participation of 10 Ghanaians in the World Food Logistics Training in Cold Chain management in Oklahoma, USA. These participants were introduced to the principles of cold chain, construction and management of facilities and other topics that enhance the management of cold chain systems. The teams also visited Michigan State University to learn about operations of supermarket cold chain systems.

Following the training of the two cohorts a "Cold Chain Interest Group" was formed. This was to serve as the focal group to promote the promotion of cold chain application in the horticultural sector in Ghana.

5.2.3. Training in Cold Chain and logistics management for a competitive agri-business. November 30- December 3, 2004

One of the objectives of the Ghana Private-Public Partnership Food Industry Development Program (GHPPP) is to develop skills, capabilities as well as the logistics of managing the quality, safety and consistency of horticultural crops. In achieving this objective, collaboration between Michigan State University's Partnerships for Food Industry Development, Fruits and Vegetables (PFID-F&V), the GHPPP and the Faculty of Engineering Sciences of the University of Ghana organized a 4-day training workshop on 'Cold Chain and Logistics Management for a Competitive Agri-Business'. This was intended to provide an opportunity to reach many stakeholders and help the country to build capacity along the supply chain to meet required quality and cold chain management standards in agri-business.

The key objective of this course was to promote and improve the application of refrigeration technology for the preservation, handling and distribution of temperature sensitive commodities for the domestic and international markets. This course was essential for quality management and sustainable market access. The course was also set up to provide information on the current trends and complexities in cold chain and logistics management.

In all over eighty, (80) participants attended the workshop. Participants represented a diverse group for interesting and educative discussions. Participants were drawn from NGOs in the horticulture industry, regulatory agencies, traders, producers as

well as processors and transporters of horticultural produce. Experienced professional resource persons from Ghana and the United States of America presented papers on the main topic of the workshop. A very interactive discussion followed each presentation.

Two field trips were also taken during the training workshop to Equitorial Capital Ventures in Peki (Volta region) and Ghana Fresh Produce Ltd at the Kotoka International Airport in Accra. These provided participants practical issues in the management of cold chain facilities in Ghana and provided a platform for discussion of the way forward for Ghana in the management of cold chain facilities.

At the end of the 4-day workshop, participants indicated they had learnt a lot and expressed the hope that the training would be the beginning of provision of improved services and products for both domestic and international markets. They expressed the hope that they would be ambassadors in the provision and management of cold chain and logistics management in Ghana.

5.2.3.1. Follow-up activities

Following observations from field trips undertaken on the 3rd day of workshop as well as lessons learnt throughout the training period, activities at the Kotoka International Airport became of concern to participants. It was therefore suggested that a team be formed to present suggestions to organizations working at the Kotoka International Airport. The team was tasked to explain lessons learnt as well as the way forward in meeting global standards and facilitation of export of fruits and vegetable products. This is aimed at making Ghana's horticultural produce more competitive on the international market. Twelve (12) participants formed this group.

Also, 25 participants joined the 10 World Food Logistics Organization trainees in the Cold Chain Interest Group. This group was expected to work to sustain the enthusiasm generated from workshop and would meet from time to time to deliberate on issues on cold chain and logistics management for a competitive agri-business.

5.2.4. Food laws and regulations

Laws and regulations are a major tool in protecting consumers. Food laws and regulations have become very important in international trade. It is therefore very important for all stakeholders, especially food processors and marketers to have knowledge of both domestic and current international laws and regulations. The Ghana Private-Public Partnership Food Industry Development Program (GHPPP) is working towards sustaining Ghana's edge in horticulture and assisting entities in the horticultural sector to

meet global standards organized several programmes to empower Ghanaian stakeholders in the horticultural sector.

5.2.4.1. Workshop

This was the first activity which brought experts from Michigan State University and University of Ghana to interact at a two-day workshop with the Ghanaian participants on “International Food Laws and Regulations.

The Food Law Workshop was organized by the Ghana Private-Public Partnership Food Industry Development Program (GPPPFID) in collaboration with the Michigan States University. The main speaker was Professor Vincent Hegarty, Director and Professor of the Institute of Food Laws and Regulations at the Michigan States University and Mr. Emmanuel Afoakwa, who had completed the first on-line course in Food Law. Present at the Workshop were representatives from the Ghana Standards Board, Food and Drug Board, Ministry of Food and Agriculture, Agro Processing Industries, Members of the National Codex Committee, Ghana Export Promotion Council, National Board for Small Scale Industries, Ghana National Fruits and Vegetable Growers Association, Food Research Institute of the Council for Scientific and Industrial Research, graduate Students from the University of Ghana and other invited Guests. The total number of participants present for the first day’s section was 53.



Figure 5.6 Some participants at the Workshop with Prof. Hegarty

The participants were introduced to the relationship between the Supply Chain Analysis and International Food Laws and Regulations, the need for Food Laws and Regulations in national development. Other topics covered included Codex Alimentarius, the Food and Drugs Administration of the USA, European Food Laws and the on-line food law courses from, Michigan State University. This workshop raised the interest of the participants in food laws, food safety issues. Some expressed interest in taking the online courses.

5.2.4.2. Online Food Law Course.

One trainee was enrolled in the fall of 2002 and completed the course with honors. Following this ten more Ghanaians from the Food and Drugs Board, Ghana Standards Board, the Universities and the private sector completed the on-line course on International Food Law. It was decided that the course be mounted in Ghana to allow more stakeholders to participate.

5.2.4.3. Local Training in Food Laws and regulations

A 4-day training workshop in “FOOD LAWS AND REGULATIONS in ensuring competitiveness and enhancing market access ” This Food Laws and Regulations training was presented by Prof. Samuel Sefa-Dedeh and supported by Mr. Emmanuel Afoakwa of the University of Ghana. It was designed to support USAID’s strategic objective of increasing the “*Competitiveness of Ghanaian private sector in the world market*”.

The main goal of the course was to provide a thorough understanding and appreciation of the Domestic and International Food Laws and Regulations and how these impact on the competitiveness of Ghanaian produce in the market place.

Over 50 participants attended the four-day capacity building workshop from different areas of the supply chain. These included managers from food industries including processors, exporters and importers; marketing companies, consulting firms, public sector organizations, and representatives of Non-governmental organizations and development agencies involved in agricultural production and marketing. Local expertise was harnessed to generate and promote the awareness of the food laws and regulations in the promotion of product competitiveness and global market access. Topics treated covered both local (Ghana Food and Drugs Law, Ghana standards Board certification procedures etc.) and international requirements (USA, EU, UK, Japan, WTO, Codex Alimentarius and HACCP) in food trade.

At the end of the training workshop, participants indicated they had learnt a lot that some of them were not aware of. They therefore stated that they would improve their business practices in various ways due to lessons learnt and knowledge of implications of not conforming to specifications.

5.2.5. Food Safety

Issues on food safety have become critical to the performance of horticultural value chain. The Ghana Private-Public Partnership Food Industry Development Program planned to place this matter as core in the capacity building of stakeholders. Programs

were planned to train core professionals to assist the industry. The first approach was participation three professionals in the International Food safety course organized by Michigan State University and a West African Regional Food Safety course held in Ghana.

5.2.5.1. International Food safety Course at Michigan State University

Three female professionals from the Customs Excise and Preventive Service, the University of Ghana and a Private sector were sponsored to Michigan State University. These trainees served as resource Persons for the local training in Food safety.

5.2.5.2. West Africa Regional Training in Food Safety

The first West Africa Regional Food Safety Workshop was organized in Ghana in May 2004 as a collaborative effort between Michigan State University and the Ghana Private-Public Partnership Food Industry Development Program. Professionals (35) from three countries, Ghana, Benin and Nigeria participated. Four of the participants came the Standards Organization of Nigeria, 1 from Centre Béninois de Normalisation et de Gestion de la qualité (Benin) and 30 from various Ghanaian public and private sector organizations. The Ghanaian participants came from the Ministries, CEPS, GEPC, Food and Drugs Board, Ghana Standards Board, Universities, Council for Scientific and Industrial Research, the Private sector (processors, exporters,) NGOs etc. The training was as a result of the implementation of the strategy to localize some of the training and make it accessible to more people. Some of the topics treated include: Tools for Food Safety, Risk Analysis Concepts, Food Safety Management Systems, Emerging Issues in Food safety, The Role of the Scientist in Ensuring Food Safety. Participants indicated at the end of the five days that the workshop was an eye opener as well as one of the best platforms for such an important interaction.

5.2.5.3. Client Specific Training in Hygiene and Food Safety

Following and audit an on-site training in food safety and plant hygiene was given to 24 personnel of Athena Foods. This has resulted in improved performance of staff on the production floor.

Edentree Limited is a vegetable processing factory located at Accra off the Spintex Road. Their operation is mainly a packhouse facility. They buy vegetables mainly from the Agboghloshie market in Accra, wash, repackage and supply supermarkets in Accra. They also produce cut cabbage and carrots into ready-to-eat salads/coleslaw.

Eden Tree supplies fresh and minimally processed fruits and vegetables (pre-cut, salad mixes, vegetable salad, ready-to-eat vegetables) to the supermarkets (Koala, Maxmart, Evergreen etc). Following an audit of the operations a training program was developed for 25 staff of Eden Tree in good manufacturing practices, hygiene of produce, personnel

and facilities. The evaluation of the program revealed that the training has resulted in improved, safer and well-labeled products to the supermarkets. Evaluation of Eden Tree after training indicated that they had adopted the principles of processing impacted by the GHPPP and hence business was better.

5.2.6. Fruitlogistica 2005

Fruitlogistica is the world's leading trade fair for the marketing of fruits and vegetables. This show is held annually in Berlin, Germany. Fruitlogistica Trade show provides industries involved in fruit trading the opportunity to present their range of products and services from growing to selling. One of the main attractions to Fruitlogistica is that it is a compact, highly effective show focusing on special target groups. It offers fresh produce professionals from all over the world the opportunity to interact. Fruitlogistica, in addition to exhibition of fresh produce, fruits, vegetables, herbs and flowers, presents technical know how and skills required for effective logistics.

In 2004 Ghana Private-Public Partnership Food Industry Development Program provided support to the Sea Freight Pineapple Exporters of Ghana (SPEG) for their participation. The support allowed SPEG to construct its stand and exhibit their products. The strategy for Fruitlogistica 2005 was different as GHPPP decided to support stakeholders in horticulture from different backgrounds to participate.

The thirteenth Fruitlogistica Trade show, Fruitlogistica 2005 was held in Berlin between the 10th and 12th of February 2005. The GHPPP and the Michigan State University's Partnership for Food Industry Development – Fruit and Vegetables (MSU/PFID-F&V) sponsored eleven (11) persons working in the horticulture industry in Ghana with funding from USAID to partake in Fruitlogistica 2005. The objectives of attending the trade show were for the participants to:

- Learn and see current state of the horticultural industry globally
- Learn about market trends as required by EUREPGAP
- Interact with other fresh produce professionals from other parts of the world
- Make contacts with buyers of fruits and vegetables for export

The Team returned from the trade show with a better understanding of the current global trends in the horticultural sector and the position of Ghana's competitors. Some of the issues suggestions made by the participants of Fruitlogistica 2005 are:

1. There were huge market opportunities for fruits and vegetables in the European market. To tap into this vast and growing market, Ghanaians need to produce what the customer wants and make it easy for supermarkets to be used as a conduit to reach the consumer.
2. Consumers now want quality products which are tasty, safe, affordable, and convenient.
3. The consumer also demands that product be produced under environmentally sustainable and socially responsible condition.
4. The consumer also expects more information on nutrition as well as how product should be prepared and eaten (labeling).

5. Our competitors are investing heavily in R & D as well as modern technology from production to marketing. They have developed quality assurance systems and innovative product presentations that were being used as a tool for differentiation of product.
6. Traceability and tracking is now a must in the EU market and implored stakeholders especially producers and exporters to acquire basic quality assurance tools for determination of produce quality and work towards achieving good tracking and tracing systems.
7. Ghana's presence as a country was not felt. We were not represented as a country with a unified front as was done by many other countries. Different organizations from the same country could therefore be found at the same place. Ghana was however not represented as a state. Instead, SPEG had its own stand whilst Ghana Yam Producers and Exporters Association exhibited their produce under Swiss Import Promotion Program (SIPPO).
8. Diversification options are available for Ghanaian producers. These include melons, star fruit/ Habanero, Formosa papaya, tropical avocado, sweet potatoes and Tahiti limes.
9. There need for improvement of Ghanaian produce to meet international standards was stressed because some of the exhibits from Ghana were poorly presented and did not reflect excellent quality produce.

5.2.7. Recommendations

- Emphasis should be placed on research and development to develop/adapt technologies and to widely disseminate the technologies to farmers and exporters
- Quality seal and branding should be developed for Ghanaian produce
- Stakeholders should work together as a group
- Ghana should find a supermarket and start developing links with it in terms of connectivity
- Stakeholders promote the consumption of fruits and vegetables locally and
- Participate in future fairs as one united Ghana

5.2.8. Sharing Fruitlogistica 2005 with Stakeholders

To share the lessons learnt from this trade show with stakeholders in the horticulture industry, the Ghana Private-Public Partnership Food Industry Development Program organized a roundtable on Tuesday 1st March 2005 at 9:00 a.m. at the Kama Conference Center for the participants of Fruit logistica 2005 to share experiences and map out a way forward for the Ghanaian horticultural industry. This half-day meeting was also briefed on current safety and consumer trends in the international marketplace. Sixty-three (63) stakeholders including producers, processors, traders, importers, exporters, regulatory agencies, financial agencies, crop associations and development associations attended the roundtable discussion. Participants of Fruit Logistica 2005 made a presentation on lessons learnt and implications for Ghana.

In addition to these the participants made various contacts and were introduced to equipment and facilities used to optimize performance in the horticultural sector. For example, Lydia Afoley Anum, treasurer of the Ghana National Tomato Traders Association (GNTTA) who was part of the team indicated her appreciation for the opportunity and indicated that she had learnt a lot. She was concerned about the way tomato is packaged in Ghana and hence interacted with a lot of packaging companies. She showed the participants samples of packaging materials she collected and indicated that she was having discussions with members of the GNTTA as to the way forward in packaging tomato. She indicated that she took a lot of pictures at Fruit Logistica 2005 and hopes to enforce observations. She expressed the hope that tomato traders would shift to the use of plastic packages to conform to conventional standards.

The way forward for the Ghanaian horticulture industry was discussed. At the end of discussions, it was suggested that Ghana Export Promotion Council take up the challenge of organizing Fruitlogistica 2006 with support from the Horticultural Export Industry Initiative. It was also suggested that all produce associations in Ghana including SPEG, VEPEAG, PAMPEAG, and HAG work together to ensure a successful Fruitlogistica 2006 participation by Ghana. It is the hope of the Ghana Private-Public Partnership Food Industry Development Program that the information shared by the Fruitlogistica 2005 team would be taken seriously by industry in order to move the horticultural sector in Ghana forward and make our produce more competitive in the global market. The National Horticultural Task Force took up this matter and it is anticipated that GTZ and other donors will work with FAGE for a successful fruitlogistica 2006.

Ghana's participation at Fruit Logistica 2005 was an eye opener. A lot of lessons had been learnt. It is the hope of the Ghana Private-Public Partnership Food Industry Development Program (GHPPP) that all stakeholders would take lessons learnt and implications for the horticulture industry in Ghana seriously. This would move the industry forward and make Ghana more competitive in the global marketplace. It is further hoped that stakeholders would learn to work together as a team so as to gain from the huge opportunities and benefits of working together.

5.3. SUPPORT THE ESTABLISHMENT OF A GHANAIAN PRIVATE ORGANISATION WITH CAPABILITY TO LEAD THE HORTICULTURAL INDUSTRY IN SUSTAINABLE AND PROFITABLE DEVELOPMENT

5.3.1. SPEG, HAG and VEPEAG

The horticultural sector in Ghana prior to the establishment of the Ghana Private-Public Partnership Food Industry Development Program had several produce associations. These are: Sea Freight Pineapple Exporters of Ghana (SPEG), The Horticultural Association of Ghana (HAG) and the Vegetable Producers and Exporters of Ghana (VEPEAG). These associations did collaborate with the other partners, Technoserve, Amex and CARE International in the past. The partnership continued to collaborate and work with these associations. Whilst each of the association offered services to members there were many issues that did not present a united front on issues of horticulture. The sector continued to suffer with the apparent lack of cooperation and trust.

The GHPPP and the partners continued to interact with SPEG, HAG and VEPEAG on strengthening their associations. It was recognized that that the mango and papaya sectors of the horticultural industry have received very little attention and are therefore facing a lot of challenges. GHPPP proposed a ‘national consensus and strategic meeting on mango and papaya’ to involve all stakeholder in the horticultural sector.

5.3.2. National consensus meeting on mango and papaya

In line with this, GHPPP and partners planned a national consensus and strategic meeting on mango and papaya on October 15, 2003 to address issues facing this industry and determine ways to help reduce some of the challenges and highlight opportunities. The meeting was attended by producers, exporters, researchers, development and marketing personnel, processors, consumers and policy makers.

Presentations were made on the following topics:

- Production Challenges for mango and papaya
- Pests and Disease challenges in Mango Production
- Status of Mango and Papaya Development in Ghana
- Post Production Challenges: Buyer’s Perspectives
- MoFA’s support to the Horticultural Sector.
- Market requirements and general supply overview of mango and papaya.
- Opportunities for Agro Industrialization Value Adding Techniques
- Possible Financial Interventions. EDIF and Ecobank view

The following comments and issues came out.

- The largest, developed and most important unit of the agricultural sector is the fruit industry. About 20 million (21%) from the horticultural sector alone is realized yearly with pineapples being the predominant fruits.
- Ghana is the largest exporter of papaya to the EU market.
- Ghanaian papaya is of top quality, delicious and a delicacy on the EU market especially the Solo 8 and the Golden Brazilian, but exports are so inconsistent in quality.
- Mangoes constitute only 1% of the non-traditional exports of Ghana. There is opportunity for improvement.

- The problems in the papaya sector are:
 - Land acquisition
 - Irrigation challenges
 - Planting material
 - Market Induced challenges
 - Technical know how
 - Small scale nature of operations

- 1. Unreliable and unavailable planting material for papaya were identified as leading to size and color inconsistency as well as poor resistance to diseases, and difficulty in meeting of consumer specifications.
- 2. Countries to which these fruits are exported have different requirements posing a lot of problems to farmers. The minimum requirements in use now in most EU countries are the EurepGAP protocol. Producers have very little choice and are paid no premiums for complying though it costs a lot. Implementation starts with the preparation of seeds even before planting.
- 3. Another major problem is lack of appropriate chemicals. The chemicals most farmers are used to have been taken off the list of internationally accepted chemicals since they have been found inappropriate. Limit of determination of these chemicals have been set at zero.
- 4. A lot of technological know-how is needed and efforts to help farmers have been woefully inadequate. It would be a great help if training for the cultivation of this fruit is institutionalized.
- 5. Problems facing mango farmers were classified as:
 - land availability and acquisition problems
 - adequate preparation and education of farmers
 - lack of inputs, services such as fertilizers to support farmers efforts
 - lack of institutional support in the form of research
 - marketing problems for both the internal and export market.

- lack of research in the mango sector

At the end of the deliberations it was agreed that interest groups for mango and papaya be formed. The GHPPP Program Director offered to assist the groups to meet and discuss how issues concerning the two commodities will be addressed. The mango and papaya interest group was born. This group later formed the papaya and mango producers and exporters association of Ghana. (PAMPEAG).

5.3.3. Organic Farmers Association

GHPPP interacted with the Organic Farmers Association as part of the strategy to develop management and leadership capabilities and build organizational capacity. As part of the requirements for the association members to receive organic certification a training program was held at Akyem Akroso for the members in September 2004. the topics treated were:

- Principles of Organic Agriculture
- Soil Fertility
- Plant Nutrition
- Pest, Disease and Weed Management
- Animal Husbandry
- Farm Economy
- Farm Management
- Quality Requirements in International Agricultural Trade. EUREPGAP/FAIR TRADE and ORGANIC

Sixty farmers participated in the training and the process of certification was initiated. These farmers hold a lot of potential for the development of organic products.

5.3.4. Supermarkets in the horticultural value chain in the Accra-Tema metropolis

A study of supermarkets in Accra was undertaken under the activity “*create sales and marketing programs. Improve performance of internal markets for fruits and vegetables*”

The study showed that Ghana’s retail industry is composed of a various operators including out door markets which usually retail food stuffs, road side vendors, table top vendors, neighbourhood retail outlets usually in kiosks or shipping containers, home based stores and until recently, the emergence of large self service stores including one stop shops. These operators retail a variety of merchandise from fresh produce, non-fresh food, non-food products which include toiletries, cosmetics and home appliances.

A supermarket is a self-service grocery outlet that sells food, beverages and other goods. They are usually located on urban high streets or in shopping malls, covering an area of between 4,000-25,000 square feet (www.corporatewatch.org.uk). The term is however used for convenience to mean all large-format ‘modern retail’ stores including supermarkets, large discount stores and hypermarkets. In some countries these large retail formats are displacing more traditional retailers such as small shops and public markets. The rise of these ‘supermarkets’ in the Greater Accra Region, particularly in the Accra-Tema metropolis is therefore of great interest.

Supermarkets are also increasingly becoming a driving force in the economy of the nation as they provide an outlet for products of the agricultural and manufacturing industries, generating employment and providing services to communities. Despite these, certain questions have arisen such as; are goods retailed by supermarkets affordable to

the average consumer? Are supermarkets meeting quality and safety standards? Do supermarkets have the proper facilities for keeping produce safe so that quality is not compromised? Are Ghanaian supermarkets setting the standards in terms of the quality and safety of produce supplied by producers, as is the case in Europe with the EUREPGAP?

In Ghana supermarkets can play an important part of the horticulture supply chain as such the Ghana Private Public Partnership Food Industry Development Program conducted a sub-sector study of supermarkets in the Greater Accra Region to further understand the peculiar characteristics of supermarkets in the region as well as their activities and to develop a system of classifying the supermarkets.

In general most of the supermarkets began operations between late 1990 and early 2000, with floor spaces ranging between 50m² to 1500m². Facilities include warehouses with 50% of the supermarkets manually checking and recording merchandise rather than using a warehouse management system. Supermarkets in the metropolis employed people ranging from as low as 8 to as high as 125 people. Of the supermarkets interviewed it was interesting to note that only 40% had customer relations unit. The gross total sales per week of the supermarkets ranged between a minimum of ₵ 2 million and more than ₵40 million.

It was also observed that 70% of the supermarkets retailed fruits and vegetables (Figure 5.7), which forms between 1% and 5% of the total stock of goods in the supermarket. These include pineapples, mango, oranges, cabbage, cucumber, tomato, spinach, okro and sweet pepper. In addition about 40% handled cut fruits and vegetables. Some of the challenges in the fruits and vegetables section include; poor quality of fruits and vegetables received from producers, limited variety of fruits available, difficulty in maintaining freshness of produce and the continuous cleaning sorting and re-merchandising before produce gets to the shelf.

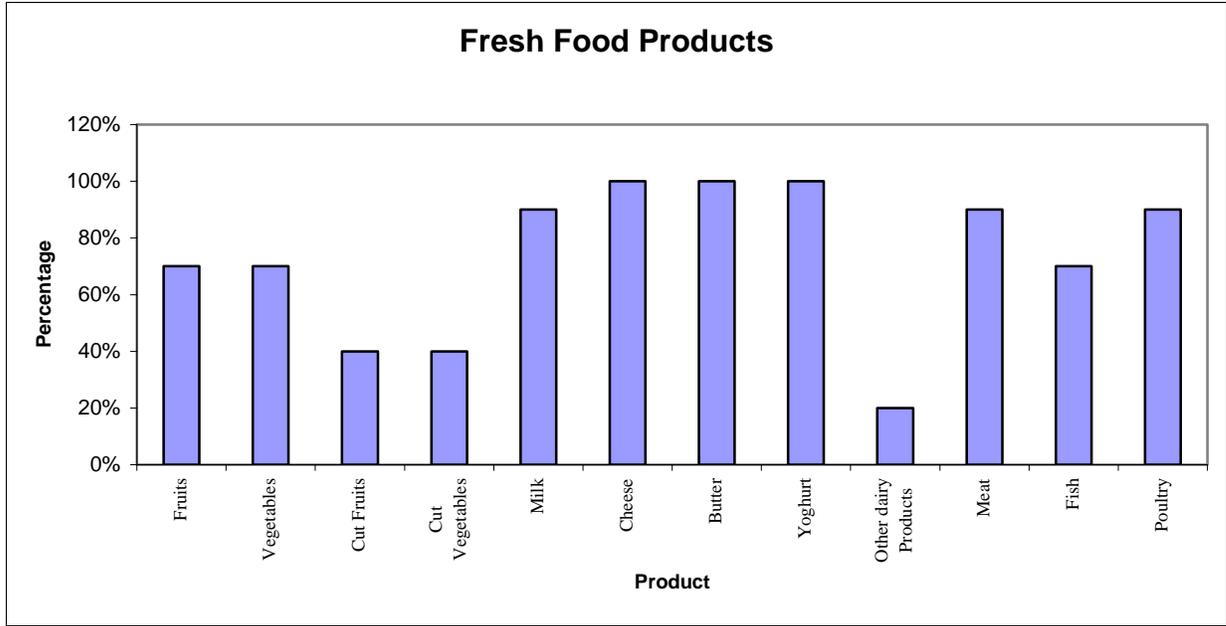


Figure 5.7. Type of Fresh Food handled by supermarkets in Accra



Figure 5.8 The Fresh Fruit and Vegetable Section of a Supermarket

The frequency with which fresh fruits and vegetables are supplied to supermarkets by local producers showed the contribution of supermarkets to the supply chain of fruits and vegetables. Only 20% of the supermarkets in the metropolis have daily supply of fruits. Another 20% have seasonal supply of fruits, which are usually imported non-tropical fruits. Vegetables supply follows a similar trend. The approximate quantity of fruit supplied to the supermarkets each week is between 3 to 50 cartons depending on the size of the supermarket and the premium they place on the sale of fruits. For vegetables this is 5 to 20 cartons a week.

How fresh fruits and vegetables are stored has profound effects on the quality of the produce as poor storage conditions lead to rapid deterioration of produce. Fresh fruits and vegetables are highly perishable and therefore must be kept cool to lower the rate of metabolic activity which would ensure that the produce stays longer. The supermarkets in the survey had various ways in which they handle and store fresh fruits and vegetables so that they do not make losses. The supermarkets store fruits the same way they store vegetables.

Twenty percent (20%) of the supermarkets stored fresh fruits and vegetables in a cold room. Other storage facilities used include the display fridge and chiller. Several measures are taken by the supermarkets to prevent the contamination of fresh fruits and vegetables. These include:

- Removal of rotten and wrinkled fruits and vegetables immediately they are detected
- Staff trained specifically to handle fresh produce
- Fresh produce stored away from the general warehouse
- Presence of standby generators to provide continuous power to refrigeration systems during power cuts.

The supermarkets, which are part of the supply chain for horticultural produce, also face their own set of challenges, which may be different from those experienced by others in the supply chain. This is because consumers demand certain standards in terms of quality and safety of fresh produce from supermarkets. The challenges indicated by the supermarkets in the survey include:

- The rapid deterioration of quality of fresh fruits and vegetables.
- The poor quality of fruits and vegetables received from producers
- The limited variety of fruits available
- The interruption in power supply which affects refrigeration
- The difficulty in maintaining freshness of produce
- The continuous cleaning, sorting and re-merchandising that need to be done before getting the produce to the shelf
- Challenge of selling fruits and vegetables fresh before quality deteriorates.

Some of the supermarkets have found ways of minimizing their losses in the fresh produce section by purchasing fruits and vegetables in small quantities so that they get sold out before their quality begins to deteriorate. Other supermarkets have an interesting

agreement with their suppliers such that fruits and vegetables that go bad before they are sold are exchanged for free. To overcome the challenges other supermarkets take the easy way out by simply not retailing fresh produce at all.

In addition to the challenges supermarkets face with retailing fresh produce; the supermarkets surveyed also had problems in other sections of the supermarket.

Problems in Warehouse Management:

- The lack of permanent staff to keep records in the warehouse
- Power failure that creates problems for the computers especially for warehouses that use the warehouse management system.
- Technical problems in the warehouse management system
- Theft of stored merchandise
- Poor organization which leads to certain goods expiring
- Inaccurate records due to manual checking.

Other challenges indicated by the supermarkets include:

- High utility costs
- Problems with expired goods
- Theft in the store.

Challenges that were specific to certain supermarkets include:

1. Inadequate car park
2. Expansion of the supermarket
3. Renovation of the supermarket..

Following the study GHPPP met with managers of the supermarkets to map out the way forward to improve horticultural handling to ensure food safety. They agreed to have some staff trained to understand supermarket operations, logistics and cold chain management, food hygiene and food safety.

A training workshop was organized for these selected staff and some of the women fruit and vegetable vendors. This was to empower them for effectiveness in their work.

5.4. PROVIDE TECHNICAL ASSISTANCE WHERE NEEDED TO ENTITIES IN ALL SEGMENTS OF THE HORTICULTURAL SUPPLY CHAIN

5.4.1. Guatemalan study tour

The GHPPP provided technical assistance in various forms to produce associations, and companies, audit of food processing facilities and in-house training. Below are examples of the technical assistance and collaboration

5.4.1.1. The mission

With the increased interest of the horticultural sector on MD2 production, the GHPPP planned a study tour for selected representative to Guatemala. The main objective of the trip to Guatemala was to study the horticultural industry in general and the pineapple sector in particular. Specific objectives of the trip were to:

- Link Ghanaian pineapple producers and support agencies with their counterparts from Central America.
- Participate in AGRITRADE 2004.
- Visit pineapple farms and learn about operations, especially MD2 and other varieties under cultivation.
- Study the market structure, export operations and support services.
- Provide feedback to the Ghanaian producers.

Six (6) participants from Horticultural Association of Ghana (HAG), Tongu Fruits Ltd., Farmapine Ghana Ltd, TechnoServe and Amex International formed the team. There were initial problems on visa acquisition to Guatemala but the interventions of Dr. Peter Achuonjei (MSU-PFID) and Luis Flores PFID-Guatemala COP), were instrumental in making the trip successful.

The Guatemala mission included study visits to pineapple operations cultivating MD2 pineapple variety and participation in Agritrade 2004, an agricultural exposition to show case horticultural products, agricultural inputs and equipment in Guatemala and the Central American region.

The main observations and lessons learnt are summarized as follows:

- Research/trials on MD2 are a key necessity to adapt new varieties to local conditions and also develop local production protocol.
- The market for the new pineapple variety (MD 2) is growing but it is uncertain how long this growth will last before another variety emerges. There is the need for industry players particularly the producers to develop options – i.e. diversification of production.
- The experience of the Guatemalan farms visited suggests that tissue culture material should not used to establish a plantation, rather they can be used to establish seed

farms from where suckers will be taken for plantation establishment. The reason given was that tissue culture materials could easily be contaminated during the laboratory process. The resulting effect is that some plants develop spines on crowns. Seed selection at the nursery stage ensures that the problem is corrected in the second generation.

- To consolidate the gains of the mission to Guatemala, it is proposed that Ghana develop MD2 production protocols suitable for the Ghanaian conditions and also set up MD2 multiplication centers for sucker production. (See Box 2)
- Experience by some farmers in Costa Rica and Guatemala indicated that variations of MD2 material planted direct ranges between 10 – 20%. Labour cost is high in Guatemala. Popoyan pays \$10 per day for farm labour whilst in Ghana labour costs \$1.5 per day.
- The use of a hormone called “maintain” helps to increase production of suckers by the mother plant. The “maintain” is applied one week after forcing and it acts by retarding the development of fruits but, however, boost the development of slips from the growing point.
- Consumer behavior and expectations have become more and more segmented. There is therefore the need to understand and appreciate the different types of consumers. These consumers are willing to pay for quality, convenience and new tastes. The current trend is moving towards semi processed especially pre-cut fruits and vegetables due to the convenience.
- The concern for the production of healthy foods is growing, emphasizing the need for enforcement of EUREPGAP, ISO 9000 and HACCP. Bar coding of products which is a system of managing data and ensuring traceability has become very important in retail trade.

It recommended that Ghana should organize its version of Agritrade. This is to showcase horticultural products in Ghana and the sub-region and also bring together buyers and sellers. We suggest that it should be spearheaded by HAG and SPEG together with the private sector with support from Government and other development partners such as MSU/P-FID, TechnoServe and AMEX.

5.4.1.2. Proposed follow-up actions

It is important to actualize the lessons learnt from this mission by taking the following action steps.

1. The team should initiate process to secure funding from MSU/PFID to procure 60,000 suckers of the MD-2 suckers for multiplication and adaptive trials in a bid to develop local production protocol for MD2.
2. HAG/SPEG should work towards the organization of agritrade version in Ghana in collaboration with and other partners.
3. The need for diversification of production was amply stressed. A task force should be put in place to immediately explore the possibility of diversifying into other potential fruits and vegetables.

4. Hold stakeholders workshop to present key findings of the Guatemala mission to industry players. This was done and the experiences shared with stakeholders. The team has been providing inputs to efforts on the promotion of MD2 in Ghana

Box 2

TECHNOLOGY for handling MD2 the Guatemalan experience

Land preparation : Good land preparation is a key success factor in MD2 production. Mother plants are ploughed back into soil. Sub-soiling at 50cm deep is done to improve drainage since good drainage is very important in MD-2 production. The land is harrowed and ridged. Ridge height is 10 cm and 112cm between centers of ridges. The company does not use mulch. The area receives 4,000mm rains annually. It rains six and half months of the year and irrigation is used for the five and half months of drought.

Planting material: MD-2 suckers ranging between 250g to 400g are optimal for planting. Using these sucker sizes, it takes 9-10 months before forcing. Sucker treatment is with alliette and diazinon, Planting is done on ridges at a spacing of 30cm x 30cm x 90cm

MD2 Nursery: In the experience this Guatemalan farm tissue culture material should not be used to establish a plantation. They can be used to establish seed farms from where suckers will be taken for plantation establishment. The reason being that tissue culture materials could easily be contaminated during the laboratory process. The resulting effect is that as some plants develop spines on crowns. Seed selection at the nursery stage ensures that the problem is corrected in the second generation.

Weedicide application: Apply pre-emergence herbicide 10 days after planting. Use Hyvar X and diuron in a ratio of 1:1 i.e. 2kg each /ha. An alternate is to use Gesapax and Velpar.

Fertilization: Fertilization application starts two (2) months after planting. Liquid application is undertaken every 15 days using a boom sprayer before forcing (300 gals / ha). Key nutrients / fertilizers are: Potassium nitrate, Urea, Magnesium, Calcium nitrate and Zinc. For a full cycle 500Kg of urea (nitrogen), 500 Kg of Potassium and 200 Kg of phosphorus are used per hectare. Fetrilon is used as a source of micro nutrients and is applied at a rate of 3kg/ha every 15 days.

Diseases and pests: Main diseases affecting MD-2 are phytophthora and erwinia. For control of these diseases in MD2 production, alliette is applied 2 months after planting and it is repeated every 2 months. Main pests are mealy bugs and symphilids. Diazinon is used to control mealy bugs. Mocup is used to control symphilids.

An innovative Technology: The farm has developed an innovative technology to protect fruits against sun burn using a white polythene material which is perforated. The material is used to cover the developing fruits 8 weeks after flower induction (forcing). This practice also helps in uniform fruit formation.

Post harvest handling : Harvested fruits from the various plots are deposited in washing tank. The fruits are washed in chlorinated water and those suspected to have mealy bugs are further treated with pressurized air, waxed and a fungicide (bayleton) is applied to the butts.

5.4.2. Post- partnership study on the pineapple sector, 2004.

The Ghanaian pineapple sector has seen much change in production, packaging and shipment since the early 1990's and today Ghana supplies about 8-9% of the world market, while Costa Rica holds about 40% of global market share. Consumer preferences have changed over the years and the industry has adapted to meet changing consumer needs with the introduction of the MD2 variety. Ghana has been a major producer of the "Smooth Cayenne" variety over the years and has not moved speedily into the production of the MD2 variety. Ghana's slow entry into the production of MD2 variety may be impacted by Del Monte's decision to launch the "Honey Gold" variety in 2006. The pineapple industry in Ghana is aware that the launch of this new variety is likely to

adversely affect their market share, and this might lead to Ghanaian producers being pushed out of the European market.

Meanwhile the Ghanaian producers have been slow to change to the MD2 variety and to adapt to changing market demands. Some farms have begun producing the MD2 variety using imported MD2 plantlets and suckers or plantlets and suckers from local tissue laboratories in Ghana. Smaller producers have experienced numerous challenges with the production of the MD2 pineapple variety. Information on their quantities and volume, and the sources of their stock are not shared or documented.

After September 30, 2004 when the two years of the Partnership had come to an end, there was the need to do an evaluation of the pineapple sector to understand the prevailing conditions in production and marketing of MD2, Smooth Cayenne and Queen Victoria varieties. This study was in part funded by Ghana Private-Public Partnership Food Industry Development Program (MSU-PFID) and AMEX International with logistics support from Technoserve. The survey was conducted on selected farms in the pineapple zones of Kasoa, Nsawam, Bawjiase, Ga North and Aburi in the Southern part of Ghana in collaboration with the Seafreight Pineapple Exporters of Ghana (SPEG),.

The main purpose of the survey was to obtain data on acreages of the assorted varieties of pineapple, in particular the MD2, Smooth Cayenne, and Queen Victoria varieties under cultivation, and more importantly to assess the preparedness of the producers to switch to the MD2 variety to meet changing consumer demand.

The objectives of the study were:

- Investigate the total land area under cultivation of pineapple in these areas which is concentrated in 3 regions of the country, i.e., the Eastern, Greater Accra, and Central Regions.
- Identify the source of planting materials for the varieties under cultivation.
- Plot the destinations of the country's pineapple produce.
- Obtain information on the number of farms that have international production/marketing certificates.
- Determine constraints in the production of MD2 production.
- Identify the suppliers of inputs for the producers, in particular fertilizers, pesticides calcium carbide and ethrel.
- Forecast MD2 Fruit and Suckers supply capacity for 2005/2006

The study was conducted in 24 farms through the administration of a questionnaire. The questions used consisted mainly of closed questions and a few opened ended ones to give a background on the problems encountered by farms in the production process. The total export volume by the sample size of 24 farms accounted for over 72% of the total export as reported by the Ghana Export Promotion Statistics of 2003

The key main findings of the survey were:

5.4.2.1. Total farm land area and export

- The majority of the farms have land sizes ranging from 100 to 300 acres. Up to 25% of the farms interviewed had land holdings in excess of 1000 acres in near contiguous settings, which makes it possible for them to fully mechanize their operations and benefit from the economies of scale in production (Table 5.8).

Table 5.8 Pineapple farm land area

Farm Area	Frequency	Percent
0-100	1	4.2
101-200	6	25.0
201-300	6	25.0
301-400	2	8.3
501-600	1	4.2
701-800	2	8.3
More than 1,000	6	25.0
Total	24	100.0

- The Smooth Cayenne variety is the traditional pineapple exported from Ghana. The 24 farms cultivated 3,237.8 acres of land with this variety, representing 80% of the total land under pineapple cultivation. MD2 and Queen Victoria were cultivated on 588 (15%) and 220(5%) acres respectively (Table 5.9).
- Thirteen (13) farms (50%) were cultivating the MD2 variety at the time of the study. One of these started production in the year 1999 whilst the rest started in 2002 and have continued to 2004.
- The Queen variety, which is a lesser known, is produced by about 10 farms and occupies a total land area of **220.5** acres.

Table 5.9: ACREAGES UNDER CULTIVATION SMOOTH CAYENE

FARM CODE	SMOOTH CAYENNE	MD2	QUEEN	TOTAL
PS017	74	0.2	0	74.2
PS003	448	4	6	458
PS005	400	30	10	440
PS002	400	40	30	470
PS020	40	0	1	41
PS011	25	0	0	25
PS018	60	2	5	67
PS007	60	100	1.5	161.5
PS014	10	0	0	10
PS010	80	0	0	80
PS001	50	10	40	100
PS004	220	0	40	260
PS015	0	250	0	250

PS012	90	0	0	90
PS008	120	25	0	145
PS009	130	3	0	133
PS022	46.6	0	0	46.6
PS023	81.7	0	0	81.7
PS024	51.1	0	0	51.1
PS025	85.9	0	0	85.9
PS026	80.5	0	0	80.5
PS013	50	2	0	52
PS006	600	120	72	792
PS016	35	2.5	15	52.5
TOTAL	3237.8 (80%)	588.7(15%)	220.5 5%)	4047 (100%)

The 24 farms participating in the study exported a total of 32,695 MT of pineapples of which smooth cayenne was 98.9% (Table 5.10). This represents over 72% of the total export as reported by the Ghana Export Promotion Statistics of 2003

Table 5.10 TOTAL EXPORTED VOLUME (MT) AND LOCAL SALES

	EXPORT VOL.	%	LOCAL VOL.	%	TOTAL
SMOOTH CAYENE	32,218.40	98.9	6,243.00	98.5	38,461.4
MD2	40	0.1	8	0.1	48
QUEEN	436.60	1.0	86	1.4	522.6
TOTAL	32,695	100	6,337	100	39,032

5.4.2.2. EurepGap Certification

- 16 farms (66%) have EUREGAP certification and 8 farms (33%) also have Fair Trade certificates.
- Of the total number of 121 outgrowers, only 32 have been EUREGAP and FAIRTRADE certified indirectly through their exporter farms or exporters..
- The farms started their certification programs in 2001. An estimated 15 farms representing 89.1% obtained their certification in the year 2003, and the latest one identified was this year 2004. The farms obtained their fair trade certificate in the years 2002-2003.
- Of the 8 farms that had no certification, 62,5% are required by their buyers to get EURAGAP certified which at the moment is the minimum certificate any farm requires. The rest said they were still exporting without any certificate and have not been compelled to get certified.

5.4.2.3. MD2 Production

- None of the 121 out growers in the pineapple industry is either cultivating or supplying the MD2 variety to the farmer exporters or their exporters.
 - The major reason identified for this was the high cost of the planting material.
 - Uncertainty with respect to correct agronomic practices
- Two farms were identified as the main point of sale of (MD2 suckers) planting material to other farms.
- BOMART and Tongu Fruits which are Tissue Culture Laboratories in Ghana were also identified to be the primary local suppliers of plantlets to the farms.
- The third potential supplier BIO-plantlet is yet to come on stream.
- Constraints identified with the production of MD2 were as follows:
 - i. Irrigation is essential for production in arid areas
 - ii. Temperature changes and fluctuations adversely affect production to a higher degree than for smooth cayenne.
 - iii. Inadequate planting materials
 - iv. High cost of planting material
 - v. Lack of sources of true to type planting material
- From the survey it was realized that MD2 is not being handled differently from smooth Cayenne. Three farms out of the 24 interviewed had differences in post harvest handling of MD2 from smooth cayenne.

In summary, Ghanaian pineapple producers are continuing to grow and export the Queen variety; some farms have made moderate investments in the new favorite of European consumers, MD2. Ghanaian farmers have followed the traditional route of agriculturalists worldwide, they are slow to moderate adopters of new technology and new varieties. Studies like this should be carried out annually by SPEG and other interested organizations to provide a basis for measuring comparisons and projecting the future. The 2004-2005 pineapple season appears similar to the 2003-2004 season, some challenges if other country's producers bring much new product to the European market, but there is still a demand for Smooth Cayenne and Queen, but prices will be lower. Beyond 2005, Ghanaian farmers will need to begin moves early to learn about emerging new varieties and to market a wider variety of Ghanaian and West African produced pineapples and value added pineapple products.

5.4.2.4. Conclusions

1. Smooth cayenne predominates in the pineapple export sector. Significant effort has been made by the industry to produce MD2.
2. The current price of the MD2 planting material puts it outside the reach of the small holder farmers. Currently none of these are into MD2 production although they are accounted 25% of the output of the exporters. There is therefore the need for some intervention for the small holder farmer to overcome the initial investment barrier as result of high price of planting materials.

3. Significant replication of planting material is taken place at the farm level, given the current pricing from the tissue culture laboratories there is a danger that their relevance in the pineapple industry may diminish.
4. The difficulty of obtaining information from farmers needs to be addressed if the role of data to support decision making process of SPEG and other allied Associations is to be enhanced.
5. The total land area of 15,875 acres available for pineapple production from the survey about 30% is currently under cultivation. This shows that there is still room for increase in the production of pineapple.

5.4.3. Development of grades and standards

Lack of grades and standards is a major drawback for the horticulture industry in Ghana. To sustain Ghana's edge in horticulture and help stakeholders meet domestic and international quality standards, the GHPPP worked with the Ghana Standards Board, USDA and MOFA under the CCARD to develop standards for Mango, Papaya, Pineapple, Ginger, Sweet Pepper, Sweet potato, Sweet Cassava and Hot pepper (Chillies). A stakeholders meeting, with 85 participants, was held at La Palm Royal Beach Hotel on June 29, 2004 to share these standards.

The following recommendations were made:

1. Participants agreed that the standards should be simplified for the average person to understand.
2. Partnership should be sought from the media to make public these standards.
3. Sensitization on the standards should be done through regional and districts level workshops. This should include awareness workshops.
4. The various produce associations should adopt these standards and apply them to their business.
5. The private sector groupings should have honest leadership to facilitate the enforcement of the standards.

The Ghana Standards Board then gazetted and published

The GHPPP believes that the implementation of these grades and standards will open many business opportunities for Ghanaian businessmen globally, and promote the consumption of safer and better quality horticultural produce. One of the outcomes of the meeting is the request for the standards to be recast in simple language. GHPPP took the lead and started the simplification process.

5.5. DEVELOP COMMERCIALLY VIABLE NUTRITIONAL PRODUCTS FOR CHILDREN AND PREGNANT WOMEN AND OTHER NATURAL PRODUCTS

Activities under this objective were carried out by Ghana Private Public partnership Food Industry Development Program (MSU-PFID) and Royal Ahold. The other Partners did not actively participate even though some expressed interest on aspects of the work.

Activities under this objective were:

1. Desk research
2. Concept evaluation
3. Product development/formulation and evaluation
4. Interaction with food processing industry
5. Intervention in rural communities
6. Client-specific interaction-The Family Traditions Enterprise

5.5.1. Desk Research

Research International was contracted to undertake desk research and collate information on food concepts, discuss with consumers and technical team and suggest concepts that could be developed further.

The work showed that Ghanaians spend about 55 % of their income on food including fish (20 %), roots and tubers (13 %) and cereals (16 %). Consumers, especially in the urban areas purchased a wide variety of convenience foods away from home on daily basis. It was realized that knowledge of the nature of economic activities, disposable income, poverty level, food security and the major food crops produced would help determine the types of convenience foods that is affordable and will meet the nutritional needs of the consumer.

A food concept was defined in terms of conventional preparation, nutritional value, conventional taste, affordable price, logical sizing, shelf stability (without refrigeration), and target groups. Food concepts that have been developed by various institutions and organizations were collated. They included food from all the major ethnic groups of the country and could be grouped into ready-to-use, semi-processed, and processed foods.

They were further grouped into:

1. Cereals and powders
2. Vegetables
3. Fruits
4. Soups
5. Spices

Fifty-six (56) concepts were collated, out of which, 22 were further discussed and 8 were finally selected on the basis of convenience, nutritional value and affordability. These concepts were:

- Fermented maize flour (fortified with cowpea)
- Fermented maize flour (fortified with Soya beans)
- Fermented maize flour and millet '*Maasa* flour' (Pancake mix)
- Precooked fermented maize flour
- Maize grits
- Cowpea flour
- '*Fula*' flour
- '*Fufu*' flours

It was also found that the most grown and consumed foods (urban and rural) were maize and cassava, hence the opportunities for developing shelf stable foods fell within these categories. This tied in with the identification of the eight food concepts whose base raw materials were in these categories.

5.5.2. Concept Evaluation

A qualitative study was commissioned to ascertain consumers' perceptions about concepts for a range of shelf stable products identified for further development for the Ghanaian market as part of objective 5.

The eight food concepts that were tested were rated based on nutritional value and convenience.

The following were selected on the basis of their perceived nutritional value

1. Fermented maize flour fortified with soybeans – added nutrients
2. Fermented maize flour fortified with cowpea – added nutrients
3. Cowpea flour

Those rated as convenient were:

- Fufu flours
- *Fula* flour
- Maize grits
- *Maasa* flour
- Precooked fermented maize flour

Table 5.11 is a summary on the concepts and the comments from panelists. The general opinion was that the products would be time saving and convenient to use. Maize flour fortified with cowpea was selected as the overall best concept in terms of nutritional value and convenience.

Table 5.11 Summary of Food Concepts and Comments from Respondents

Product	Concept Presented	Take out by Consumers/Evaluators
Fermented maize flour fortified with cowpea	Flour made from fermented maize dough fortified with cowpea. Fortification with high protein cowpeas (which we already eat) makes it more nutritious. It is produced and packaged under very hygienic conditions, making it healthier. It can be stored for a long time without refrigeration because it is a flour, provides the extra nutrients at an affordable price and it is easy to prepare. It could be used for the preparation of <i>Koko, Banku, abolloo</i> and <i>Kenkey</i>	The main strength of the concept is centered on the fact that it is highly nutritious as compared to the ordinary fermented maize dough which is mainly carbohydrate It is Good for weaning babies because of protein content. The idea that the product could be stored for a long time without refrigeration was welcomed. Some respondents had a problem with storing the corn dough.
Fermented maize flour fortified with soybeans	This is flour made from fermented maize dough fortified with soybeans. Fortification with soybeans makes it more nutritious. It gives you extra nutrients at an affordable price and it is easy to prepare It could be used for the preparation of <i>Koko, Banku, Abolloo</i> and <i>Kenkey</i>	There was positive identification with this concept. Respondents said it contains a lot of proteins and is very nutritious. It was prepared and packaged under very hygienic conditions thus making it safe to eat. For some groups, the insight was identified as similar to the concepts on fermented maize flour fortified with cowpea
Precooked fermented maize flakes/flour	This is a precooked fermented maize product. It is convenient for making instant porridge with cold or hot water	The main strength of this concept was the fact that the product was very convenient to prepare. They liked the idea that it could be easily prepared with cold or hot water because sometimes, they do not have the time for setting the fire to cook. Others were not sure how it will taste like since it was going to be precooked before it is made into flour.
Cowpea flour	This product is made from de-hulled cowpea seeds. It is highly nutritious because it contains a lot of good quality proteins that are building blocks for the body.	The overall takeout from this concept was that the product is highly nutritious and it will improve the nutritional level of their diet. Respondents liked the fact that the beany flavour and the gas content will be reduced because according to them, a lot of people did not like the flavour and had problems with bloating. The term “dehulled” did not sit well with them and they said it should be replaced with a more comprehensive word.
<i>Maasa</i> flour	This is premixed traditional pancake flour made from millet or rice or both and traditional spices.	This concept was liked because the product is time saving and convenient to prepare. It will give respondents the opportunity to try the product at home. The product is prepared under hygienic conditions as compared to the one on the market Also some respondents said when the flour is prepared without the spices it could be used for baking bread.
<i>Fula</i> flour	This is precooked premixed flour made from millet/sorghum and traditional spices.	The most appealing thing about this idea was that of convenience. Respondents liked the idea because most of them were of the opinion that the traditional Fula was prepared under unhygienic conditions. They also liked it because the product could be stored for a long time without going bad. Respondents who worked in the institutions said it would add variety to the kinds of drinks consumed

Product	Concept Presented	Take out by Consumers/Evaluators
Maize grits	<p>This is made from dehulled maize, which gives it a whitish appearance. It is produced under hygienic conditions and attractively packaged. This makes it healthier.</p> <p>It is dry therefore it has a long shelf life. It is affordable and very convenient to prepare. It is used to prepare Maize grits porridge – <i>ekuegbeemii</i>.</p>	<p>This concept was welcomed by respondents who were involved in institutional feeding. They were of the opinion that hulling and milling of maize into grits was very tedious and time consuming. Although some were of the opinion that when the maize is hulled, some of the nutrients will be lost</p>
Composite flours or Fufu	<p>This is a blend of cassava with either plantain or cocoyam in flour form. It is produced and attractively packaged under very hygienic conditions and therefore it is safer to use.</p> <p>It is convenient and easy to prepare it drastically cuts down the time and energy required to prepare pounded fufu and the final product is more hygienic.</p>	<p>Respondents welcomed this idea a lot because the product is going to cut out the drudgery in preparing <i>Fufu</i>. It will have the same taste and texture like the pounded <i>Fufu</i>. Some respondents were however stuck to the belief that powdered <i>Fufu</i> was not the same as pounded <i>Fufu</i></p>

The next stage was the commissioning of the Team from the Bean-Cowpea Project at the University of Ghana to produce these food concepts for evaluation.

5.5.3. Product Development Formulation and Evaluation

The Bean-cowpea Team from the University of Ghana produced the food concepts identified for evaluation. The objective of this phase was to test new packaged shelf stable products that are highly nutritious and convenient to use for sale on the Ghanaian market in terms of taste, texture, colour and time spent in processing it at home.

Women responsible for the purchasing and cooking decisions for their households in Accra and Tamale and prepared meals mostly from stable food crops were recruited. They included women from the LSM band covering ‘low to high’ income consumers.

Four branded products each about 1 kg in transparent sachets were provided to each respondent a week prior to participating in the discussion groups. User instructions were provided for some of the products. Respondents described culinary routine and evaluated packaging, market map of products and in-home use of products. The products tested included:

Group 1:

- Cowpea-fortified fermented maize flour
- Yam ‘*fufu*’ flour
- ‘*Fula*’ flour
- Cassava Plantain ‘*fufu*’ flour

Group 2:

- Cowpea flour
- Cassava '*fufu*' flour
- Precooked fermented maize flour fortified with cowpea
- Plantain '*fufu*' flour

Respondents were satisfied with packaging material used but suggested that products be made in bigger packs for supply to institutions such as schools, hospitals and prisons. They also indicated that instructions on products were important in order to explain how they were to be prepared. Suggested outlets for marketing included: Open market, Supermarkets and stores, Institutions e.g. schools, hospitals, prisons, food fairs

It was suggested that products be prepared on 'cooking programs' on TV as a way of advertising and education on products at women's fellowship programs be carried out.

The overall products (rating) for both sectors were:

- Cassava Plantain '*fufu*' – tasted just like '*fufu*' and time saving
- '*Fula*' flour – very refreshing drink
- Yam flour – tasted like yam

In terms of nutritional value and convenience, cowpea flour was adjudged the best product, followed by the fermented maize flour fortified with cowpea flour and Cowpea fermented maize flour (could have ranked higher if they were fermented for a shorter period of time). '*Fula*' flour and '*fufu*' flours were rated more for convenience than for nutritional value.

A two-pronged strategy was developed by the Ghana Private-Public Partnership Food Industry Development Program to extend the results of the work . One strategy involved extending the high protein products to rural communities to address malnutrition, improve quality and serve as a source of income for women operators. The other involved working with specific small-scale food processing enterprises which will show interest and commitment in producing some of the food concepts.

5.5.4. Interaction with the food industry

The Ghana Private-Public Partnership Food Industry Development Program together with Ahold and the IFC invited entrepreneurs in the food industry to share results of findings of research done on the development and testing of the food concepts. This was to provide a platform for sharing and also interest them entrepreneurs on the business opportunities available in this sector of the food industry.

Mr. Roland Waardenburg of Ahold presented the results of the findings of the work carried out by Research International on "New Product Development and Business Opportunities: Desk Research and Exploratory Market Study on New Packaged shelf Stable Products."

Prof. Samuel Sefa-Dedeh gave a presentation on “New Product Development and Business Opportunities: Products and Processes.”. The participants were taken through the unit operations and other treatments required for the processing the eight food concepts, the equipment required and packaging options. He also took participants through the production of traditional foods in Ghana such as ‘*Aburo ne Nkate*’, ‘*kenkey*’, ‘*fula*’ and ‘*abolo*’. He explained the production steps and raised concern about the short shelf life of the traditional food products. He mentioned some of the challenges faced in the production of the food products as:

- Laborious processes
- Poor shelf stability
- Packaging
- Equipment and facility
- Quality and safety
- Marketing and
- Finance

Following interactions the participants who were interested in the products were requested to submit a simplified business plan (see Box 3). Their submission of these plans was to determine the next steps.

Only one company based in Elmina, Family Traditions Enterprises (FTE) responded with a business plan. The Ghana Private Public Partnership Food Industry Development Program and Royal Ahold therefore continued to work with this company.

SHORT CUT BUSINESS PLAN: NEW FOOD PRODUCT DEVELOPMENT

Business Plan

Many entrepreneurs are unsure of where to begin when preparing a business plan. The business plan should be prepared so as to articulate your business model in a form that is easily understood

Preparing a Business Plan Who should write a business plan? A business plan reflects your thoughts and plans for your business and as such must be written by the entrepreneur/ CEO. You may need some help from advisors in challenging your comments and assumptions, deciding on content and overall format and you may also need assistance in preparing financial projections. You can contact IFC on that.

Outline Contents and Structure

- **Executive Summary** (1/2 page)
The executive summary should summarize the key points of your proposal, including:
 - The business opportunity
 - The product offering and unique selling points
 - Business operations
 - Strategic alliances
 - Sales and marketing strategy
 - Management team, their experience and how they will realize the opportunity
- **Product and Service** (1/2 page)
This section should explain, without technical jargon, your principal product OR service, its application and distinguishing features
- **Market Analysis** (1/2 page)
The market analysis section is of critical importance. It must clearly identify your understanding of the markets, its characteristics and your position and influence within it.
- **Marketing and Selling** (2 page)
Marketing and promotion
Key issues include:
Making the product or service known. Creating interest in the product/service. Various forms of promotion
Choices of sales method. Use of distributors, wholesalers or retailers
Product delivery. Order processing fulfilment. Physical stockholding
Out-sourced or in-house
- **The Management Team** (1/2 page)
By this stage, your plan would have demonstrated the potential of your product/service. But at every stage of your business's development, you have to prove that the management team is able and likely to realize the potential.
- **Key Issues – Risk Assessment** (1/2 page)
Demonstrate an understanding of the key risks
- **Strategic Alliance** (1/2 page)
A key consideration with early stage technology business is to decide whether strategic partnerships are required.
- **Appendices or Exhibits**
 - Management biographies
 - Financial projections (The assumptions based behind your projections are critical; they require careful thought and must be consistent with previous narrative)
 - Action Plan and Milestones (List the key stages necessary to achieve the plan, in chronological order with a note of responsibility for completion and the current status of each stage)

5.5.5. Intervention in rural communities

The first community identified was Gomoa Okitsew in the Central Region of Ghana. The main goal of the project was to introduce some of these products to the community, identify parties/persons interested in the mass production of these products for sale and also train these parties in the preparation of the product.

Okitsew was identified through interaction with the Ministry of Health in the Central region. The District Public Health Nurse of Agona Swedru, Mrs. Angie Bolton helped in this identification process. The community was chosen based on poverty level and the need for improved nutritional status of the children and women. A focus group discussion was initially held with the members of the community to introduce the product and get feed back after use of the product as to whether the product was acceptable and if the members of the community were willing to pick up the idea.

The community was introduced to the product and the benefits of the product discussed. They were informed that the product, which can be used as a weaning food, in no way should replace breastmilk but should be given after 4-6 months of exclusive breastfeeding (if possible). They were also instructed not to think of this food as a “miracle” food and therefore would not take their weanlings to the hospital when they are sick. A question and answer session was allowed after the teaching session. Questions relating to the dough and also its benefits were asked. A lady who was instrumental in the introduction of this product by the Hunger Project to Awutu Kwamang, when the current Program Director of GHPPP was its Country Director, accompanied the GHPPP team and spoke about the benefits of the product. She also talked about the benefits of the product and how it helped a lot of infants in Awutu Kwamang.

Samples of the product was distributed to the community and asked to evaluate. Only one woman had a negative report that her daughter had diarrhea after eating porridge made from the fortified fermented maize dough. Positive responses were:

- No off flavours, tasted just like fermented corn dough
- No diarrhea
- Takes phlegm out of children unlike what the fermented corn dough
- Gives a lot of breastmilk
- Gives good appetite for children
- Get more porridge out of the fortified dough compared to the unfortified.

A woman who sells “hausa koko”, a traditional cereal-based porridge, in the community showed interest in using the cowpea-fortified fermented maize dough for making her product. She was supplied with dough of 23,000 cedis (she was not told about the price) and asked to make the porridge and then tell us how much she made. She made 43,000 cedis.

She also asked for some financial support so that is an area that is being looked into. The community in general was interested in the cowpea-fortified fermented maize dough, but preferred if someone in the community will prepare it for sale.



Blending maize and cowpea

Milling into flour

Figure 5.9

Following the successful introduction of the nutritional products for children and pregnant women in Okitew five (5) more rural communities in the Greater Accra Region (Kordiabe), Central Region (Obosomase and Amanfrodo), and Eastern Region (Yensiso and Kwamoso) of Ghana were identified for the introduction, development and marketing of the cowpea –fortified fermented maize dough products. All the communities were visited and consultations held with the chiefs and elders

Following the approval of the elders of these communities to participate in this project, subsequent visits were paid to each community on weekly basis on a day convenient to each community. Members of the communities were educated on the nutritional benefits as well as profitability of the product. Demonstrations on the process of preparing the cowpea –fortified fermented maize dough were done in each community. Samples of dough were given to each member present for organoleptic assessment. Entrepreneurs involved in the sale of maize-based products in the various communities were also identified. Samples of dough prepared with their active participation were given to these entrepreneurs to be used to prepare the traditional food products (*koko, moree, banku and kenkey*) to be marketed.

Positive responses about the cowpea-fortified fermented maize dough such as nicer taste and flavour, higher elasticity, satiety and higher swelling capacity were reported by the members of the communities visited. In all, forty-seven (47) entrepreneurs were identified in the five communities. Thirty-three of them accepted to adopt the use of the cowpea- fortified fermented maize dough for the preparation of their traditional products. Twelve of them however could not adopt it due to alleged poor patronage of products made from cowpea fortified fermented maize dough as well as high cost of cowpea, which they claimed would be an extra burden in terms of cost of production. Profitability

from sale of traditional products made from cowpea- fortified fermented maize products ranged from -25.0% to 80.0%.

The cowpea-fortified fermented maize dough was well accepted in all the communities visited. Most of the entrepreneurs were enthusiastic in adopting the technology of cowpea fortification of maize dough. However, poor record keeping practices and inconsistencies in price of maize were identified as major problems undermining correct assessment of profitability of the product. A training program on record keeping was conducted for the entrepreneurs and follow-up made.

The Example of Amanfrodo Community

Profile of the Community

Amanfrodo is a farming community located in the Central Region of Ghana. It is 74km from Accra. The main crops grown include cassava, maize and cocoa. Main food eaten includes banku, koko and kenkey. It has a population of 450 to 500 adults. The community has a private school up to the junior secondary level, central refuse dump and bore hole as their main source of drinking water. One disc attrition mill was identified and is operated throughout the week. The community lacks a clinic and electricity. The taboo day for the community is Thursday.



Five visits were paid to the community. Activities included demonstration and evaluation on the product, identification of entrepreneurs, product evaluation, profitability of the concept and process evaluation.

The community was taught the different methods of dehulling the cowpea, however the traditional method was emphasized. Samples of the dough prepared were given out to community members for use and assessment. They were asked to ferment it as they



usually do, and use them in preparing their traditional foods for evaluation. Dough was used to prepare foods like banku and koko.

Feedback from Community. Some of the comments and observations they made about the product are documented below.

Product	Comment/Observation
Banku	<ul style="list-style-type: none"> • The dough had a high swelling capacity. • Colour was slightly browner compared to banku made from ordinary fermented maize dough. • The product had a slight beany flavour • The product was relatively more elastic • Product had a sweet taste.
Koko	<ul style="list-style-type: none"> • No colour change was observed • The product had a sweet taste • Product had a faint beany flavour

Twelve women entrepreneurs were identified and encouraged to use the fortified high protein dough for the commercial products and evaluate customer response and profitability. It was observed that record keeping was a problem for most of the entrepreneurs and this seriously affected their ability to assess profitability. It was

observed that some of them have been making losses in their businesses over a long period without their knowledge because they have not been keeping records of purchases made and revenues received. A portion of the products was served as family meals, and unaccounted for. Training program in simple business management and record keeping was put in place to assist the entrepreneurs.

5.5.6. Client-specific interaction-The Family Traditions Enterprise

Following the interaction with entrepreneurs on “product development and business opportunities,” it was agreed that all participating companies should submit a business plan following the outline given. This was to assist the Ghana Private-Public Partnership Food industry Development Program, Royal Ahold and African Project Development Facility (APDF) to evaluate the companies and develop a plan of further cooperation. Family Tradition was the only company that submitted a business plan and it was agreed that a visit be paid to the company.

A trip as made by Prof. Samuel Sefa-Dedeh, Program Director for Ghana Private-Public partnership Food Industry Development Program, Mr. Roland Waardenburg, Program Director for Royal Ahold and Dr. Peter Achuonjei, Coordinator, Michigan State University.

Family traditions Enterprises is a family business run by Mrs Gifty Dorkenoo. She is assisted by her husband Mr. Godson Deku who acts as the Sales and Marketing Director. The company is a small-scale enterprise involved in the artisanal processing of various food commodities. Family Traditions is interested in improving the quality of its products and expand on the product lines to include nutritious high protein foods. These are roots and tubers, cereals, fish, oilseed and spices.

5.5.6.1. The Company

Family Tradition Enterprises (FTE) is 10 years old and located at Eyiaye, a farming and fishing community near Elmina. FTE products are sold on the local market even though recently it has been involved in export of some of its products through contract arrangements with exporters. The company has six employees made up of 5 females and 1 male. They assist in executing unit operations such as cleaning, peeling, salting, packaging.

5.5.6.2. Product Profile

- Fish is processed by smoking, salting and drying and grinding into fish powder
- Shrimps are smoked and ground into powder
- Palm oil is processed out of location in some community in Western Region where the raw materials are available.
- Fermented Corn Dough (partially dehydrated)
- Corn Flour (Fig. 5.10)
- Dried cassava flour (kokonte), solar dried
- Cassava dough (agbelima)
- Gari (processed at Kissi village using contract employees).
- Pepper powder



Figure 5.10 Some Products of FTE

5.5.6.3. Overview on Product, Equipment and Facilities

- FTE is an artisanal company that applies modern concepts in processing, packaging and marketing. The methods used for processing fish, corn and cassava flours need to be reviewed to ensure product safety, shelf stability and meet regulatory requirements. For example, the corn dough was presented as a dry product. An evaluation of the product however showed that it contained a high moisture content which will make it unstable. It should be possible to set up a simple drying system (solar driers) to allow FTE to reduce the moisture content of their products.
- The company does not have its own mill therefore relies on a community-based private mill for its operations. This can promote contamination of the products. It is recommended that FTE repairs the mill which has broken down or invests in a new one to allow proper monitoring and control of the quality of the milled products.

- It was proposed that a HACCP Plan be drawn for all the products currently being produced. The plan should incorporate the strategies to ensure safety.
- Record keeping on processes should be done with appropriate forms designed for easy completion.
- The Ghana Standards Board and the Food and Drugs Board have regulations that guide the operations of Food Processing Establishments. FTE should ensure that its operations are so guided and that the necessary approvals and certifications have been properly done.

Following the visit the Ghana Private-Public Partnership Food Industry Development Program proposed to assist FTE with the following:

- Process evaluation and modification to improve quality. The processes for the corn and cassava dough to be reviewed and suggestions made to reduce the moisture content and increase shelf stability. FTE will be trained in Good manufacturing Practice, Simple dehydration systems and packaging.
- A layout of the premises will be proposed to ensure efficient use of space and promote safety.
- FTE will be shown how to produce a high protein fermented maize dough with the incorporation of cowpeas.

These activities were accomplished and the company adopted the new process for improving the protein content of its maize dough by incorporating cowpeas.