**Final Draft**

# Republic of Ghana

# Ministry of Food and Agriculture

## Food Safety Task Force

# World Bank

## Africa Agriculture and Rural Development (AFTAR)

# Revised Food Safety Action Plan

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## Tables



## Boxes:

## Acronyms and abbreviations

| | |
|---|---|
| AfDB | African Development Bank |
| AESD | Agricultural Engineering Services Directorate |
| AgSSIP | Agricultural Services Sub-Sector Investment Program |
| APD | Directorate of Animal Production |
| BRC | British Retail Consortium |
| CBPP | Contagious Bovine Pleuropneumonia |
| CCMC | Chemicals Control and Management Centre |
| CDP | Cashew Development Project |
| COCOBOD | Cocoa Marketing Board |
| Codex | Code Alimentarius Commission |
| COLEACP | Europe/Africa-Caribbean-Pacific Liaison Committee or *Comité de Liaison Europe-Afrique-Caraïbes-Pacifique* |
| CRI | Crops Research Institute |
| CSIR | Council for Scientific and Industrial Research |
| DANIDA | Danish International Development Agency |
| DFID | Department for International Development |
| DOF | Directorate of Fisheries |
| DVS | Directorate of Veterinary Services |
| EC | European Commission |
| ECOWAS | Economic Community Of West African States |
| ELISA | Enzyme-linked immunosorbent assay |
| EPA | Environmental Protection Agency (Ghana) |
| EU | European Union |
| EUREPGAP | European Retailers Protocol for Good Agricultural Practice |
| FAGE | Federation of Associations of Ghanaian Exporters |
| FAO | Food and Agriculture Organization of the United Nations |
| FDB | Food and Drug Board |
| FMD | Foot and Mouth Disease |
| FRI | Food Research Institute |
| FDL | Food and Drug Law |
| GAP | Good Agricultural Practice |
| GDP | gross domestic product |
| GHP | Good Hygiene Practices |
| GOG | Government of Ghana |
| GSB | Ghana Standards Board |
| GTZ | German Technical Cooperation |
| HACCP | Hazard Analysis Critical Control Point system |
| HAG | Horticulturalists Association of Ghana |
| HEII | Horticultural Export Industry Initiative |
| HIV | Human immunodeficiency virus |
| HPAI | Highly Pathogenic Avian Influenza |
| HPLC | High performance liquid chromatography |
| IPM | Integrated Pest Management |

| | |
|---|---|
| IPPC | International Plant Protection Convention |
| IRR | internal rate of return |
| ISO | International Standards Organisation |
| ISPM | International Standards for Phytosanitary Measures |
| MCC | Millennium Challenge Corporation |
| MD2 | A new variety of pineapple, developed in Latin America |
| MiDA | Millennium Development Authority |
| MLGRDE | Ministry of Local Government Rural Development and Environment |
| MOAP | Market Orientated Agriculture Program |
| MOESS | Ministry of Education Science and Sports |
| MOFA | Ministry of Food and Agriculture |
| MOH | Ministry of Health |
| MOTIPSPSI | Ministry of Trade, Industry, Private Sector and President's Special Initiatives |
| MRL | Maximum Residue Limit |
| NHTF | National Horticulture Task Force |
| NPV | net present value |
| NRI | Natural Resources Institute |
| OIE | World Organization of Animal Health or *Office International des Epizooties* |
| PAMPEAG | Papaya And Mango Producers And Exporters Association Of Ghana |
| PIP | Pesticides Initiative Program |
| PCR | polymerase chain reaction |
| PPR | *peste des petits ruminants* |
| PPRSD | Plant Protection and Regulatory Services Directorate |
| PRA | Pest Risk Analysis |
| QMS | Quality Management System |
| RIPH | Royal Institute of Public Health |
| SANAS | South African National Accreditation System |
| SPEG | Sea-Freight Pineapple Exporters Association of Ghana |
| SPS | Sanitary and Phytosanitary Agreement |
| SSA | Sub-Saharan Africa |
| TBT | Technical Barriers to Trade Agreement |
| TIPCEE | Trade and Investment Program for a Competitive Export Economy |
| UEMOA | West African Economic and Monetary Union or *Union économique et monétaire oust-africaine* |
| UK | United Kingdom |
| UNIDO | United Nations Industrial Development Organization |
| USAID | United States Agency for International Development |
| VEPEAG | Vegetable Producers Exporters Association of Ghana |
| WATH | West African Trade Hub |
| WB | World Bank |
| WTO | World Trade Organization |

# Executive Summary

## Introduction

With an estimated one in forty Ghanaians suffering each year from serious food-borne disease, poor food safety poses an important drain on the economy. Similarly, with production and post-harvest losses of 10 – 30 percent each, poor agricultural health conditions significantly affect rural livelihoods. A very approximate, but conservative estimate shows that total losses from human disease and production and post harvest losses because of pests and diseases exceed US $ 300 million per year.

The need for action to reduce these losses will become even more important in the future. As a result of the growing Ghanaian economy, food supply chains will get longer and risks for contamination will therefore grow. Moreover, as per capita income increases, the emerging affluent consumer will demand safer food. Also, access to export markets with high value foodstuffs will remain a critical engine for rural development, and hence for equitable and sustainable growth. But this access will only be achieved, if high quality and safe produce is presented at the market. Strengthening laws, institutions, and infrastructure to produce safer food for the domestic and export markets is therefore economically and socially justified.

A large number of actions needed to support the production of safer food resort in the public domain. Action by the Government of Ghana (GOG) is therefore needed. The issues are well-known and have been documented by the recent studies, carried out by GOG, the World Bank-FAO, and other development partners. These studies covered the major sectors and the overall institutional framework. A Task Force under the coordination of the Plant Protection and Regulatory Services Department (PPRSD) of the Ministry of Food and Agriculture (MOFA) has integrated these studies into an investment plan. This Task Force Investment Plan provides a detailed and useful overview of the proposed investments. However it does not address the regulatory and institutional issues, lacks investments in a number of critical areas (such as risk analysis, control of emerging pests and the development of Good Agricultural and Hygiene Practices), does not provide a clear set of priorities, and is not explicit in the respective funding contributions of the public and private sectors for the plan. As such, it was not yet suitable for funding.

To make this Task Force Investment Plan acceptable for investors, the GOG asked the World Bank (WB) to review this Plan, with a focus on refining the priorities and identifying missing critical investments. Moreover, GOG requested the WB to address the regulatory and institutional issues and identify the scope for public and private funding. This Revised Action Plan, prepared by a GOG-WB mission, is based on the Task Force Investment Plan, earlier studies and the mission's discussions with stakeholders. It seeks to meet GOG's requests, and to provide specific recommendations on the necessary legislative and institutional and infrastructural requirements to meet their goals of reducing the incidence of food-borne diseases, improving the health of its

crops and livestock and maintaining and enhancing access to export markets. It now requires the endorsement of GOG to translate this Revised Action Plan into concrete actions.

**The Current Situation**

In summary, the *legislative and institutional framework* is outdated, and is characterized by overlaps and ambiguity in institutional responsibilities in particular in inspection and laboratory tasks. This, in turn, results in inefficiency in the use of government resources, increased overhead costs and loss of national and international competitiveness for the private sector. Moreover, it does not follow the principles of international good practice of separating (a) Standard setting and advisory roles from standard enforcement roles; and (b) Risk assessment from risk management functions.

Regarding *Sanitary and Phytosanitary Standards (SPS),* in addition to the excellent product safety performance in the cocoa sub-sector, the horticultural and fisheries sub-sector have shown to be able to meet the standards of international markets. For the domestic market, food safety and agricultural health standards are often set at quite stringent levels, but are poorly enforced, leading to the public health and economic losses described in the introduction of this Revised Action Plan. The challenge is to establish domestic market standards at a level which results in safer food, while being enforceable.

Regarding *infrastructure,* Ghana can meet most required food safety and SPS related analyses, although strengthening to international certification level is needed. More significant weaknesses exist in disease and pest surveillance and control systems and the related capacity for risk analysis. Even greater food safety and agricultural health deficiencies prevail in the on-farm production, processing and distribution systems.

**Recommendations**

With this background, the specific recommended actions are:

(a) At **the legislative level,** a regulatory framework needs to be established that clearly and unambiguously stipulates the mandates of the institutions involved. More specifically:

- The pending **Standards Decree** and **Food and Drug Law** need to be harmonized to eliminate any duplication between the Ghana Standard Board and the Food and Drugs Board;
- The pending **Plant Quarantine Law** and **Meat Inspection Law** and **Veterinary Surgeons Act** need to be revised and enacted, to bring in line with international requirements; and
- The supporting **regulations for the Fisheries Law** need to be issued.

The revised drafts of the new food safety, standards and agricultural health laws, now pending Parliament approval, do not yet adequately address these weaknesses, according to key stakeholders interviewed by the mission. Detailed reviews and revisions are therefore needed before these laws and regulations are approved.

(b) At **the institutional level,** it is recommended that an organizational framework would be established, which follows the above mentioned principles regarding the separation of (i) standard setting and enforcement; and (ii) risk analysis and risk management functions. While more specific studies and discussion are required, this would lead to the following recommendations regarding the institutional adjustments in the public sector**:**

- **FDB** would become **the Central Food Safety Agency for Ghana**, in charge of the coordination of all activities related to the regulation of food safety. In this capacity, FDB would implement the policy decisions from the ministries concerned (MOFA, MOH, and MLGRDE) and enforce the standards set by GSB, through inspections and conformity assessments, either directly or through relevant agencies, such as the districts and municipalities. Over time, and in consultation with the EU as the major buyer, FDB could take over from GSB to become Competent Authority for export certification for fisheries. An alternative could be that DVS would develop into the Competent Authority, in line with the OIE recommendations. The comparative capacity of FDB and DVS in meeting the analytical requirements in fish certification, and the respective costs to bring the two laboratories up to the standards required by the EU would be important factors affecting this decision. Similarly, PPRSD could become the Competent Authority for plant health certification. In line with international good practice, this central food agency could evolve over time into a semi-autonomous agency, dependent on a SPS sector-neutral ministry, to avoid conflict of interest with consumers if directly dependent on MOH, or with the producers, if directly dependent on MOFA;

- **GSB** would become the **standard setting body,** for those standards where there is a moral hazard and/or a-symmetry in information. It would not be involved with the inspection, certification or other forms of conformity assessments, because of the potential conflict of interests. It could also be charged with the initial registration of food stuffs and agricultural inputs[1]. In the food safety area, the standards setting would cover standards for all contaminants with a potential risk for public health (microbiological, heavy metals, and other contaminants). It would normally leave the setting of commercial quality standards without public health risks, to the private sector;

- The **technical ministries and agencies** (MOH, MOFA and EPA) would concentrate on **policy setting, and maintain the advisory and risk management functions**, thus separating the enforcement and advisory functions; and

[1] There could be a potential conflict with its proposed responsibility for standard setting, but entrusting the initial registration of a product to an enforcement agency (FDB), which would also be responsible for subsequent conformity assessment of that product would establish a more significant conflict of interest situation.

- **The CSIR with the Food Research Institute and the Animal Research Institute and the universities** would be the prime institutes to develop a **risk assessment capacity,** thus separating the risk assessment and risk management functions.

This Action Plan also recommends a strong emphasis on the development **of private institutions.** This would include:

- **Establishment of an apex** body for the plant sub-sector and **professional organizations** for the livestock and fisheries sub-sectors. The main tasks of these private organizations would be to present the interests of their sub-sectors in the policy dialogue. For the plant sub-sector, this apex body could set quality standards (but not safety standards, as this is a public sector responsibility) in close cooperation with the leading body on GhanaGAP (see below). For the livestock and fisheries sub-sectors, the professional associations could develop GHPs. Both could develop training programs, negotiate more favorable prices for inputs and transport costs and seek access to new markets, etc; and

- **Further development of GhanaGAP** according to a gradual, modular (food safety/quality/environment/social issues) and multi-tiered (domestic/export markets) approach, to be led by a single public-private partnership GhanaGAP body, with an effective leadership mandate, clear roles, responsibilities and adequate resources.

(c) At the **investment level**, this Action Plan recommends, in line with the Investment Plan proposed by the Task Force, investments to **strengthen the capacity of the central agencies to carry out their mandate** and to establish **pilot operations with innovations or demonstrations how to upscale technologies to improve the safety of the supply chain**. The funding of these pilot and demonstration operations would be in partnership between the public and private sector. The investments are summarized in table A.

(d) For the funding, this Revised Action Plan recommends different **financing mechanisms**, including pure public sector funding, matching grants, and government ownership with lease, and cost recovery through user fees, depending, among others, on the level of public good of the investment, and the access to credit. Routine laboratory and certification services would need to move to full cost recovery, to enable private sector services to emerge.

(e) As these investments carry a total budget of US $ 90 million, of which US $ 70 million would have to be contributed by the public sector, **priorities** have to be set. On the basis of their priority in the development sequence, and the approximate cost/benefits of the different potential investments, this Action Plan recommends the following priorities over a five to ten year period:

- A first priority to be carried out over the first year for the proposed recommended **adjustments in legislation and institutional organization** of the food safety and agricultural health sector;

- The second priority to the **strengthening of the Lead Laboratories** (table 8) for the different types of analyses to be carried out over the first two years, increasing their users fees for routine certification to full cost recovery;

- The third (but still very high) priority to **strengthening the risk management** functions of institutions concerned with the crop sector. The higher returns in the crop sector (Chapter 8) justifies this priority, and in particular for the control of the Fruit Fly; and

- The fourth (more long term) priority to the **establishment of realistic GAP and GHP** in the production and processing sector.

Investments in the **pilot operations or demonstrations** in the different sectors could be introduced all along this sequence, although some actions would clearly benefit from the activities described under the earlier priorities, and could better wait till they are met. For example, slaughterhouse improvement, without a clear delineation of the responsibilities for inspection and agreed GHP would be counterproductive, but GHP could be developed in parallel with the finalization of the legislation.

This leads to a first priority investment of US $ 32,418,000, a second priority investment of US $ 32,191,500 and a third priority of US $ 5,371,000, as detailed in the Annex 5

## Table A. Summary of proposed investments

| Sector | Main Items | Overall Costs (US$) | Proposed Public Sector Contribution |
|---|---|---|---|
| **Capacity Building and Agricultural Health** | | | |
| Overall | Review legislation, development of GAP, and risk assessment capacity | 1,020,000 | 1,020,000 |
| Plant sector | Development of surveillance systems, and pilot control of pests, in particular the fruit fly | 3,610, 000 | 2,285,000 |
| Fisheries sector | Development of GHP and upgrading inspection systems | 510,000 | 510,000 |
| Livestock sector | Development of GHP and upgrading inspection systems | 1,462,000 | 1,024,500 |
| Total | | **6,602,000** | **4,839,500** |
| **Enhancing Laboratory Capacity** | | | |
| Leading labs | Equipment improvement | 4,388,000 | 4,388,000 |
| Back-up labs | Id. | 3,121,000 | 3,121,000 |
| Total | | **7,509,000** | **7,509,000** |
| **Infrastructure Investments** | | | |
| Maize Mycotoxin | Refurbishing and pilot testing drying installations for corn | 14,495,000 | 4,519,500 |
| Other commodities | Improving environmental health of oil palm and cassava processing | 400,000 | 200,000 |
| Horticulture | Development of pilot improved vegetable supply chains in 5 districts | 9,025,000 | 6,487,500 |
| Fisheries | Developing landing sides and processing capacity | 47,600,000 | 43,750,000 |
| Livestock | Introducing improved slaughterhouse technology | 4,925,000 | 2,675,000 |
| Total | | **76.445,000** | **57,632,000** |
| **Overall total** | | **90,556,000** | **69,980,500** |

## Introduction

Sanitary and Phytosanitary (SPS) and food safety issues are already playing an important role in the Ghanaian export sector of perishable products such as fruit, vegetables and fish. The inability to meet the standards also has a serious impact on the domestic economy with major losses caused through a reduction in work output and an increase in medical costs from food-borne diseases and through losses in the production and post harvest food chain caused by poor agricultural health situations. Their importance in domestic agricultural production, processing and marketing can be expected to increase as the Ghanaian economy continues to grow, and more affluent consumers will demand safer products.

Over the last six years, the Government of Ghana (GOG) with support from World Bank and FAO, has prepared a number of studies covering key aspects of the food safety system, i.e. the original Food Safety review prepared by Abigail Andah (2002), a series of commodity studies on maize (Plahar, 2005), Fisheries (Akande, 2005), a commodity survey on vegetables (Graffham, 2005), and an initial project identification report (Gagnon and team, 2005). Useful information has also been prepared by USAID.[2]

To consolidate these various studies into an overall investment plan, the Ministry of Food and Agriculture (MOFA) established the Task Force on Food Safety. This task force is chaired by the Plant Protection and Regulatory Services Directorate (PPRSD) of MOFA and includes the main stakeholders of the public and the private sectors. The Investment Plan prepared by the Task Force is based on the initial studies mentioned above, and provides a detailed description of the needs in infrastructure, equipment and human capacity building. However, the document lacks a clear set of priorities, does not address the regulatory and institutional issues, lacks some critical investments, and is not clear in the respective funding contributions of the public and private sectors for the plan. MOFA asked the World Bank therefore to review this Investment Plan, addressing these issues, thus making the Plan ”bankable” according to the requirements of the development partners. A seven person mission[3] composed of national and international experts were involved from November 15 till December 20, 2007 in this review. A workshop on GhanaGAP was organized on November 29 and 30 in conjunction with this mission.

The Revised Action Plan prepared by the MOFA/World Bank team is based on the food Safety Action / Investment Plan prepared by the Food Safety Task Force, combined with a critical review of the previous documents, and discussions with the key

[2] WATH Technical report 18 on SPS Capacity in Ghana (December 2006)

[3] Mr. Michael Boateng (Public Health and cover photos), Mr. Francois Gary (Livestock and Fisheries sector), Ms Laura Ignacio (Cost/benefits), Dr. Wisdom Plahar (Plant sector), Mr. Christophe Ravry (Institutions) and Ms Jeanette Sutherland (Good Agricultural Practices). Mr. Cees de Haan was the technical coordinator of this Action Plan. The Bank-Netherlands Partnership Program funded this mission.

public and private stakeholders of the different sectors. This Revised Action Plan consolidates the individual consultant reports of the November-December mission. Their reports are available on request from PPRSD.

The Plan provides first a *description* of the recent trends in the agriculture and food sector and the recent developments in the food chain. It is then followed by an *analysis* of the available information on the health and agricultural production losses caused by poor food safety and sanitary and phytosanitary conditions, and the main gaps and overlaps in the regulatory and institutional framework for agricultural health and food safety. It then provides *recommendations* on actions regarding the mandate of the institutions involved to redress these gaps and overlaps, and arrive at a more efficient use of human and financial resources. It finally provides a summary of the needed investments, grouped by category (capacity building, disease and pest control, and infrastructure investments) and priorities and finishes with cost-benefit calculations and their implications for priority setting of these major investments.

# Chapter I The Agriculture and Food Sector

Agriculture is an important economic sector for Ghana, contributing about 38 percent of gross domestic product (GDP) (Table 1), accounting for more than 55 percent of foreign exchange earnings and employing about 70 percent of the labor force.[4] Within the sector, crops (including fruit and vegetables but excluding cocoa) and livestock contribute 25 percent to GDP, cocoa 5 percent and fishing and forestry, 4 percent each.

**Table 1 GDP and sectoral value added contribution (percent), selected years**

| **Year** | 2000 | 2005 | 2006 |
|---|---|---|---|
| GDP (current US$, billion) | 5.0 | 10.7 | 12.9 |
| Agriculture, value added (% of GDP) | 35.3 | 37.5 | 37.7 |
| *Crops and livestock* | *24* | *25.1* | *24.9* |
| *Cocoa production and marketing* | *3.2* | *4.5* | *4.9* |
| *Forestry and logging* | *3.5* | *3.8* | *3.8* |
| *Fishing* | *4.6* | *4.1* | *4.1* |
| Industry, value added (% of GDP) | 25.4 | 23.2 | 21.2 |
| Services, value added (% of GDP) | 39.3 | 39.4 | 41.1 |

*Sources*: World Bank Development Data, Ghana Data Profile and Details of the Agriculture sector from the Bank of Ghana Annual Report 2006.

***Crops*** Ghana's wide range of climates, combined with GOG policy to reduce dependency on a small number of crops (cocoa, maize and tubers) resulted in a rather diversified cropping system, with cocoa still utilizing the largest area, followed by cassava and maize (table 2). Banana, cocoa beans, oranges and maize have the highest growth rates in production for the period 2001-2006, 460 percent, 88 percent, 57 percent and 27 percent, respectively,—cocoa beans and pineapple are the most important foreign exchange earners, banana and oranges are growing export products, although from a very low level. Maize is traditionally the major staple food used for both human consumption and formulation of animal feed and is a part of the majority of the farming systems of the central and southern parts of the country.

***Fisheries*** Fisheries is an important sector in Ghana affecting the livelihood of an estimated 1.8 million people, or about 10 percent of the population of Ghana. Other than the people directly involved in the primary production of fish, there are those involved in ancillary industries such as packaging, marketing, boat building, gear making, ice production, etc. Fish consumption is about 25 kg per person or 60 percent of animal protein intake. The industry consists of marine fisheries, fresh water fisheries and aquaculture.

- Marine fishing has three sub-sectors: artisanal, inshore and industrial. There are about 125,000 fishermen in the artisanal sector, with about 11,200 canoes, operating in 304 landing centers in 185 fishing villages. The inshore fleet consists of about 230

[4] African Development Fund 2005

trawler/purse-seiners, operating from eight landing sites. The industrial sector has trawlers and shrimpers, bait boats and purse-seiners operating from Tema and Takoradi.

- Fresh water fishery is mostly carried out in the Lake Volta region, contributing 90 percent of inland fishery production and involving 300,000 people.
- Aquaculture is still relatively new but is growing. Tilapia (80 percent) and catfish (20 percent) are the main products.[5] Production from aquaculture was estimated in 2004 at 950 tons, at a value of about $1.5 million per year.[6]

**Table 2 Production (1,000 metric tons) and area harvested (thousand hectares) for selected crops and selected years**

| | 2001 | | 2003 | | 2005 | | 2006 | |
|---|---|---|---|---|---|---|---|---|
| | Quantity | Area | Quantity | Area | Quantity | Area | Quantity | Area |
| Cocoa beans | 390 | 1,350 | 497 | 1,500 | 740 | 1,850 | 734 | 1,835 |
| Cereals | | | | | | | | |
| *Maize* | 938 | 713 | 1,289 | 792 | 1,171 | 750 | 1,189 | 793 |
| *Sorghum* | 280 | 329 | 338 | 346 | 305 | 305 | 315 | 320 |
| *Rice, paddy* | 275 | 136 | 239 | 117 | 287 | 120 | 250 | 125 |
| *Millet* | 134 | 193 | 176 | 207 | 185 | 185 | 165 | 200 |
| Roots and tubers | | | | | | | | |
| *Cassava* | 8,966 | 726 | 10,239 | 807 | 9,567 | 750 | 9,638 | 790 |
| *Yams* | 3,547 | 287 | 3,813 | 321 | 4,102 | 319 | 3,600 | 300 |
| *Taro* | 1,688 | 262 | 1,805 | 277 | 1,686 | 255 | 1,660 | 260 |
| *Sweet potato* | 90 | 65 | 90 | 65 | 95 | 68 | 90 | 65 |
| Fruit | | | | | | | | |
| *Plantains* | 2,074 | 265 | 2,329 | 286 | 2,792 | 290 | 2,900 | 299 |
| *Banana* | 10 | 4 | 10 | 4 | 53 | 7 | 56 | 7 |
| *Pineapple* | 60 | 10 | 60 | 10 | 71 | 12 | 66 | 11 |
| *Oranges* | 300 | 42 | 300 | 42 | 500 | 54 | 470 | 59 |
| Vegetables | | | | | | | | |
| *Tomatoes* | 200 | 37 | 200 | 37 | 200 | 40 | 176 | 33 |
| *Okra* | 100 | 18 | 100 | 18 | 100 | 18 | 105 | 19 |
| *Chilies and peppers, green* | 270 | 75 | 270 | 75 | 329 | 89 | 277 | 77 |

*Source*: FAOSTAT, accessed December 2007

An annual average of 400,000 tons of marine and inland water fish is landed at a value of about US $ 1 billion, or 2.4 percent of GDP. Fish caught includes sardinellas, mackerels, anchovies and tunas. Tuna landing of the three major species is between 60,000-80,000 tons per annum. In the industrial sector, the fish is usually frozen at sea. Two tuna canneries are based in Tema. For the artisanal and inshore fleet, the catch is smoked, salted or dried. Post harvest losses because of lack of infrastructure (ice) are estimated at 10-15 percent of total landings.

***Livestock***: The livestock sector produces almost exclusively for local consumption, with draught power for crop production being an important by-product. Production levels for selected meat products, milk and eggs from 2001-2006 are shown in Table 3.

[5] National aquaculture sector overview, FAO fisheries
[6] Akande Consultancy report Fish Sector (2005).

Increases were recorded for all meat products except for Pigs due to outbreaks of African Swine Fever.

**Table 3 Annual Domestic Meat Production (1000 Metric Tons) 2001-2006**

| Type of Livestock | **2001** | **2002** | **2003** | **2004** | **2005** | **2006** |
|---|---|---|---|---|---|---|
| Cattle | 19.1 | 18.3 | 18.5 | 18.5 | 18.9 | 19.1 |
| Sheep | 12.8 | 13.2 | 13.6 | 14.0 | 14.5 | 14.9 |
| Goats | 12.0 | 12.6 | 13.9 | 15.3 | 15.3 | 15.6 |
| Pigs | 9.7 | 10.4 | 10.2 | 10.0 | 9.7 | 10.6 |
| Poultry | 14.6 | 19.4 | 21.1 | 23.0 | 22.7 | 27.2 |
| *Milk, total | 34.2 | 34.6 | 35.1 | 35.5 | 36.0 | 36.5 |
| *Eggs, total | 22.3 | 23.3 | 24.4 | 25.2 | 25.2 | 25.7 |

Source: Statistical Research and Information Directorate (SRID), 2006, and computations from Livestock Production data *Source: FAOSTAT, accessed December 2007.

***Structure of the farm sector*** Agricultural production is dominated by small-scale operations, with 90 percent of total cultivated land on land holdings of less than two hectares. These small farms are largely managed by women using labor intensive technology. Initial post-harvesting and storage of the main food crops, in particular of maize is on-farm. These products are then sold through a network of small traders with few links between producer and consumer. There are substantial economies of scale in several aspects of the improvement of food safety, and the very fragmented production and processing systems are therefore a major constraint to the production of safe food. For example, the dissemination of knowledge on good agricultural practices is more complex under smallholder systems. The investments needed to produce safer foods are costlier per unit of products than for large scale producers. Costs of certification are higher on spatially fragmented smallholder farms and initial processors. For example, pineapple growers with less than one hectare can not meet the investment and operating costs related to the access into the European market, and those with 1-2 ha only marginally, even if they grouped together for some of the investments and services required.

Formal maize marketing through a parastatal company is stopped[7]. Aquaculture production is similarly characterized with a majority of small-scale subsistence farmers, and hence with lack of organization to support the establishment of suppliers of inputs such as fish seed and feed.

[7] An overview of the food supply chains (which is outside the scope of this Plan), is provided by Christian Berg, Susanne Bercher-Hiss, Martina Fell, Alexander Hobinka, Ulrike Müller and Siddharth Prakash (2006) Poverty Orientation of Value Chains for Domestic and Export Markets in Ghana S SLE Publication Series Humboldt University, Berlin, Germany

# Chapter II Developments in the domestic and export food chain

## (a) Domestic food sector

The domestic food chain is dominated by small- and medium-scale family-owned businesses that process locally grown foods such as cassava, fruit and vegetables, and nuts. There are local establishments such as Cowbell and Fan Milk which produce dairy products and juices. More recently Athena Foods and Pinora have set up pineapple and orange concentrate juice factories. There are also multinational and regional food processors such as Nestle and Cadbury.[8] The retail food market consists of (a) traditional open air markets with 65 percent of the total retail food sales; (b) small convenience stores and groceries with 30 percent of the food retail market; and (c) supermarkets with 5 percent of the market. The traditional open air markets retail mostly locally produced agro-foods with a limited selection of imported products, which they obtain from wholesale outlets owned by importers. The growth of the sector is driven by growth in the supermarket sub-sector with high-value food products. Improved living standards, together with a growth in expatriate population, are seen as the main drivers behind the increasing demand for high-value food products. Total sales for the retail food sector in 2006 were about $1.2 billion with the breakdown shown in Table 4.

**Table 4 Breakdown of retail food sales for 2006 by value**

| Type of food product | Percentage of total sales | US $ million |
|---|---|---|
| Imported [9] | 32 | 384 |
| Partly processed and packaged in Ghana | 8 | 96 |
| Totally processed in Ghana | 15 | 180 |
| Locally produced | 45 | 540 |
| Total | 100 | 1200 |

*Source*: Ghana exporter annual guide 2007. USDA FAS. Gain report GH7005. October 5, 2007.

Future trends point to an increasing share being processed outside the family homes. Two trends will be particularly important:

- The important and growing role in the domestic food retailing sector played by street food vendors. It is estimated that there are about 60 000 street food vendors in Accra with a combined annual turnover of US$ 100 million[10]. Street foods play an important socio-economic role in African economies in terms of employment generation. Although street food vendors come from diverse backgrounds, the majority are female heads of households.

[8] "Agri-food market in Ghana", report by the Canadian High Commission in Accra, ITCan InfoExport site.
[9] Of the imported high-value food products, 45 percent come from Europe, 40 percent from Asia, 5 percent from USA and 10 percent from South Africa and other countries.
[10] Tomlins and Johnson, 2002.

- The growing importance of the supermarket sector. While, currently at five percent still rather insignificant, Ghana has already nine large retailers (each with annual sales figure over US $ 1 million) operating in the country. Major South African supermarkets, such as Shoprite, have opened branches, and are planning to expand further[11]. It is likely that Ghana will follow the same trend as in Kenya, with a growth of 18 percent per year from the mid-nineties to 2003, including a significant build-up in the rural areas.

**(b) Agricultural Trade**

Since the late 1990s, GOG Government has sought to diversify the agricultural sector to reduce reliance on the traditional exports of cocoa, yams and cassava, shifting the focus and resources towards the development of non-traditional exports such as fish, fruit such as pineapple, papaya and mangoes, and vegetables such as Asian vegetables, okra and long beans.

Table 4 shows the level of agricultural exports and imports for the years 2001-2006. Food and live animals comprise on the average 58 percent of total exports and 14 percent of total imports. Major exports are cocoa beans, fish products and fruit (notably pineapples) and vegetables. Fish and seafood exports are made up of tuna (whole loins and canned), frozen fish (mainly demersal species), shrimps, lobsters, cuttlefish and dried/smoked fish. The value of food and live animal exports has more than doubled in the period 2001-2006, a reflection of the growth in cocoa beans and fruits although the latter from a lower level. Maize is also exported, but often through informal channels, and hence not fully captured in the data of Table 4.

The drop in the value of pineapple exports in 2005 reflects the shift from the production of smooth cayenne variety to the MD2 variety. European countries are the primary destinations for all food exports. Cocoa beans exports reach also the Asian markets.

[11] http://www.ats.agr.gc.ca/sahara/3918_e.htm

**Table 5 Ghana agro-food exports and imports (US$'000), 2001-2006**

| | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 |
|---|---|---|---|---|---|---|
| **Total exports** | **1,442,834** | **1,595,265** | **1,951,627** | **2,228,811** | **2,144,111** | **2,369,065** |
| Food & live animals | 673,469 | 864,396 | 1,157,671 | 1,362,864 | 1,331,429 | 1,580,354 |
| Live animals except fish | 749 | 1,025 | 1,417 | 1,151 | 1,338 | 1,275 |
| Meat & preparations | 83 | 262 | 271 | 125 | 70 | 3 |
| Dairy products & eggs | 298 | 510 | 4,899 | 5,712 | 6,064 | 4,366 |
| Fish/shellfish/etc. | 106,081 | 115,429 | 129,838 | 139,461 | 123,269 | 136,029 |
| Cereals/cereal preparation | 869 | 2,745 | 5,189 | 2,011 | 1,561 | 930 |
| Vegetables and fruit | 61,298 | 80,106 | 123,071 | 151,355 | 147,961 | 141,983 |
| *Vegetables* | *17,596* | *18,192* | *22,726* | *27,621* | *29,211* | *33,702* |
| *Pineapples* | *36,202* | *49,567* | *69,859* | *82,309* | *71,152* | *61,888* |
| *Banana/plantain* | *2,830* | *3,134* | *1,305* | *2,580* | *4,606* | *28,357* |
| Sugar/sugar prep/honey | 503 | 317 | 867 | 1,333 | 231 | 115 |
| Coffee/tea/cocoa/spices | 486,593 | 659,927 | 887,092 | 1,057,154 | 1,044,113 | 1,285,196 |
| *Cocoa* | *484,217* | *657,961* | *884,727* | *1,054,129* | *1,041,383* | 1,282,101 |
| Animal feed exc. un-milled cereal | 15,553 | 2,576 | 1,973 | 2,046 | 2,592 | 2,702 |
| Miscellaneous food products | 1,441 | 1,500 | 3,055 | 2,515 | 4,229 | 7,755 |
| **Total imports** | **2,379,108** | **2,703,779** | **3,565,178** | **4,219,531** | **4,371,160** | **4,598,498** |
| Food & live animals | 267,973 | 345,044 | 488,331 | 635,852 | 731,959 | 664,901 |
| Live animals except fish | 3,980 | 2,774 | 7,839 | 3,078 | 1,783 | 1,707 |
| Meat & preparations | 13,651 | 24,883 | 36,443 | 49,779 | 66,559 | 65,863 |
| Dairy products & eggs | 30,307 | 23,596 | 34,060 | 48,208 | 51,151 | 58,030 |
| Fish/shellfish/etc. | 15,060 | 26,897 | 36,028 | 34,995 | 39,901 | 49,354 |
| Cereals/cereal preparation | 107,646 | 120,811 | 149,366 | 246,145 | 243,825 | 175,384 |
| *Wheat/meslin* | *36,577* | *44,997* | *40,265* | *58,903* | *54,986* | *59,646* |
| *Rice* | *46,777* | *48,521* | *71,088* | *140,160* | *123,649* | *76,491* |
| *Cereal etc flour/starch* | *19,720* | *21,484* | *34,897* | *44,354* | *49,151* | *35,980* |
| Vegetables and fruit | 20,130 | 36,354 | 55,924 | 65,912 | 81,004 | 64,611 |
| Sugar/sugar prep/honey | 38,553 | 53,718 | 96,009 | 105,257 | 141,397 | 136,814 |
| Coffee/tea/cocoa/spices | 8,915 | 11,108 | 18,839 | 22,161 | 33,821 | 34,222 |
| Animal feed ex un-milled cereals. | 3,030 | 3,836 | 5,202 | 3,686 | 7,698 | 8,259 |
| Misc. food products | 26,700 | 41,068 | 48,619 | 56,629 | 64,822 | 70,658 |
| *Note*: These import data are actually export data of trading partners from Ghana. | | | | | | |
| *Source*: UN Comtrade (World Integrated Trade Solution), using SITC3 classification, accessed October 2007. | | | | | | |

## (c) Future Development in the agricultural export sector[12]

The following trends are expected in the different export sectors:

- ***Cocoa*** production will most likely remain the main agricultural export product of Ghana. The trend is towards increasing the value added in the country, with the share

[12] Based to a large extent on the TIPCEE Annual report, October 2006

of processed cocoa beans and cocoa intermediate products increasing. This will increase the need for external and internal laboratory tests in the cocoa sector.

- ***Pineapple*** production is gradually achieving a successful conversion to the MD2 cultivar. Current unmet orders for Ghanaian MD2 are estimated to reach a level of 40,000 tons annually, double the current supply. This market pull is expected to be catalyzed by the expected completion of the Shed 9 cold store terminal at Tema port, funded under World Bank supported AgSSIP project and the roll-out of the MCC program, which will provide investment in roads, irrigation and post-harvest installations. The growing interest in pineapple juice, particularly single strength but also concentrate and organic has re-kindled interest in Smooth Cayenne from processors seeking to develop export markets both internationally and regionally.

- ***Mango*** has been the focus of much attention, with a clear interest from the market to develop a supply line from Ghana as the country has some seasonal advantages, and could present an attractive alternative. However, several technical challenges remain as the crop is relatively new (40 percent of planted acreage in the South and 90 percent of the northern farms have yet to fruit). A major problem identified during the pilot mango sea shipment to Europe in June 2005 was poor quality of fruit due to inappropriate pruning techniques, an inability to control key pathogens and pests such as the mango stone weevil and anthracnose, and, more recently, the fruit fly, and poor agricultural and post-harvest practices used by most of the farmers.

- ***Papaya*** is starting to attract more attention from buyers. However the input and marketing channels open to small farmers is currently very limited – with four exporting firms accounting for most of the country's exports, and only one interested in developing linkages with smallholders. This is caused by the requirement for GlobalGAP (ex EurepGAP) certification and the loosely organized smallholder base with poor knowledge of best practices. The USAID sponsored TIPCEE has supported the re-building of the industry by teaming with an existing exporter and his surrounding out-growers to promote the Golden variety, together with improved nursery, husbandry, drip irrigation and post-harvest techniques. The initiative has captured the industry's interest, and several other firms otherwise involved in vegetable, mango or pineapple production have linked with TIPCEE to access the improved seed-stock as well as the associated field level support.

- ***Vegetables*** export from Ghana has been gradually growing, capturing a sizeable portion of the ethnic vegetable niche market in the UK, as a result of its clear advantage in terms of airfreight costs compared with current East African suppliers. Despite this commercial success, productivity remains low. Moreover, the limited skill base and unavailability of high quality seed stock depresses yields, to the point of making some crops unprofitable despite the freight cost advantage. One such product is okra, a major staple on the UK Asian specialty market, but for which Ghana has never captured substantial market share due to the currently used seed stock's vulnerability to various viruses. TIPCEE will support associations and farmer groups to develop seed procurement skills, the introduction of Integrated Pest

Management specific to the export crops, and other agronomic best practices, including drip irrigation. Recently, a thrips-infested vegetable shipment was rejected by British authorities. Loss of access to that market would cause a loss of US $ 5 million. PPRSD is preparing an action plan in response to this crisis, involving additional field training of small scale farmers involved in the industry.

- ***Cashew*** is gaining momentum with the recent creation of the African Cashew Alliance. However, the Ghanaian cashew output is still only one-tenth of the Cote d'Ivoire production. Nevertheless, the production base could grow significantly through the support of such programs as the Cashew Development Project (CDP) being managed by MOFA, as well as a clear interest in the crop on the part of professional traders active throughout the sub-region.

- ***Tomato*** in fresh form and as concentrated tomato paste is a staple of the West African diet and a major outlet for smallholders involved in commercial farming. The market is very competitive and Ghanaian farmers and processors face strong competition, at the regional level for the supply of fresh tomatoes and at the international level for the processed products. Tomato is part of the new set of commodities supported by TIPCEE's program. Activities, including irrigation and diversification trials have been programmed to improve productivity and quality to be able to compete with other international suppliers and thus maintain acceptable revenues for the farmers.

## Chapter III Need for Increased Action

Losses to the economy due to lower labor output because of high food-borne disease incidence, lower crop and livestock yields because of pest and diseases, and food spoilage because of poor post harvest processes, are considerable. An approximate estimate, although based on a deficient data base, gives losses to the economy at more than US $ 300 million per year, as detailed below. This is not counting foregone export opportunities and missed employment generation in the processing sector through increased value adding. Urgent action is therefore recommended and justified.

### (a) Impact on domestic human health.

- ***Diarrheal diseases from fresh foods*** are closely linked to poor hygiene in vegetable, fruit, meat and fish production and processing, including street foods. The food-borne diseases include diarrhea, hepatitis, typhoid and cholera. The total number of outpatient cases reported with these diseases is about 420,000 per year, with an annual death rate estimated at 65,000 and a total costs to the Ghanaian economy at US $ 69 million[13]. Other figures[14] give a total number of 84,000 deaths per year, with 25 percent being children under five years. Figures varying from 15 to 75 percent of diarrheal diseases due to food-borne pathogens are cited, as attribution of diarrheal diseases to food-borne diseases is difficult, as they are partially caused by poor sanitary quality of drinking water. If a 50 percent attribution is assumed, this would imply more than 200,000 Ghanaian cases annually of diarrhea caused by food borne diseases, with a loss to the economy of about US $ 35 million.

- ***Mycotoxin poisoning from poor maize drying*** is closely linked with mould development because of inadequate and delayed drying of maize. A number of studies by the Food Research Institute have confirmed the presence of myco-toxins in maize and maize products at unsafe levels, varying from 20 to 355 µg/kg aflatoxin from silo-stored maize and from 0.7 to 313 µg/kg aflatoxin in fermented maize-dough collected from major processing sites[15]. These high levels have carcinogenic effects (liver), stunt growth and cognitive behavior in children, and weakens the immune system, thus increasing, for example, the risk of HIV infection[16]. While the exact impacts of these high levels of myco-toxins on human health in Ghana are not known, it is reported that 40 percent of the productivity lost to diseases in developing countries is due to diseases exacerbated by aflatoxins. More specifically, figures from one district in Western Kenya[17] with a similar level of maize consumption, and,

[13] Breakdown (US$M): Lost working days- 9; , ORS-5.76; Health centre visit - 39.06; Transport to health centre - 3.15; Hospitalization- 8; and Funeral costs- 4.20. From Ghana Public-Private Partnership for Hand washing

[14] Ghana News Agency, 2003

[15] Ghana has adopted the Codex acceptable level of 15µg/kg (or 15ppb) for aflatoxin content in maize and products thereof, including fermented maize dough.

[16] Williams JH, Phillips TD, Jolly PE, Stiles JK, Jolly CM, Aggarwal D (2004) Human aflatoxicosis in developing countries: a review of toxicology, exposure, potential health consequences, and interventions. American Journal of Clinical Nutrition, Vol. 80, No. 5, 1106-1122, November 2004

[17] *Environmental Health Perspectives* Volume 113, Number 12, December 2005

incidental myco-toxin levels similar to the current levels reported in Ghana, show an incidence of 16.7[18], with a mortality of 33 percent.

- ***Poisoning from improper pesticide use*** is caused by poor knowledge, inadequate equipment and storage, application of unregistered and non-approved pesticides and the use of an excessive dosage. While, with an average annual use over the period 1995 – 2000 of 814 tons the use of pesticides and herbicides is relatively moderate in Ghana, most are in the highly and moderately hazardous category, and there are pockets of high use, such as in tomatoes, cabbage, onion and okra. In a survey, about 90 percent of the farmers interviewed indicated that they used pesticides. Of these, 45 percent stored the pesticides inside their homes, which constitutes a major health risk. Almost all farmers interviewed experienced some health complaints and on average spent between US $ 1- 1.50 per year on pesticide-related health problems[19]. The inappropriate use of pesticides is also reflected in the pesticide content on vegetables. A survey in three major cities[20], showed up to 80 percent of the vegetables contaminated, often with residue levels exceeding the MRLs. With an estimated 400,000 households using pesticides, and assuming seven day of lost labor per case, this would amount to losses of about US $ 5 million per year.

- ***Zoonotic diseases[21] from improper meat inspection*** have, according to the available records, minor importance, but are probably significantly under-reported. Of the zoonotic disease tuberculosis is present in Ghana with several human cases each year (3 to 5) declared at World Animal Health Organization (OIE), anthrax is reported in 2006 in about 31 human cases of with 7 deaths, and brucellosis has also been reported in several cases in 2006. In addition, parasitic diseases caused by Cysticercosis and other parasites, transmitted through the consumption of infected beef, seem widespread.

- ***Increased resistance to antibiotics*** resulting from improper use of antibiotics as growth promoters in livestock feed. While no data are available, these effects of non-therapeutic use of antibiotics in livestock and aquaculture can be expected to be a growing problem in human public health.

**(b) Impact on Plant health**

- ***Production and market losses from the fruit fly*** affect fruits such as mango, citrus, guava and papaya, and vegetables, like tomato, egg plant and pepper**.** The fruit fly *(Bactrocera invadens)* was identified in Ghana in 2005. Both males and females are similar in appearance but damage is often caused by females. They pierce the fruit to lay eggs. The larvae live and feed inside the fruit and destroy the pulp. The losses

[18] Number of cases per 100,000 inhabitants
[19] Source: research by Samuel E. Timpo of the Biotechnology and Nuclear Agriculture Research Institute, (Accra) as quoted in Michael Boateng's report.
[20] Amoah, Philip, Drechsel, Pay, Abaidoo, and Ntow, W,J.2006, Pesticide and Pathogen Contamination of vegetables in Ghana's urban markets, Archives of Environmental Contamination and Toxicology, 50:1-6. Springer, New York.
[21] Diseases transferred from animals to humans

because of the fruit fly are major, including a likely ban on fresh fruits and vegetables imports from Ghana (now valued at about US $ 140 million), with the consequent reduction in foreign exchange earnings, post-harvest losses for sale in the domestic market, loss of farmers income, and increased risk of exposure of producers and consumers to pesticides. Good Agricultural Practices, treatment of the fruits and eventually the establishment of pest free zones are some of the control measures available. A one quarter loss would signify at least US $ 35 million of foregone markets.

- ***Impact on production and market access of mango by anthracnose*** is a pest caused by a fungus mostly in the humid mango growing areas. It attacks the leaves, twigs, flowers and fruits. Severe infections can cause up to 80 percent yield loss. Diseased fruits result in reduction in fruit quality. Consequently, farmers lose expected revenue. Management options include farm sanitation and chemical control.

- ***Impact on production and market access by the mango stone weevil*** came to public notice in Ghana in the late 1980s following rejection of infested fruits by the export market. It is considered a hidden threat to the mango industry[22]. The weevil attacks only mango. Management options currently adopted include farm sanitation, cultural practices and chemical control. The chemical control involves the application of approved pesticides when fruits attain pigeon-egg size, and repeated after two weeks of initial application.

**(c)** ***Productivity losses from poor animal health*** are difficult to estimate, but with a reported calf mortality varying between 10 – 20 percent[23], and an even higher rate in sheep and goats, and the pig population decimated from African Swine Fever, economic losses because of animal disease certainly exceed US $ 50 million per year.

**(d)** ***Impact of post harvest losses*** are estimated by FAO at 10 to 30 percent of agricultural production. A more recent report[24] prepared for the World Bank shows a large variation (2 – 60 percent) but overall a somewhat lower figure. Assuming moderate losses between 5-20 percent depending on the type of food, the background report for this Action Plan estimates a total loss to the economy of more that US $ 500 million, and US $ 1-5 per week to spoilage of fresh agricultural produce and US $ 0.5-6 is lost per week per household to spoilage of processed and semi-processed food. Even if it is assumed that only 20 percent of the post harvest losses would be due to poor hygiene, this would still imply a loss to the economy of US 100 million. Similarly, if it is assumed that about 20 percent of the household level losses would be due to poor hygiene (a large part of the rest would be due to poor water and power quality) this would be, for the about 3 million households in Ghana a further loss of US $ 150 million.

[22] The pest attacks the stone and not the flesh. Although the merchantable value of the fruit is not affected, it remains a serious threat because this stone weevil (Sternochetus Mangiferae) is listed as a quarantine pest in the EU (zero tolerance), with any infected shipment likely to be entirely destroyed.

[23] http://www.cipav.org.co/lrrd/lrrd19/8/ndam19111.htm

[24] Sardong: Harvest and Post Harvest Baseline Study, Department of Agricultural Economics University of Ghana

# Chapter IV Institutions, legislation and infrastructure

## A. Institutions

This chapter will describe the institutional and legislative aspects of public and private institutions involved in food safety and agricultural health in Ghana, including the activities of the development partners, and the trends in SPS and food safety standards. It will also provide an overview of the current situation in the infrastructure for the sanitary and phyto-sanitary safeguarding system, the laboratories and production and processing capacity.

**(a)** ***Public institutions*** concerned with the food safety and agricultural health issues have been described in the earlier documents, and the framework has not changed since the Andah and Gagnon reports. They are also documented in the background studies to this Action Plan. Below is a short summary of their capacities.

- The ***Ghana Standards Board (GSB)***, with 179 technical staff[25], central facilities in Accra and regional offices in Ho (Volta region), Koforidua (Eastern Region), Takoradi (Western Region) and Tamale (Northern sector). GSB has been supported by the World Bank funded AgSSIP and now by UNIDO to bring its MRL analysis capacity up to ISO 17025 requirements;
- The ***Food and Drugs Board (FDB)***, with 80 technical staff, central facilities in Accra and five zonal offices in Kumasi (Middle Belt), Bolgatanga (Northern sector), Takoradi (Western Region), Ho (Volta Region) and Sunyani (Brong Ahafo Region);
- The ***Food Research Institute (FRI)***, with 44 research scientists and 23 support staff and facilities in Accra, with analytical laboratories for chemistry, microbiology, molecular biology, biochemistry, toxicology and nutrition, and pilot scale processing facilities;
- The ***Plant Protection and Regulatory Services Directorate (PPRSD),*** with 4 senior scientific staff and 77 technical offers, at the headquarters near Accra and at the main entry and exit points throughout the country;
- The ***Quality Control Division (QCD) of the COCOBOD***, which only recently has decided to develop their own capacity in quality control, mostly for mycotoxins and pesticide residues. The COCOBOD has an excellent record in quality and safety control, although there are major differences between the perishable export and bulk commodities for the domestic markets, which is the focus of this Revised Action Plan (see box);
- The ***Directorate of Veterinary Services (DVS)*** with 127 veterinarians and 90 graduates of other disciplines, 493 technicians, 150 technicians for meat inspection and 10 technicians for the inspection of imported food stuffs of animal

[25] As of March 31, 2008.

origin. DVS has main laboratories in Accra and the North (Tamale), smaller laboratories in all 10 districts and 5 livestock quarantine stations;

- The ***Animal Production Directorate (APD)*** with production services represented in all regions, currently not involved in food safety issues, although with future plans of getting involved in feed inspection;

- The ***Ministry of Fisheries***, with a staffing of about 300, represented in all districts;

- The ***Environmental Protection Agency (EPA),*** and in particular its **Chemical Control and Management Division,** responsible for pesticides control and management, has offices in all regions as well as three district offices with on average seven professional staff;

- ***Women in Agricultural Development (WIAD),*** also play a role in food safety issues through the running of programs on Food and Nutrition contributing to the education of market women and street foods vendors.

- ***Districts Assemblies,*** depending on local authorities, with the responsibilities for inspection under the oversight of FDB. This delegation of routine food inspection duties to the local authorities is part of Ghana's decentralization policy, and is normal practice in many countries, but will require training and demonstration of good practice, as foreseen in this Action Plan, to become more effective.

**Box 1: Ghana's Cocoa quality record: lessons for the other sectors?**

The Ghana Cocoa Board has developed, through its specialized Quality Control Division (QCD), a highly recognized expertise and internationally trusted reputation in maintaining consistently high quality of exported cocoa beans. Through intensive training of small holder farmers in disease control, pruning of trees and the observance of the required best practices in the fermentation of beans, and though the enforcement of strict grading procedures, QCD has been able over the years to maintain Ghana's cocoa quality so that meets strict specifications in commodity exchanges with price quotations for future delivery, and consistently fetches premiums on world market prices.

If this is a good example of a product of Ghanaian agriculture competing successfully on the world market, the parallel is not easy to draw with the perishable products for export and bulk commodities for the domestic market that are the focus of this report. The concerned value chains are more complex and – in the case of fruit and vegetables exports - quality management has to take into account other constraints for the produce to reach the market in good condition while retaining significant commercial shelf life. There is need for pre-cooling capacity, expertise in cold chain management, the availability of efficient modular refrigerated transport and brand management knowledge (major distributors require from their shippers the produce to be exclusively branded).

**(b)** ***Private institutions*** are mainly involved in the trade and export of other and smaller agriculture products, but the organization is rather fragmented and weak. The Federation of Associations of Ghanaian Exporters (FAGE), supported by the USAID funded development program TIPCEE and by GTZ, is the closest to an apex body for the fresh fruit exporting business. In addition Ghana counts on a number of commodity

associations, of which the most important are the Sea-freight Pineapple Exporters of Ghana (SPEG) with customers in UK and Denmark, which acts more as a freight consolidator, the Vegetable Producers Association of Ghana (VEPEAG), and the Horticulturist Association of Ghana (HAG) which represent pineapples air-freight exporters. More recently there has also been the creation of the Papaya and Mango Producers and Exporters Association of Ghana (PAMPEAG). As recommended below, integration of the different groups into one apex body would be highly desirable. All institutions expressed a high demand for laboratory support, mainly to carry out pesticide residue tests to meet the requirements of European customers and markets. These organizations support their members to meet the standards of GlobalGAP, which represents the requirements of the most important retailers of Europe and now increasingly the US. Certification by GlobalGAP requires strict adherence to a code of conduct in agricultural, environmental and social practices, which are broader and more stringent than those of Codex, IPPC or OIE.

**(c)** ***Development partners'*** assistance in SPS focuses on the export competitiveness of horticulture. The majority of initiatives place heavy emphasis on training and technical support to enable growers to obtain GlobalGAP certification. Assistance on infrastructure ranges from packing houses to feeder roads. Other donor activities in food safety and phytosanitary areas include assistance to improve the hygiene of street food vendors, conformity assessments and overall SPS capacity building. A summary of the current internationally financed support for food safety and agricultural health is provided in Annex 1.

**(d)** ***Standards and regulations for the export markets*** have increased over the last decade dramatically in number and stringency in response to food safety scares and a rise in concern for health, environmental, and social aspects of food. They are emanating from both the public and private sector. Private sector standards – which often are more stringent than public-sector regulations – are playing an increasingly decisive role in deciding market access and are becoming, in a sense, a *defacto* mandatory requirement for the agriculture exporter. Ghana's reliance on the agriculture sector, in particularly on the horticulture sub-sector, as an engine of economic growth and poverty alleviation faces considerable challenges from these increasingly stringent international food safety and quality standards requirements. To realize its potential in the horticulture export sector, Ghana must be able to respond strategically to these market requirements. One strategic choice currently facing the country is how to respond to GlobalGAP, a private regulatory standard that plays an important role in the horticulture markets targeted by Ghanaian exporters. Broadly speaking, exporters can comply with GlobalGAP directly or through a national GAP benchmarked to GlobalGAP (see background document 5 for further details). Current discussions with Ghanaian stakeholders, although more discussion is needed, indicate that the most viable option for Ghana is to develop a national code of Good Agricultural Practices, which can be benchmarked to GlobalGAP at a later stage. A national GAP standard, while waiting to be benchmarked, offers a way to improve the safety and quality requirements of domestic, regional and international markets that do not yet require the stringent requirements of private standards, and would therefore be enforceable. A more immediate bench marketing of national standards to the international GlobalGAP or other international standards would most likely create an

unenforceable regulatory framework, and, if enforced –at high costs-- seriously affect the livelihood of Ghana smallholders.

The rapid development of private food safety and quality standards as a major determinant of access to global food markets, however, does mean that all Ghanaian stakeholders must be able to gradually adapt to this evolution of market demands. The changing market environment challenges traditional discussions on food standards both at the international and national levels. This trend highlights the need for increased dialogue and exchange between a wide range of stakeholders from the public as well as the private sector in developing a comprehensive set of standards related to the food industry. Within this context, a key objective of the Ghanaian government should be to support the private sector to establish a national GAP protocol – owned by the private sector – as a vehicle for effective achievement of its national food safety plans, sustainable increased agricultural productivity, and its export goals. The National Horticulture Task Force (NHTF) is now responsible for reviewing and consolidating these various initiatives, as an important step in progressing on the GhanaGAP discussion. But there is still a lack of understanding and consensus among some stakeholders on the main concepts, objectives, scope, as well as required supportive policies, and benchmarking opportunities of a national GAP code. Insufficient consultation and weak leadership preclude arriving at a common view.

Export certification is mostly done through internationally accredited auditing companies, based in Ghana, such as SGS (Ghana) Limited or from outside, for example South America. This third party certification services are reliable and their results engender trust at the level of the buyers, but their services are costly, at rates exceeding US $ 1000 per day (which is much higher than in countries such as Kenya and South Africa, because of the limited current scope of certification services), and are therefore a major constraint for smallholders.

## B. Legislation

The legislation supporting these institutions is in many instances outdated, and inadequate for the current more complex food chain, with longer distances between producers and consumers, a more diversified market with more discerning consumers, and a much higher share of the food being processed outside the family home. It also neglects the two basic and inter-related principles of modern food regulation:

- Institutional separation between standard setting and advice responsibilities, and standard control and enforcement responsibilities, to avoid conflict of interest between the setting of standards and their monitoring and enforcement. Mixing those two functions can lead to the introduction of overly lax or stringent standards to respectively benefit or penalize certain groups of producers, without adequate oversight and transparency and hence recourse by the affected stakeholders; and

- Institutional separation between those responsible for risk assessment and advice to policy makers on priorities, and the risk managers responsible for the implementation

of those policies, for the same reason of transparency and avoiding conflict of interest.

An overview of the legislation is provided in Table 6.

**Table 6 Overview of the main laws and regulations governing food safety and agricultural health**

| Sector | Law or regulation | Mandate and main functions | Ministry | Gaps and overlaps |
|---|---|---|---|---|
| All | Food and drug law (1992) and Food and drug act (amendment) (1996) Revised Food Law pending Parliament approval | The Food and Drug Board is the Implementing Agency of the Food Law , which enforces regulation through: | Ministry of Health (MOH) | FDB is defined as a competent authority on palm oil only, not yet for other agricultural export products. It has a mandate to define food safety policy, but there is no coordination with other institutions involved in food safety. This is not in compliance with the new European rules (R882-2004) |
| | | ▪ Food Premises Inspection | | Role overlaps with that of the GSB |
| | | ▪ Food Post Market Surveillance | | GSB also conducts post market surveillance |
| | | ▪ Food Safety and Quality Management | | |
| | | ▪ Food Standards and Legislation Research | | |
| All | Standards Decree 1973 and Standards decree (amended) 1979. Revised Standards Decree pending Parliament approval | Ghana Standards Board is the implementing Agency with the following functions ▪ Standards Development | Ministry of Trade, Industry, Private Sector and President's Special Initiatives (MoTIPSPSI) | No overlaps |
| | | ▪ Certification Services | | Roles of Product Registration by FDB at times confused with Product Certification by GSB |
| | | ▪ Inspection Services | | FDB also involved in Inspection |
| | | ▪ Metrology | | No overlap |
| Environment | Environmental protection Agency Act, 1990, (Act 490). . | Chemical Control and Management Centre (CCMC) of the EPA has the mandate of protecting human health and the environment from the potential harmful effects of chemicals. Under Pesticide control and management, the CCMC performs the following function: • Pesticide registration • Licensing of pesticide dealers • Enforcement(Post registration monitoring/surveillance) • Disposals (pesticides and containers). • Analysis of pesticides | MLGRDE Ministry of local government, Rural development and Environment | Functions perform in collaboration with other institutions, some overlap exists with PPRSD in control of pesticides |

| Sector | Law or regulation | Mandate and main functions | Ministry | Gaps and overlaps |
|---|---|---|---|---|
| Plant Protection | Plant Quarantine Bills<br>(i) Preventions and Control of Pests and Diseases of Plants Act 307 (1965).<br>(ii) Pesticides Control and Management Act 528 (1996).<br>(iii) Seed Inspection and Certification Decree, NRCD 100 (1972). | Plant Protection Regulatory Services Directorate (PPRSD) provides the following services:<br>▪ Crop pest and Disease Management<br>▪ Plant Quarantine<br>▪ Pesticide Management<br>▪ Seed Inspection and Certification | MOFA (Ministry of Food and Agriculture) | Functions performed in collaboration with other agencies. Some overlap with EPA |
| Food research | FRI was established in Oct. 1963 and incorporated by Legislative Instrument No.438 in 1965. Integrated into CSIR by Decree 293 established the CSIR in October 1968 | FRI, the Food research Institute of Ghana conducts applied research into problems of:<br>▪ Food processing & preservation<br>▪ Storage, marketing and distribution<br>▪ Food safety<br>▪ Food utilization<br>▪ National Food and Nutrition Security | Ministry of Education Science and Sports (MOESS) | Nutrition and Food Science Dept. of the Univ. of Ghana also conducts similar research.<br><br>The GSB and FDB also carry out some analytical services to industry. |
| Animal production and health | Diseases of Animals Acts (1961) | This act empowers the MOFA (Directorate of Veterinary Services) to define, promote and implement any policy concerning animal diseases. It gives the power to the veterinary services to declare disease and to manage prophylaxis measures (inspection of animals, restrict slaughters…). This act creates local veterinary services at the District level. | MOFA (Ministry of Food and Agriculture) | It is an old law that needs to be updated. This law does not take in account the new international rules for live animal trade. There is nothing about international trade of animal origin food.<br>It should also be harmonized with the Animals (control of importation) ordinance of 1952. |
| | Veterinary surgeons law (1992) | This law creates the regulatory for the private veterinarian activities (registration of veterinary surgeons, restriction of private veterinary activities). | MOFA (Ministry of Food and Agriculture) | Missing application texts defining the relationship between veterinary services and private veterinarian surgeons.<br>Lacking regulation concerning veterinary drugs distribution. |
| | Meat inspection law (in preparation) | This text defines the rules of the inspection of carcasses and the responsibilities of the veterinary services in meat inspection.<br>The proposed meat inspection law gives the Veterinary Services the responsibility to register the slaughterhouses, to train the meat inspectors and to supervise the meat inspection. | MOFA (Ministry of Food and Agriculture) | Lack of legal structure defining meat inspection procedures. This means that any condemnation authorised by a Veterinary Services inspector can be disputed by the butcher. |
| Fisheries | Fisheries Act (2002) | Defines the mandate of the Directorate of Fisheries concerning fisheries management. | Ministry of Fisheries | The coordination with MOFA and veterinary services is not defined.<br>The application regulation is not in force. |
| | Fisheries Regulation (pending) | This text would include the following mandates of relevance to food safety :<br>- Permit for aquaculture operations and approval for aquaculture establishment;<br>- Fish seed production certificate and engagement in fish breeding;<br>- Aquaculture record keeping;<br>- Export and import live fish;<br>- Responsible Aquaculture Practices | | This pending regulations focus on fisheries management. The definition of the responsibilities of the fish inspectors is unclear, including the responsibilities for the inspection of exported fish |

In summary, the following overlap and gaps in the legislation and the resulting institutional framework emerge from this overview:

**(a)** The pending **Food Law** and the **Standard Decree,** accordingly to the consulted stakeholders, do not address adequately the overlap between GSB and FDB in inspection functions. Inspection for the various purposes (certification, including export certification and conformity assessments) involves very similar administrative, enforcement and analytical activities, as shown in box 2. More specifically:

- Inspections conducted by FDB for registration overlaps with inspections conducted by GSB for the purpose of certification and conformity assessments;

- Post market surveillance activities by GSB as a step in the certification process overlaps with the FDB inspection at the borders, markets, warehouses etc.; destination inspection by GSB for conformity assessment overlaps with inspection by FDB to enhance coordination of the registration, importation and post market surveillance activities; and

- Export certification, which GSB considers a conformity assessment activity relating to goods to be exported and feels falls within its legal mandate, could overlap with FDB tasks of food production premises inspection or registration of food stuffs. [26]

The overlap implies that, for example, manufacturers and importers can be subject to two tests where one test is sufficient and adequate, thus duplicating efforts and unnecessary costs to the private sector.

**(b)** The **Plant Quarantine Law**, which is also pending in Parliament, covers most of the International Standards for Phytosanitary Measures (ISPM). However, ISPM # 11 (Pest risk analysis for quarantine pests including analysis of environmental risks and living modified organisms) and the newer ISPM, which are issued in 2007, including those relating to the establishment of Pest Free Areas (ISPM 26 and 29), which are of particular relevance in the control of the Fruit Fly are not included;

**(c)** The **Environmental Protection Agency Act** allows for consultations in the issuance of regulations between the Ministries responsible for Environment and Food and Agriculture. The responsibilities for inspectorate functions are regulated by the EPA in collaboration with other institutions such as the PPRAD, Local Government Authority etc. A related problem is certification of agricultural exports as free from pesticides for purposes of access to markets. This issue is important due to recent rejections of Ghanaian agricultural produce in Europe on account of high residue levels. To date, no regulations have been enacted pursuant to Act 490 either on pesticide residues in food or

[26] The writers of this report are of the opinion that it is highly desirable that the responsibility for standard setting and certification/conformity assessment should be kept separated to avoid an obvious potential risk of conflict of interest.

on certification of agricultural produce from residues, although the GSB is currently in the process of establishing maximum residue levels for Ghanaian agricultural produce.

**Box 2. DEFINITION OF TERMS**

***Certification***
Procedure by which a third party gives written assurance that a product, process or service conforms to specific requirements (ISO/IEC Guide 2:1996, 15.1.2). GSB carries out carries out product assessment and issues product assessment and issues certificate of conformity

***Certification Body***
This is a Body that conducts certification. A certification body may operate its own testing and inspection activities or oversee these activities carried out on its behalf by other bodies (ISO/IEC Guide 2:1996, 15.2)

***Certificate of Conformity***
Document issued under the rules of a certification system, providing confidence that a duly identified product, process or service is in conformity with a specific standard or other normative document (ISO/IEC Guide 2: 1996, 15.5). This is currently issued by the GSB.

***Conformity Assessment***
This is a demonstration that specified requirements relating to a product, process, system, person or body are fulfilled. The subject field of conformity assessment includes activities such as testing, inspection and certification as well as the accreditation of conformity assessment bodies (ISO/IEC 17000: 2004, 2.1). Undertaken by the GSB

***Inspection***
The main purpose of inspection is to determine whether products meet the requirements of a given standard. One or more characteristics of a product are examined, measured or tested, and compared with the requirements. Inspection is done by both GSB and FDB, and EPA (pesticides).

***Registration***
This is a procedure by which a body indicates relevant characteristics of a product, process or service in an appropriately available list (ISO/IEC Guide 2:1996). Registration is done by the FDB and EPA (pesticides).

***Regulatory Authority***
An organization recognized by the national government as being responsible for the regulation or approval of products within their jurisdiction. It exercises a legal right to control the use or sale of products within its own jurisdiction, and may take enforcement action to ensure that products marketed within its jurisdiction comply with legal requirements. FDB is this authority. The EPA is also a regularity authority.

***Risk Analysis***
This is the overall process of risk assessment, risk management and risk communication

***Risk assessment***
This is the systematic approach for organizing and analyzing scientific information for potentially hazardous activities or substances that may pose a risk to humans, animals, or plants. It identifies a hazard, gauges its potency, estimates the likelihood of occurrence, characterizes the risk and determines the magnitude of its consequences. The output of the assessment aids policymakers (risk managers) in their decision making about alternative control options.

***Risk Management***
This is concerned with the evaluation of the risks and the identification and implementation of strategies to control those risks, based on the scientific tolls provided by the risk assessors. The risk management process identifies the options to eliminate or reduce the hazard, their effectiveness, feasibility, impact on various stakeholders, and certainty of achieving expected results. In decision making, policymakers need to evaluate the risks, match the identified risks with risk reduction options, and develop a realistic operational approach balancing protection and resources. The risk manager also needs to monitor and improve the implementation of the selected risk reduction option.

**(d)** The **Animal Health Law** is outdated and does not take into account the new international rules for live animal trade and risk analysis. The subsidiary laws, such as the **Veterinary Surgeons** Act also doesn't provide for modern developments, such as the

emergence of a private veterinary service. We strongly recommend that these comments should be included in the new Meat Inspection Law in preparation. Finally, the pending **Meat Inspection Act** is not adequate in the enforcement of condemnation of diseased carcasses, and is, according to earlier documents and interviews with stakeholders, vague about the distribution of responsibilities of carcass inspection between FDB and DVS.

**(e)** The **Fisheries Act** still lacks the application regulations, and doesn't define unambiguously the responsibilities of the fish inspectors, including the responsibilities for inspection of fish for export.

## C. Infrastructure

The infrastructure required to enable the above described institutions to implement the legislation and enforce their ensuing regulations pertain to the Sanitary and Phyto-sanitary systems, and their supporting laboratory capacity. It is described below.

(a) The strengths and weaknesses of the **Sanitary and Phytosanitary Safeguarding system** are reported in detail in the WATH/Accra Technical Report (2006)[27] on which this summary is based. For the **plant sector** the different activities are:

- ***Quarantine*** is ensured by 43 quarantine stations throughout Ghana, which is satisfactory for the size of Ghana. PPRSD issues phytosanitary certificates and import permits according to the IPPC format. It also inspects plant materials and makes sure they are free from pests. Finally PPRSD also operates the National SPS Enquiry Point at MOFA. While overall capacity is considered good, strengthening communication between the entry/exit points and the central laboratories and improving the equipment at the inspection posts are mentioned in the WATH review as remaining needs. These weaknesses are addressed in this Revised Action Plan;

- ***Surveillance systems*** are inadequate as the data on pest occurrence is not collated well enough to maintain an effective surveillance system and carry out adequate risk analyses. Technical staff skills, surveillance equipment and transport facilities are weak;

- ***Control of pests*** has focused on IPM as the cornerstone of Ghana's strategy. Overall pest control capacity is poor, in particular to confront the new challenges presented by recently emerging pests, such as the Fruit Fly. In particular poor staff skills, low pesticide stocks and poor quality of laboratory equipment and materials for pest and disease diagnosis are reported by WATH. They are addressed in this Revised Action Plan; and

[27] SPS Capacity in Ghana. WATH/Accra Technical Report No. 18, 2006 See also the report of Crops (Dr. Plahar) and Livestock Products (Mr. Gary)

- ***Risk Analysis*** under the Crop Pests and Disease Management Division of the PPRSD was evaluated as good (with the exception of identification of pest-free areas) by WATH, although the lack of data bases must constitute a major constraint to risk assessment.

For the **animal sector**, the sanitary safeguarding system can be summarized as follows:

- ***Quarantine*** is ensured by DVS through border control stations and five quarantine stations in the North of the country. However, a significant part of the imported animals do not pass through these official check points. For imported meat or fish, DVS gives the authorization to the country of origin, although the inspection is carried out by FDB or the local authorities; finally it should be noted that the draft Meat Inspection Law makes provision for the Port of Import Inspection by the Veterinary Personnel at the ports of import.

- ***Surveillance, monitoring and inspection*** are carried out by ten veterinary laboratories, which are able to carry out a large part of the tests on the animal disease, although supply of reagents is often an issue. There is no active surveillance system;

- ***Control of diseases*** counts with adequate staff capacity to control emerging diseases and Ghana has an emergency plan to control HPAI. However, the use of private veterinarians, a major part of disease control strategies in other, including SSA countries, is weak;

- ***Risk analysis*** is seriously constrained by the lack of data. When data are collected through inspection (carcasses, meat, livestock…), handling and synthesizing this data is fragmented. This Revised Action Plan will address this weakness; and

- ***Export certification*** is carried out for live animals by DVS, according to OIE recommendations. For fish, the certification is carried out by GSB, which is in contradiction to the OIE recommendations, and has caused some recent problems, for example, with exports to Egypt.

(b) Ghana, with support of its development partners, has significantly strengthened its **laboratories capacity** over the last decade[28], and now has ISO 17025 certification capacity in some analyses and is near certification in others. While therefore some more support is required, more important is the institutional overlap, which leads to under utilization of facilities, higher analytical costs and, in general a waste of public resources. This is summarized in Table 7.

[28] Currently UNIDO is equipping PPRSD with a seed laboratory and sponsoring study tours doe two staff. UNIDO is also involved in boosting GSB's and FDB's laboratory capacity.

**Table 7 Description of Laboratory Capacities of Institutions involved in Food Safety**

| Agency | Specialization | No. of Technical Staff | Facilities | Capacity[29] | Overlap |
|---|---|---|---|---|---|
| Ghana Standards Board (GSB) | ▪ Pesticides Residues | 7 | Sufficient basic equipment for:<br>▪ Pesticide residues and Heavy metal analysis (250 per year),<br>▪ Microbiological tests (1000 per year)<br>▪ General chemical food analysis, lacks capacity for histamine analysis | +++ | No overlap |
| | ▪ Heavy metal Contaminants | 7 | | ++ | No overlap |
| | ▪ Mycotoxins Analysis | - | | - | - |
| | ▪ Microbiological Analysis | 8 | | + | FRI (ISO-accredited microbiological lab) |
| | ▪ General chemical Analysis | 10 | | +++ | FRI (ISO-accredited chemical lab) |
| Food and Drugs Board (FDB) | ▪ Microbiological Analysis | 3 | The laboratory has sampling, measurement and test equipment necessary to perform tests within its scope. Will be supported by UNIDO | ++ | FRI (ISO-accredited microbiological lab) |
| | ▪ Mycotoxins Analysis | - | | - | - |
| | ▪ General Chemical Analysis | 6 | | ++ | FRI (ISO-accredited chemical lab) |
| | ▪ Adulterants (Sudan Dyes) | 4 | | +++ | No overlaps |
| Food Research Institute (FRI) | ▪ Mycotoxins Analysis | 4 | HPLC | ++ | No overlaps |
| | ▪ Microbiological Analysis | 6 | Well established microbiological laboratory (SANAS accredited laboratory) | +++ | GSB and FDB also conduct some microbiological analysis. |
| | ▪ Biotechnology | 3 | Some basic facilities | ++ | No overlaps |
| | ▪ General chemical Analysis | 9 | Adequate facilities for general chemical analysis (SANAS accredited to ISO 17025) | +++ | GSB and FDB also conduct general chemical analysis of foods |
| | ▪ Nutrition | 7 | Well equipped Test kitchen and sensory evaluation laboratory | ++ | No overlaps |
| | Pesticide Residues, heavy metal contaminants and food adulterants | - | - | - | - |

[29] - = not available, + = some, ++ = moderate, and +++ = good

| | | | | | |
|---|---|---|---|---|---|
| Plant Protection Regulatory Services Directorate (PPRSD)[30] | ▪ Pests and Disease | 19 | Some basic facilities available but not adequate | ++ | - |
| | ▪ Pathology | 3 | | ++ | - |
| | ▪ Nematology | 4 | | ++ | - |
| | ▪ Biological control | 5 | | ++ | - |
| | ▪ Seed Inspection and certification | 7 | | ++ | - |
| | ▪ Phytopharmacy | 1 | | ++ | |
| | ▪ Pesticide management | 3 | | ++ | |
| | ▪ Food Safety | 1 | | ++ | |
| | ▪ Risk Analysis | 1 | | ++ | |
| | ▪ Microbiology | 0 | | | |
| COCOBOD | ▪ Pesticide residues | - | Yet to be acquired | - | GSB |
| | ▪ Mycotoxin Analysis | - | | - | FRI |
| | ▪ Free Fatty Acids | - | | - | FRI |
| Feed Analysis Laboratory (ARI) | Chemical tests on nutritional components: protein, fat, fiver, ash, minerals | 1 Specialist, 5 technicians | Equipment: Kejtec (out of service), Fibertec, Soytec (fat), SAA (out of service), HPLC for aflatoxins (without reagents), UV spectrophotometer | - | Alflatoxins with FRI |
| Veterinary Services | Necropsy diagnosis Microbiology Immunological tests (for Rinderpest, ASF, Rabies, anthrax, CBPP, PPR, FMD…), and to detect influenza virus group H5 | 5 veterinarian doctors 6 technicians officers 1 technical assistant | ELISA, immunofluorescence, agglutination; PCR tests Quick test (semi quantitative test) for aflatoxins | + | |
| Environmental Protection Agency (EPA) | Pesticide analysis(active ingredient and formulation) | 3 | Some basic facilities available but not adequate | + | No overlaps |

[30] These figures are as of May 2008. PPRSD also has staff at the Regional and district levels.

# Chapter V Recommendations

The recommendations in this Revised Action Plan will cover the legislative and institutional frameworks, as well as the necessary infrastructure. They are described below.

## A. Legislation

The above analysis, as well as earlier documents, lead to the following recommendations. At the legislative level, a regulatory framework needs to be established, which clearly and unambiguously stipulate the mandates of the institutions involved, and eliminates overlaps. More specifically:

- The pending **Standards Decree and Food and Drug Law**, need to be harmonized to eliminate any duplication between the Ghana Standard Board and the Food and Drugs Board;
- The pending **Plant Quarantine and Meat Inspection Law and Veterinary Surgeons Act** need to be revised and enacted, to bring in line with international requirements; and
- The supporting **regulations for the Fisheries** law need to be issued.

The revised drafts of several new food safety, standards and agricultural health laws, now pending Parliament approval, according to the authorities interviewed[31], do not yet adequately address these weaknesses. Detailed reviews and revisions are needed before these laws and regulations are approved.

## B. Institutions

At **the institutional level**, the following adjustments are recommended:

- **Granting FDB the status as the Central Food Safety Agency for Ghana**, in charge of the coordination of all activities related to the regulation of food safety. In this capacity, FDB would implement the policy decisions from the concerned Ministries (MOFA, MOH, and MLGRDE) and enforce the standards set by GSB, either directly or through relevant agencies, such as the districts and municipalities. This enforcement responsibility would include all inspection, certification and conformity assessments. The initial registration of a product would become be the responsibility of GSB or EPA respectively[32]. In consultation with the major buyer, the EU, FDB could become the Competent Authority for export certification for Fisheries. An alternative could be that DVS would develop into the Competent Authority, in line with the OIE recommendations. Key factors affecting this decision would be the comparative capacity of FDB and DVS in the key analytical areas in fish certification (histamine, heavy metals and microbiological contaminants), and the costs to bring the two laboratories up to the standards required by the EU. Similarly, PPRSD could become the Competent Authority

[31] The mission was not provided access to these drafts.

[32] Registration of food products is mandatory as stipulated by statute, whereas Certification or Conformity Assessment is voluntary.

for Plant Health certification. As EU is the major importer, the preference of the EC would be an important factor in taking this decision. Similarly, and also in line with international good practice, this central food agency could evolve over time into a semi-autonomous agency, dependent on a non-sector related ministry. This would avoid conflict of interest as with consumers if directly dependent on MOH, or with the producers, if directly dependent on MOFA. Independent agencies have been established, for example, in Canada, Australia, New Zealand and the EU, are under consideration in China and Vietnam, and are advocated by many in the USA. While ambitious, such set-up would give Ghana a comparative advantage in getting access to overseas markets, as buyers prefer such a transaction costs reducing set-up. It would clearly also reduce overlap, ambiguity and transaction costs in enhancing domestic food safety;

- **Focusing GSB's functions** on standard setting and product registration, and, in line with its public sector status, on those standards where there is a moral hazard and/or a-symmetry of information. In the domain of food safety standards this concerns the standards for inputs (pesticides, feed additives, fertilizer, etc) and all food-borne contaminants with a potential risk for public health, such as microbiological, heavy metals and other contaminants. Although GSB feels they should also be in charge of conformity assessments, this review strongly recommends that the responsibility for standard setting and initial registration should be kept firmly separate from the inspections, conformity assessment and certification, because of potential risks for conflict of interest. Under this arrangements, GSB as the official standard setting agency would be in charge of the mandatory functions, whereas FDB and EPA would be in charge of the management of the voluntary functions. Assigning the initial registration of a product to GSB could present also a potential conflict with its proposed responsibility for standard setting. However, entrusting the initial registration of a product to an enforcement agency (FDB), which would also be responsible for subsequent conformity assessment of that product would establish a more significant conflict of interest situation;

- **Concentrate the responsibilities of the technical ministries** and agencies (MOH, MOFA and MLGRDE) on policy setting, while maintaining the advisory, disease control and risk management functions, thus separating the enforcement and advisory services;

- **Developing a risk assessment capacity at CSIR with its Food Research Institute and the Animal Research Institute and the universities**. A scientific task force could be created for each issue. As the costs of a risk assessment is significant, and the risks are probably of a similar nature in the different countries of the region, the possibility of carrying out risk assessments at the regional level (ECOWAS, UEMOA), is recommended[33]. With this organizational framework, the implementing agencies, such as EPA[34], FDB, PPRSD and DVS would concentrate on risk management functions, and not be involved in conflict of interest situations between assessing and managing the risk.

[33] Other possible regional activities include collaboration in pest and disease control/eradication, and harmonization of standards. Ecowas is active in this area, and should be supported.

[34] EPA is involved in risk assessment and management (environmental, consumer, operator, by-stander etc) of pesticides during registration and post registration.

An allocation of risk assessment responsibilities over several institutes and between plant and animal products is needed in view of the large volume of work involved.

Applying this distribution of responsibilities would also have repercussions on the future development of laboratory operations. This Revised Action Plan recommends the enhancement of the efficiency of human and financial resources by following a strategy of specialization for each type of analysis in a prime and back-up laboratory, according to Table 8 below.

**Table 8 Recommended plan for specialization of laboratories**

| **Type of health risk** | **Lead laboratory** | **Back-up** |
|---|---|---|
| Microbiological contamination | Food Research Institute | Food and Drug Board |
| Mycotoxins | Food Research Institute | Food and Drug Board |
| Pesticide Residues | Ghana Standards Board | PPRSD |
| Heavy metal Contamination | Ghana Standards Board | Food Research Institute |
| Food Adulterants | Food and Drugs Board | Ghana Standards Board |
| Plant Health | Plant Protection and Regulatory Services Directorate | - |
| Pesticide analysis(formulation and active substances) | Environmental Protection Agency | GSB |
| Problems specific to Cocoa (mycotoxins, pesticide residues and free fatty acids content) | Already covered Ghana Standards Board and Food Research Institute | Quality Control Division of COCOBOD but with low priority as enough capacity is available |

The Action Plan also recommends a strong emphasis on the development of **private institutions** and public private partnerships**.** This implies:

- **Establishing an Apex** body for the plant sub-sector and **professional organizations** for the livestock and fisheries sub-sectors, which can represent the interests of their sectors in the policy dialogue. For the plant sector this Apex body can develop standards in close cooperation with the leading body on GhanaGAP (see below). For the livestock and fisheries the professional associations can develop GHPs. Both could develop training programs, negotiating more favorable prices for inputs and transport costs, etc. and seek access to new markets; and

- **Providing further government support for developing a national code of Good Agricultural Practices (GhanaGAP) and Good Hygiene Practices**. While more discussion on the scope of the GhanaGAP is required, this Action Plan recommends developing GhanaGAP according to a gradual modular (food safety/quality/environment/social issues) and multi-tiered (domestic/export markets) approach. In any case, during the planning and development of the national GAP, support should be continued to enable relevant smallholders to comply with export markets requirements through such schemes as GlobalGAP. Given the dependence of a

national GAP on an effective food safety regulatory framework, and the current weak institutional leadership driving the national GAP process, it is recommended that the working group on food safety and the working group on developing a National GAP code be institutionalized under a single strong public-private partnership leading body. This public-private body should have an effective leadership mandate, clear roles and responsibilities, and resources to guide the GAP development process. A detailed action plan, as agreed at the Workshop in included in Annex 4.

## C. Investments

At the investment level, the proposed institutional framework needs to be supported by the introduction of new equipment and other facilities to capitalize on the synergy and increased efficiency of the new organization and to face the new challenges ahead. These investments are divided into:

- Capacity building and agricultural health interventions, which covers support for institution building, development of legislation and regulation, training and preparation of Good Practice (Agriculture and Hygiene) manuals, and the management and control of pests and diseases, with particular attention to the preparation and initial implementation of a control strategy for the fruit fly;

- Investments in laboratory capacity along the proposed specialization of laboratory facilities, with a lead laboratory and a back-up facility; and

- Infrastructure would cover the construction and equipment related to the collection and processing of food stuffs to improve food safety. In the Revised Action Plan this would be mostly directed to the pilot testing of a small number of innovations in processing, and, more importantly, to the demonstration of improved models of food processing (drying of maize, total supply chain for horticultural products, cool chain for fish, and improved inspection facilities in slaughterhouses). They would be co-financed with private partners.

As indicated in the introduction, the basis of the investment plan is the plan prepared by the Task Force, chaired by PPRSD, with some, mostly minor, adjustments and additions by the World Bank supported mission. The details are provided in Annex 2, a summary is provided in Table 9.

## D. Funding sources

As shown in Table 9 the majority of the investments would have to be paid through public funding. This is fully justified in view of the strong public good character of food safety improvements. However, the proposed infrastructure investments yield not only benefits to the general public in the form of a safer product, but also to the individual private user or operator of that infrastructure in the form of higher sales prices and less spoilage and other post-harvest losses. In view of these shared benefits, co-financing, sharing the costs of the investment and eventually of the operation and maintenance of the proposed infrastructure, is therefore justified.

Co-financing, compared to sole public sector financing will also extend the impact of the investments, as more public sector investments can be made, and the national capacity therefore expanded. Reversely it will also leverage funds from the private sector. Four forms of co-financing are proposed:

- *Matching grants* are co-funded investments between the public and the private sector, justified by benefits for both sectors. They are becoming increasingly popular in development cooperation, and are recommended by the Task Force on Food Safety in their Investment Plan. Generally matching grants are the preferred funding mechanism in situations where private institutions exist with already moderate to good management, and adequate access to other sources of finance. In this case they are an important source of leveraging public funding. The sustainability of the investments under such ownership transfer to the private operator, an essential need for public investments would thereby be assured. If such management capabilities and the required public financing are available, the efficiency of the operation of the facility would be greatly improved. The share of the respective public and private sector contributions recommended depends on the estimated public sector benefit and the level of innovation as new investments justify a higher level of public support. For ease of administration, and as an example, four levels of public support are proposed, i.e., none (0 percent), low (say 20 – 40 percent), high (say 40-60 percent) and full (100 percent). These ranges are based on practice in other (Latin American and Asian countries) but what levels are finally selected is a policy decision by the Government. To provide an approximation of the public investments required, the detailed investment tables in Annex 2 provide recommendations on the distribution of the costs under the matching grant system, using the averages of the percentages given above. Thirty percent contribution of the public sector is therefore proposed for the majority of the investments, the fifty percent figure is recommended in the case of the introduction of innovative technologies.

- *Government ownership with private sector lease arrangements* is a form whereby the total investments are provided through the public sector, and the facility is leased (normally on a long term basis) to private operators. As the ownership remains with the public sector, in principle, the sustainability of the operation under this form is less dependent on the strength of the private sector operator and on the availability of credit. This form, however, is more affected by the common public sector administrative constraints as shown by the difficulties encountered (and still not solved) with the fruit and vegetable cold-store (Shed 9) by the Agricultural Services Sub-sector Investment Project (AGSSIP) in Tema.

- *Government ownership with private payment of user fees* is a form whereby the total investment and operating costs are borne by the public sector, with a partial or complete, recovery of the costs of private sector users of the facility. This is the preferred form in situations where the sustainability of private sector management capacity is doubtful.

- *Cost recovery for laboratory services*, is a form related close to the previous option, but is here described, because it is already used in GSB, FDB, FRI and DVS laboratories for routine tests often not coming from the smallholder sector. This is an important trend,

although the rates charged are all below the full cost price, thus cross subsidizing from other sources a service, which is a private good, and preventing private operators to enter that market. A fast move towards full cost recovery should therefore be envisaged.

Under the latter two options, it is essential that the revenues are returned to the public institution, which operates the facility concerned, can directly be used by the agency for Operation and Maintenance and not returned to the general treasury of the state. This is a broader problem, which will affect many other agencies as well, and should therefore be addressed in a much broader context, but it is an essential element of efficient public-private partnerships.

**Table 9 Summary of proposed investments**

| Sector | Main Items | Overall Costs (US$) | Proposed Public Sector Contribution |
|---|---|---|---|
| **Capacity Building and Agricultural Health** | | | |
| Overall | Review legislation, development of GAP, and risk assessment capacity | 1,020,000 | 1,020,000 |
| Plant sector | Development of surveillance systems, and pilot control of pests, in particular the fruit fly | 3,610, 000 | 2,285,000 |
| Fisheries sector | Development of GHP and upgrading inspection systems | 510,000 | 510,000 |
| Livestock sector | Development of GHP and upgrading inspection systems | 1,462,000 | 1,024,500 |
| Total | | **6,602,000** | **4,839,500** |
| **Enhancing Laboratory Capacity** | | | |
| Leading labs | Equipment improvement | 4,388,000 | 4,388,000 |
| Back-up labs | Id. | 3,121,000 | 3,121,000 |
| Total | | **7,509,000** | **7,509,000** |
| **Infrastructure Investments** | | | |
| Maize Mycotoxin control | Refurbishing and pilot testing drying installations for corn | 14,495,000 | 4,519,500 |
| Other commodities | Improving environmental health of oil palm and cassava processing | 400,000 | 200,000 |
| Horticulture | Development of pilot improved vegetable supply chains in 5 districts | 9,025,000 | 6,487,500 |
| Fisheries | Developing landing sides and processing capacity | 47,600,000 | 43,750,000 |
| Livestock | Introducing improved slaughterhouse technology | 4,925,000 | 2,675,000 |
| Total | | **76,445,000** | **57,632,000** |
| **Overall total** | | **90,556,000** | **69,980,500** |

**Cost/Benefits**

While data, in particular on the benefits are weak, a cost/benefit assessment is included in this Action Plan to provide an approximation of the economic returns from this investment. This assessment is based on a model, whereby for the costs, the investment costs are those estimated

in table 9 and for the benefits, moderate increases in the value added (0.05 and 0, 1 percent) were estimated for the initial years, increasing to a somewhat higher response (1 to 4 percent) for the long term (year 10 onwards). The detailed assumptions and calculations are provided in Annex 3, the results in Table 10.

**Table 10 Estimated Cost/Benefits of Proposed Food Safety Investments**

| | NPV | | | IRR (%) |
|---|---|---|---|---|
| | 5% | 10% | 15% | |
| Overall | 86.95 | 35.99 | 7.80 | 17 |
| Crops | 84.29 | 44.19 | 21.51 | 26 |
| Fisheries | 45.57 | 17.76 | 2.48 | 16 |
| Livestock | 7.49 | 3.33 | 1.01 | 19 |

This overall evaluation shows an internal rate of return of 17 percent and positive net values for the discount rates of 5, 10 and 15. Even with modest assumptions, the investments are therefore economically attractive. The same results can be seen in the sectoral evaluations with positive net present values, with crops having the highest value. These results follow the magnitude of the value-added contributions of the sectors, with crops contributing the most, followed by fisheries and livestock with the least value among the three. The internal rate of return is affected mostly by the cost aspect, thus, fisheries with the highest investment cost has relatively lower returns.

**Priorities**

The priorities over the next five to ten years, which emerge from the overview of the current situation and this calculation, are:

- A first priority to be carried out over the first year for the proposed recommended **adjustments in legislation and institutional organization** of the food safety and agricultural health sector;

- The second priority to the **strengthening of the Lead Laboratories** (table 8) for the different types of analyses to be carried out over the first two years, increasing their users fees for routine certification and analyses to full cost recovery;

- The third (but still very high) priority to **strengthening the risk management** functions of institutions concerned with the crop sector. The higher returns in the crop sector (Chapter 8) justifies this priority, and in particular for the control of the Fruit Fly;

- The fourth (more long term) priority to the **establishment of realistic GAP and GHP** in the production and processing sector.

Investments in the **pilot operations or demonstrations** in the different sectors could be introduced all along this sequence, although some actions would clearly benefit from the activities described under the earlier priorities, and could better wait till they are met. For example, slaughterhouse improvement, without a clear delineation of the responsibilities for

inspection and agreed GHP would be counterproductive, but GHP could be developed in parallel with the finalization of the legislation. Similarly, investments in the lead laboratories would only be justified, if an agreement on the respective roles had been reached, as without this agreement, the chance of duplication continues. Finally, a decision on the strengthening the PPRSD capacity would only be highly dependent on the decision regarding the appointment of this agency as a Competent Authority.

This leads to a first priority investment of US **$ 32,418,000**, a second priority investment of **US $ 32,191,500** and a third priority of US $ 5,371,000, as summarized in Table 11 and detailed in Annex 5.

**Table 11 Investments by priorities**

| **Priorities and Time Frame** | | **Amount (US$)** |
|---|---|---|
| High priority: | Short-term | 1,045,000 |
| | Medium-term | 1,885,000 |
| | Long-term | 29,488,000 |
| | *Sub-total* | *32,418,000* |
| Medium priority: | Short-term | 1,359,000 |
| | Medium-term | 30,832,500 |
| | *Sub-total* | *32,191,500* |
| Low priority: | Medium-term | 5,371,000 |
| **Total** | | **69,980,500** |

# Annexes

## Annex 1. Development partner's support in Food Safety and Trade

In general, trade-related assistance of donors in agriculture focuses on export competitiveness of horticulture. The majority of the initiatives place heavy emphasis on training and technical support to enable growers to obtain EUREPGAP certification. Assistance on infrastructure ranges from packing houses to feeder roads. Other donor activities in food safety and phytosanitary areas include assistance on street food, conformity assessment, and overall SPS capacity building.

***Street foods*** UK's Department for International Development (DFID) had four research projects on street food from 1999 to 2006 that looked at the importance of the sector to the urban economy of Accra, studied sources and extent of food safety hazards and recommended strategies to control and eliminate these hazards. The first project estimated the sector's annual turnover to be over US$100 million and that it employs about 60,000 (mostly female) people.

***Conformity assessment*** UNIDO's ongoing Trade Capacity Building project (budget of US$2.4 million) focuses on the country's capacity to prove conformity with market requirements. Ghana was chosen as one of nine pilot countries to receive assistance to expand exports in identified priority areas, through the establishment and upgrading of the conformity assessment infrastructure, such as calibration and testing laboratories and enterprise certification. Also, from 2001 to 2005, UNIDO, with financial assistance of €14 million from EU, has assisted the eight member states of the West African Economic and Monetary Union (*Union économique et monétaire ouest-africaine* or UEMOA) in the strengthening of their trade-related institutional infrastructure to promote regional integration. The second four-year phase of the project was scheduled to start in 2007 to include member states of the Economic Community of West African States (ECOWAS) and Mauritania. The objective is to strengthen standards bodies of the countries and to harmonize standards in the region to be able to establish a regional system for accreditation and certification. DANIDA's Trade Support program (discuss below) also includes the harmonization of standards for ECOWAS countries.

***Horticulture*** count with several support programs:

- The Horticulture Export Industry Initiative (HEII) of the Agricultural Services Sub-Sector Investment Program (AgSSIP)[35], now completed, addressed, among others, key issues in food safety and quality management that included training in safe and effective use of crop protection products, pesticide regulations, and laboratory infrastructure. Assistance included construction of pack houses and airport and cold chain facilities.
- USAID'S Trade and Investment Program for a Competitive Export Economy (TIPCEE)[36] is a five-year project that seeks to increase the competitiveness of the private sector in agricultural trade. It has two components: export business development and enabling environment. The export business development component provides assistance towards the

[35] A Multi-donor initiative led by the World Bank.
[36] USAID/Ghana. Annual report for partners, October 2005-september 2006. October 2006.

development of supply chain systems such as pineapple, mango, papaya, cashew and Asian vegetables. Assistance includes trainings and the production of training manuals. In cooperation with the Ghana Standards Board, draft standards for pineapples, papaya and medicinal plants have been developed and GlobalGAP group certifications have been obtained for farmer groups. There were 3,514 households that directly benefited from this assistance. Also, it was estimated that the firms that received assistance exported about US$24.7 million in 2005. The coverage of assistance will be expanded to include crops significant to regional and domestic trade such as citrus, tomato, onions, maize and medicinal plants. The enabling environment component is involved with policy and regulatory issues to boost private sector opportunities. A major assistance is on the legal framework for pesticide importation, manufacture, sale, storage use and disposal.

- GTZ's Market Orientated Agriculture Program (MOAP) [37] (July 2004-June 2013) aims to contribute to poverty alleviation by increasing the competitiveness of agricultural producers and processors. The program has three components: promotion of selected agricultural value chains, increasing efficiency of public sector, and strengthening of private sector institutions. The value chains which include pineapple, citrus, mango, chili pepper, grasscutter, guinea fowl, and aquaculture are provided assistance to improve the quality of the products to comply with market requirements. Policy advice is provided to the public sector. Agricultural associations are strengthened. Assistance provided to an orange juice producer enabled it to make use of the produce of 100 certified out-growers and export 3000 tons per annum worth US$1.5 million. Also the assistance created 150-200 seasonal jobs especially for women. The program also provided for GlobalGAP certification of 10 pilot groups of over 100 smallholders for MD2 pineapple export. The project envisions that the commercialization and certification projects will lead to a 20-30 percent increase of fresh fruit exports. Several of the projects were done in collaboration with USAID's TIPCEE.

- African Development Bank's Export Marketing and Quality Awareness project[38] will be implemented over five years in four regions in Ghana to address constraints which limit export growth. The project has four components: production and productivity, export marketing promotion and infrastructure improvement, capacity building, and project coordination and management. Some of the activities are provision of training and strengthening of associations. The outputs envisioned include the establishment of demonstration farms, cold chain facilities, database on market information and increased volume of MD2 suckers. The African Development Bank supports also other projects that contribute to the overall productivity in agriculture, such as a livestock development project, a cashew development project, and a food crops development project. Under the Food Crops Development Project (2001-2006) which sought to increase production of maize, sorghum, cowpea, groundnuts and soybean, improved storage facilities were constructed for selected communities. Each structure can hold 100 tons and is to be managed by a committee of farmers on service charge basis.

[37] GTZ-Ghana Sustainable Development. http://www.gtz.de/en/weltweit/afrika/ghana/7787.htm
[38] Ghana: Export Marketing and Quality Awareness Project. Appraisal report. May 2005.

- The Millennium Development Authority/Millennium Challenge Corporation (MiDa/MCC)[39] with a planned program in agriculture (budget of US$ 241 million) aims to raise farmer incomes through private sector-led agribusiness development by improving productivity of high-value cash and food staple crops in certain areas and enhancing export competitiveness in horticultural and other traditional crops. The program will provide infrastructure such as pack houses and storage and cooling facilities to reduce post harvest losses. Assistance to the public sector consists of capacity building of the plant agency PPRSD to enable compliance with international plant protection standards.

- The Pesticides Initiative Program (PIP) of COLEACP and SPEG (EU funding) has linked with SPEG to establish a horticultural taskforce (20 members from private and public sectors) to identify key issues within the industry. The assistance includes improvements to GSB laboratory facilities and cost sharing agreements with nine export companies to support costs of training and certification to EUREPGAP, BRC or other private sector standards.

***Laboratory capacities*** are supported by three external sources of finances:

- UNIDO will provide equipment for the upgrading of PPRSD's Seed Inspection and Certification laboratory.

- HEII, with AfDB funding, intends to support GSB in upgrading its pesticide residue detection laboratory to ISO 17025 accreditation.

- AfDB's Export Marketing and Quality Awareness project includes assistance towards the construction of a residual analysis lab at GSB for the analysis of chemical elements in fruits and vegetables for export.

***Fisheries*** One of the value chains to be promoted and improved under GTZ's MOAP is aquaculture (see earlier discussion).

Under the ***HACCP*** capacity building project, the Natural Resources Institute (NRI) with DFID funding has supported FDB to get individual staff qualified to provide training in HACCP to the standards set by the Royal Institute of Public Health (RIPH) (recognized standard for UK food safety laws), BRC implementation and auditing and lead assessor courses. FDB is now registered as an (internationally accredited) RIPH training centre and can offer training in HACCP at all levels. Training and examinations are conducted in Ghana, but marking and issuing of certificates is done by the RIPH in the United Kingdom. As part of the NRI program, HACCP support was provided for 20 establishments (including two pineapple processing and export companies).

***Overall SPS capacity building*** is supported by DANIDA's Trade Sector Support Program (TSSP), 2005-2010[40] with four projects in the Standards component of the program:

[39] http://www.mida.gov.gh/index.htm

[40] Trade sector Support Program (2005-2010). Volume 2. Programme Implementation plan. Final draft. September 12, 2005. Ministry of Trade and Industry.

- Institutional upgrading, including the development of a national standards strategy and action plan, the streamlining of institutions and regulations (including elimination of GSB/FDB overlaps), and the upgrade and accreditation of laboratories;

- Strengthening of SPS/TBT Enquiry Point with participation in international standard setting bodies, the provision of inspection facilities for exports, and the establishment of a national alert system to respond to export problems;

- Enforcement of standards on domestic market, with the establishment of post market control systems, the development of traceability systems, and harmonization of standards in ECOWAS; and

- Productivity improvement, with the introduction of quality management techniques, and an outreach program to support firms to acquire ISO QMS certification

## Annex 2. Detailed Investment Tables

| Activity | Specific Activities | Costs ($) | Agency concerned | Suggested Level of priority | Funding Mechanisms | Share of Public Sector[41] | Time Frame |
|---|---|---|---|---|---|---|---|
| **Overall Institutional Framework** | | | | | | | |
| | Review of existing (pending) legislation and definition of most appropriate legal framework | 75,000 | FDB/GSB | High | Public | Full | Short term |
| | Creation of Consumer Associations | 25,000 | FDB | High | Public | Full | Short term |
| | Development of Good Agricultural Practices | 200,000 | MOFA /GhanaGAP | High | Public | Full | Short - Medium |
| | SPS Enquiry Point and inter-institutional data base | 220,000 | FDB/MOFA | High | Public | Full | Short - Medium |
| | Risk Analysis Data base | 500,000 | FRI, Universities | High | Public | Full | Short - Medium |
| Plant Products Safety and Health | | | | | | | |
| Surveillance and diagnostics | Development and implementation of plant pest surveillance systems, including staff training | 600,000 | PPRSD with MOFA | High | Public | Full | Short - Medium |
| | Design and implementation of commodity specific surveys and their supporting data management systems and diagnostic equipment for Pest Risk Analysis | 300,000 | MOFA and CSIR | High | Public | Full | Short – Medium Term |
| | Analysis of all strategic options for developing specialized diagnostic services for domestic and exportable commodities | 50,000 | MOFA and CRI | Medium | Shared | High | Short Term |
| Control | Development and initial implementation of Fruit Fly (*Bactrocera invadens*) campaign | 100,000 | PPRSD | High | Shared | High | Short Term |
| | Implementation of surveillance systems for Anthracnose and mango weevil | 60,000 | PPRSD | Medium | Public | Full | Short term |

[41] Full (100 %), High (40-60 percent) low (20-40 percent) and none (0 percent) The averages are taken for the totals

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | Implementation of control measures, including pilot testing of fruit treatment, the establishment of pest free zones, etc[42]. | 2,500,000 | PPRSD | Medium | Mostly matching grants | High | Medium Term |
| | Total Capacity Building Plant Health (US $) | 3,610,000 | | | | 2,285,000 | |
| **Fisheries Products Safety** | | | | | | | |
| | Preparation of a regulation concerning fish inspection | 60,000 | DOF with VS and GSB | High | Public | Full | Short term |
| | Upgrading the inspection system | 150,000 | DOF/VS | High | Public | Full | Short term |
| | Development of Good Hygiene Practices for the fisheries sector | 300,000 | DOF | High | Public | Full | Short term |
| **Livestock Products Safety** | | | | | | | |
| Surveillance and diagnostics | Preparation of a regulation concerning meat and dairy inspection | 62,000 | DVS with GSB | Medium | Public | Full | Short term |
| | Pilot step for a national cattle identification system | 140,000 | DVS with APD | Low | Shared | High | Medium term |
| | Development of Good Hygiene Practices for the livestock sector | 300,000 | APD and DVS | High | Public | Full | Short term |
| Control | Upgrading Carcass Inspection | 85,000 | DVS with FDB | High | Public | Full | Short term |
| | Upgrading inspection dairy and poultry chain | 300,000 | FDB with DVS | Medium | Public | Full | Medium term |
| | Improving quality raw dairy products | 175,000 | FDB with APD | Medium | Shared | High | Medium term |
| | Improving safety of poultry products | 400,000 | FDB with APD | Medium | Shared | Low | Medium term |
| | Total Capacity building Animal Products | 1,462,000 | | | | **1,024,500** | |

[42] Not included in Task Force report.

**Proposed investments in laboratories**[43]

| Type of health risk | Leading lab | Rough estimate of investment needs | Back-up If needed | Rough estimate of investment needs |
|---|---|---|---|---|
| Microbiological contamination | Food Research Institute | (2, 3, 4,5) $298,000.00 | Food and Drug Board | (2,3,4,5,6) $378,000.00 |
| Mycotoxins | Food Research Institute | (2,3,4,5,6) $378,000.00 | Food and Drug Board | (1,2,3,4,6) $778,000.00 |
| Pesticide Residues | Ghana Standards Board | (2,3,4,5,6,7,8) $448,000.00 | PPRSD | (2,3,4,5,6,7,8) $448,000.00 |
| Heavy metal Contamination | Ghana Standards Board | (2,3,4,5,6,9) $428,000.00 | Food Research Institute | (2,3,4,5,6,9) $428,000.00 |
| Food Adulterants | Food and Drugs Board | (2,3,4,5,6, 10) $398,000.00 | Ghana Standards Board | (2,3,4,5,6,10) $398,000.00 |
| Plant Health | Plant Protection and Regulatory Services Directorate | (2,3,4,5,7,8,9,10) $438,000.00 | - | - |
| Cocoa safety (mycotoxins, pesticide residues and free fatty acids content) | Quality Control Division of COCOBOD | Already covered under GSB and FRI | | $691,000.00 Low Priority because adequate capacity alre ady available |
| All | Central Incinerator | 2,000,000 | | |

**Priorities: leading laboratory: high, and back-up laboratory: Low**

[43] 1)Major laboratory equipment: HPLC - $400,000.00, 2) Complementary general laboratory equipment and spare parts - $ 150,000.00,3) Laboratory Standards - $ 70,000.00, 4)Other laboratory consumables - $70,000.00, 5) Services required to establish accredited costing systems for full-cost recovery on services - $8,000.00, 6) Accreditation of laboratory methods to ISO 17025 (including training in good laboratory practices, developing quality manuals and protocols, and cost of accreditation) - $ 80,000.00, 7) Pesticide Test kits - $ 20,000.00, 8) Monitoring of pesticide residues - $ 50,000.00, 9) Monitoring of heavy metals - $50,000.00, 10) Food Quality Test kits - $ 20,000.00

**Infrastructure Investments in the Plant Sector**

| Specific Activities | Costs ($) | Agency concerned | Suggested Level of priority | Funding mechanisms | Public sector share (%) | Time Frame |
|---|---|---|---|---|---|---|
| **Mycotoxin control** | | | | | | |
| Facilitate refurbishment of 100[44] existing drying facilities | 200,000 | MOFA Districts | High | Matching grants | Low | Short - Medium Term |
| Procurement of 500 mechanical dryers | 4,000,000 | MOFA/ Districts | Medium | Matching grants | Low | Short to Long Term |
| Construction of 3,000 Narrow Maize Drying Cribs | 600,000 | MOFA/ Districts | Medium | Matching grants | Low | Short to Medium Term |
| Facilitate refurbishment and relocation of unutilized silos to maize growing areas | 500,000 | MOFA | Medium | Initial Government lease | Full | Short - Medium Term |
| Facilitate transfer of ownership of silos and warehouses to interested private investors | 5,000 | MOFA | Medium | Public | Full | Short - Medium Term |
| Procurement of household metallic silos | 340,000 | Districts | Medium | Matching grants | Low | Short - Medium Term |
| Facilitate construction of 1 warehouse each (5,000 MT) at 5 major maize producing/ marketing areas | 5,000,000 | MOFA/ Districts | Low | Matching grants | Low | Medium to Long Term |
| Facilitate the upgrading of 5 abandoned warehouses | 1,500,000 | MOFA/ Districts | High | Matching grants | Low | Short to Long Term |
| Facilitate procurement of 5 appropriate trucks | 750,000 | | Medium | Private | None | Short to Long Term |
| Facilitate rehabilitation of 3 Pontoons for carting agricultural goods | 600,000 | MOFA | Low | Matching grants | Low | Short to Long Term |
| Facilitate mounting of 20 retail pilot schemes at regional markets to demonstrate proper packaging and presentation of grains | 400,000 | MOFA/ WIAD/ AESD | Medium | Matching grants | Low | Short to Long Term |
| Facilitate allocation of specific sheds for retailing grains in 10 major markets | 100,000 | MOFA/ WIAD | Medium | Matching grants | Low | Short to Long Term |

[44] There are fewer than 100 government-owned drying facilities at the moment, but it is estimated that about 100 such facilities should be needed to provide sufficient coverage for commercial drying in Ghana.

| | | | | | | |
|---|---|---|---|---|---|---|
| Facilitate tax waiver on imported raw materials for the manufacture of quality food processing equipment | 5,000 | MOFA | High | Public | Full | Short - Medium Term |
| Introduction of the use of 20 hammer mills to gradually replace disc attrition mills | 40,000 | MOFA/ Districts | Medium | Matching grants | High | Short to Long Term |
| Facilitate design and piloting of 20 standard housing for grain mills | 155,000 | MOFA | Medium | Matching grants | High | Short to Long Term |
| Acquisition of 1000 sets of primary processing equipment | 300,000 | MOFA/ | Medium | Matching grants | Low | Short to Long Term |
| **Other plant commodity infrastructure** | | | | | | |
| Design and construction of a starch settling tank at 10 cassava processing sites | 200,000 | MOFA | Low | Matching grants | High | Short to Long Term |
| Facilitate design and construction of an efficient effluent disposal system at 10 oil palm processing sites | 200,000 | MOFA | Low | Matching grants | High | Short to Long Term |
| **Horticulture infrastructure** | | | | | | |
| Development and construction of five pilot demonstration units, including water development, farm pack houses and cold chain | 3,600,000 | FDB and Districts | Medium | Matching grants | Low | Medium to Long Term |
| Procurement and piloting of 1000 plastics/plastics collapsible crates for horticultural produce | 25,000 | MOFA | Medium | Matching grants | Low | Medium to Long Term |
| Facilitate the construction of 5 Horticultural wholesale markets with cold storage facilities | 5,000,000 | Districts | High | Initial Government lease | Full | Medium to Long Term |
| Facilitate the construction of 10 model fruits and vegetable retail shops | 300,000 | Districts | Low | Initial Government lease | Full | Medium to Long Term |
| Facilitate the designation and construction of special areas for horticultural produce in 10 major markets | 100,000 | Districts | Medium | Initial Government lease | Full | Medium to Long Term |
| **Total Infrastructure Plant sector** | **23,920,000** | | | | **11,207,000** | |

**Infrastructure investment in Fisheries and Livestock sector**[45]

| Specific Activities | Approximate Costs ($) | Agency concerned | Suggested Level of priority | Funding mechanisms | Public sector share (%) | Time Frame |
|---|---|---|---|---|---|---|
| **Fisheries Products** | | | | | | |
| Construction of 3 sea-side landing sites | 24,000,000[46] | MOFI/ districts | Medium | Initial Government lease | Full | Medium term |
| Construction of 2 inland landing sites | 18,000,000[47] | MOFI/ districts | High | Initial Government lease | Full | Medium term |
| Fisheries cold chain and processing | 5,500,000 | MOFI | High | Matching Grants | Low | Medium term |
| Development of pilot centers for aquaculture | 100,000 | MOFI | Medium | Public sector | Full | Medium to long term |
| Total (US $) | **47,600,000** | | | | **43,750,000** | |
| **Livestock Products** | | | | | | |
| Pilot Center for Butchers training | 425,000 | MOFA/APD | Medium | Public sector | Full | Short term |
| Various improvements (slaughterhouses, markets for livestock products) | 4,500,000 | MOFA/VS | Medium | Matching grants | High | Medium term |
| Total (US$) | **4,925,000** | | | | **2,675,000** | |

[45] Details are provided in the working paper on Fisheries and Livestock Products.

[46] Pending confirmation of on-going feasibility study supported by GTZ expertise. The reported cost in this Action Plan is based on previous experience, where the Ministry of Fisheries has built 13 landing sites, including 2 harbors for US $ 120 millions, so it means about 8 millions USD for each landing site

[47] Pending confirmation of on-going feasibility study supported by GTZ expertise. See previous footnote.

## Annex 3. Costs and benefits

### Assumptions

*Costs* Cost consisted of investment costs and operating costs. The investment costs were derived from the recommended actions which were grouped accordingly—crops, livestock and fisheries. The costs on laboratory equipment on mycotoxin, food adulterants, pesticide residues, microbiological and heavy metal contaminations and incinerators were prorated to the three sectors. The same process was done on the cost of the overall action on legislation and risk assessment (see cost figures in Table below). Operating costs were assumed to start in the second year and increased in the fifth year when all (or most) of the actions have been implemented.

*Benefits* The benefits were assumed to be percentages of the respective sector's contribution to GDP. Thus, the 2006 GDP of US$12.9 billion (see Table1) was apportioned accordingly, Annex Table 1 below shows the percentages and amounts used in the calculation. The percentage for "crops and livestock" was divided between the two sectors.[48] The benefits are assumed to be achieved gradually, starting in the third year, with increments in subsequent years.

The exercise did two evaluations: one was an overall assessment where total costs and benefits were lumped; the second was a sectoral assessment where costs and benefits of each sector were evaluated.

**ANNEX Table 1 Assumptions used for cost-benefit exercise**

| | Overall | Crops | Fisheries | Livestock |
|---|---|---|---|---|
| Investment costs (US$M) | 90.6 | 31.2 | 52.4 | 7 |
| Operating costs (US$M) (initial, subsequent) | 2, 3 | 2, 3 | 1,2 | 0.1, 0.2 |
| Value-added % of GDP | n.a. | 0.226 | 0.041 | 0.103 |
| Value-added (US$M) | n.a. | 2,915.4 | 528.9 | 296.7 |
| Assumed % increase in value-added: | | | | |
| Year 3- Year 4 | 0.1 | 0.05 | 0.5 | 0.1 |
| Year 5- Year 6 | 0.3 | 0.1 | 1.0 | 0.3 |
| Year 7- Year 9 | 0.5 | 0.5 | 2.0 | 0.5 |
| Year 10 and after | 1.0 | 1.0 | 4.0 | 1.0 |

### Results

The results of the exercise are presented in Annex Table 2. The overall evaluation shows an internal rate of return of 17% and positive net values for the discount rates of 5, 10 and 15. The same trend can be seen in the sectoral evaluations with positive net present values, with crops having the highest value, followed by fisheries, both of which have much higher values than livestock. These results follow the magnitude of the value-added contributions of the sectors, with crops contributing the most, followed by fisheries and livestock with the least value among the three. The internal rate of return is affected mostly by the cost aspect, thus, fisheries with the highest investment cost has relatively lower returns.

[48] According to the FAO Livestock Sector Brief, livestock contributes 6.2% of agricultural GDP. Also, "cocoa" was not included as one of the sectors since the value of the recommended action for cocoa comprises only 0.08% of the total costs.

**ANNEX Table 2 Results of cost-benefit Calculation**

| | NPV | | | |
|---|---|---|---|---|
| | 5% | 10% | 15% | IRR (%) |
| Overall | 86.95 | 35.99 | 7.80 | 17 |
| Crops | 84.29 | 44.19 | 21.51 | 26 |
| Fisheries | 45.57 | 17.76 | 2.48 | 16 |
| Livestock | 7.49 | 3.33 | 1.01 | 19 |

**ANNEX Table 3 Detailed C/B calculation (US$M)**

| | **Year 1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **I. Overall** | | | | | | | | | | | | | | | |
| Investment cost | -4.53 | -9.06 | -18.12 | -27.18 | -31.71 | | | | | | | | | | |
| Operating costs | | -2 | -2 | -2 | -3 | -3 | -3 | -3 | -3 | -3 | -3 | -3 | -3 | -3 | -3 |
| Benefits: Crops | | | 2.92 | 2.92 | 8.75 | 8.75 | 14.58 | 14.58 | 14.58 | 29.15 | 29.15 | 29.15 | 29.15 | 29.15 | 29.15 |
| Benefits: Livestock | | | 0.30 | 0.30 | 0.89 | 0.89 | 1.48 | 1.48 | 1.48 | 2.97 | 2.97 | 2.97 | 2.97 | 2.97 | 2.97 |
| Benefits: Fisheries | | | 0.53 | 0.53 | 1.59 | 1.59 | 2.64 | 2.64 | 2.64 | 5.29 | 5.29 | 5.29 | 5.29 | 5.29 | 5.29 |
| Net benefits | -4.53 | -11.06 | -16.38 | -25.44 | -23.49 | 8.22 | 15.71 | 15.71 | 15.71 | 34.41 | 34.41 | 34.41 | 34.41 | 34.41 | 34.41 |
| NPV (5%, 10%, 15%) | 86.95 | 35.99 | 7.80 | | | | | | | | | | | | |
| IRR | 17% | | | | | | | | | | | | | | |
| **I. Crops** | | | | | | | | | | | | | | | |
| Investment cost | -1.56 | -3.12 | -6.24 | -9.36 | -10.92 | | | | | | | | | | |
| Operating costs | | -2 | -2 | -2 | -3 | -3 | -3 | -3 | -3 | -3 | -3 | -3 | -3 | -3 | -3 |
| Benefits | | | 1.46 | 1.46 | 2.92 | 2.92 | 14.58 | 14.58 | 14.58 | 29.15 | 29.15 | 29.15 | 29.15 | 29.15 | 29.15 |
| Net benefits | -1.56 | -5.12 | -6.78 | -9.90 | -11 | -0.08 | 11.58 | 11.58 | 11.58 | 26.15 | 26.15 | 26.15 | 26.15 | 26.15 | 26.15 |
| NPV (5%, 10%, 15%) | 84.29 | 44.19 | 21.51 | | | | | | | | | | | | |
| IRR | 26% | | | | | | | | | | | | | | |
| **II. Fisheries** | | | | | | | | | | | | | | | |
| Investment cost | -2.62 | -5.24 | -10.48 | -15.72 | -18.34 | | | | | | | | | | |
| Operating costs | | -1 | -1 | -1 | -2 | -2 | -2 | -2 | -2 | -2 | -2 | -2 | -2 | -2 | -2 |
| Benefits | | | 2.64 | 2.64 | 5.29 | 5.29 | 10.58 | 10.58 | 10.58 | 21.16 | 21.16 | 21.16 | 21.16 | 21.16 | 21.16 |
| Net benefits | -2.62 | -6.24 | -8.84 | -14.08 | -15.05 | 3.29 | 8.58 | 8.58 | 8.58 | 19.16 | 19.16 | 19.16 | 19.16 | 19.16 | 19.16 |
| NPV (5%, 10%, 15%) | 45.57 | 17.76 | 2.48 | | | | | | | | | | | | |
| IRR | 16% | | | | | | | | | | | | | | |
| **III. Livestock** | | | | | | | | | | | | | | | |
| Investment cost | -0.35 | -0.70 | -1.4 | -2.1 | -2.45 | | | | | | | | | | |
| Operating costs | | -0.1 | -0.1 | -0.1 | -0.2 | -0.2 | -0.2 | -0.2 | -0.2 | -0.2 | -0.2 | -0.2 | -0.2 | -0.2 | -0.2 |
| Benefits | | | 0.30 | 0.30 | 0.89 | 0.89 | 1.48 | 1.48 | 1.48 | 2.97 | 2.97 | 2.97 | 2.97 | 2.97 | 2.97 |
| Net benefits | -0.35 | -0.8 | -1.2 | -1.9 | -1.76 | 0.69 | 1.28 | 1.28 | 1.28 | 2.77 | 2.77 | 2.77 | 2.77 | 2.77 | 2.77 |
| NPV (5%, 10%, 15%) | 7.49 | 3.33 | 1.01 | | | | | | | | | | | | |
| IRR | 19% | | | | | | | | | | | | | | |

## Annex 4. GhanaGAP Action Plan

| Action Plan for enabling smallholders in the horticulture sector to comply with export market product and processing standards | | | | |
|---|---|---|---|---|
| Constraints | Recommended Actions/Measures | Proposed Timeframe | Implementing Agencies | Monitoring Indicators |
| **Priority 1: Priority 1:Assess the relevant regulatory framework to identify gaps and shortcomings and lobby for reform** | | | | |
| Two sets of policies and regulations are critical to effective implementation of a national GAP code: (i) those pertaining to food safety, which form the foundation of any GAP code and (ii) those pertaining to the business environment, which are necessary incentives for investing in GAP implementation | Review recent framework of the Food Safety Action Plan for completeness and alignment with national and international laws and regulations<br><br>Conduct an assessment of regulations related to the business environment to identify reforms, particularly related to contract enforcement, necessary for improving the business environment | On-going<br><br>Immediate | Food Safety Working Group<br><br>Apex working group (see priority 2) | Assessment report on food safety policies & regulations and recommendations for improvement<br><br>Assessment report on business environment policies & regulations and recommendations for improvement. |
| **Priority 2**: **Establish a single working group to lead the food safety and G.A.P processes** | | | | |
| Currently, multiple and somewhat disjointed initiatives related to the GhanaGAP process exist. There is a lack of clarity on the relationship between government regulations and private-sector standards and, by extension, there's a lack of clarity on each sector's role | Institutionalize the working group on food safety and the working group on developing a National GAP code under one apex a public-private partnership body, with identified leadership/champion to implement and monitor implementation of the action plan. | Immediate | Food safety working group NHTF | Established working group with effective leadership mandate, clear roles and responsibilities & resources to guide the process. |
| **Priority 3**: **Outline a strategy for developing a national code of Good Agricultural Practices** | | | | |
| Lack of common understanding and agreement of the purpose and scope of a national code of GAP (GhanaGAP) | Assist the private-private partnership body to develop a conceptual framework and identify appropriate approaches for (i) implementing the food safety action plan; (ii) lobbying for changes in the business environment; and (iii) developing national GAP standards for key commodities | Short-term | The apex working group | A strategy document outlining objectives, scope, roles and responsibilities and road map for developing and implementing a national code on GAP |

| Action Plan for enabling smallholders in the horticulture sector to comply with export market product and processing standards | | | | |
|---|---|---|---|---|
| Constraints | Recommended Actions/Measures | Proposed Timeframe | Implementing Agencies | Monitoring Indicators |
| | | | | |
| **Priority 4: Consolidate existing guidelines and standards into a national GAP code for the fresh produce sector** | | | | |
| Lack of coherent and readily accessible GAP standards for key export commodities | Assist working group in collating, field-testing and validation of for good agricultural practices standard development for outstanding commodities | Short to medium-term | The apex group | A national code of Good Agricultural Practice for fruits and vegetables |
| **Priority 5: Adoption of laws and regulations** | | | | |
| Assessments (step xxx) provide recommendations for completing and streamlining food safety and business environment policies and regulations | Assist public-partnership body in lobbying for establishment of recommended laws and regulations, including procedures and cost-sharing arrangement for food safety control and monitoring.<br><br>Also assist body in lobbying for establishment of recommended business codes and regulations. | Short to medium-term | The apex body<br>Ministry of Health<br>Ministry of Agriculture<br>Ministry of trade & Investment | Relevant laws adopted and enforced |
| **Priority 6: Adoption and implementation of GAP guidelines by smallholders** | | | | |
| Large number of producers and exporters lack practical knowledge in use of GAP, including hygiene and use and disposal of agricultural chemicals. | Conduct technical audit to assess gaps in knowledge and design information campaigns to raise producers/exporters' awareness of the benefits of applying good agricultural practices, including compliance with food safety regulations, and provide them training in the adoption of the GAP.<br><br>Help organize more coherent groups and provide tailored training to groups in farm management and record keeping for traceability. | Short-term to medium term<br><br>Short-term | the apex body,<br>MOFA<br><br>The apex body<br>MOFA | Increased number of farmers/producers applying GAP<br><br>Increased number of farmer groups with managerial capacity and implementation of traceability. |

## Annex 5. Detailed review of priority investments

| Priorities | Amount | Timeframe | Amount (US $) | Investment |
|---|---|---|---|---|
| **High** | **US $ 32,418,000** | Short-term | 510,000 | Fish products safety |
| | | | 100,000 | Institutions (legislations and consumer groups) |
| | | | 50,000 | Plant pest control |
| | | | 385,000 | Livestock products (GHP, carcass inspection) |
| | | Short/medium | 920,000 | Institutions (GAP, risk, SPS EP) |
| | | | 900,000 | Plant surveillance and diagnostics |
| | | | 65,000 | Mycotoxin infrastructure (drying facilities, tax waiver) |
| | | Short/Long | 450,000 | Mycotoxin infrastructure (warehouses) |
| | | Medium/Long | 5,000,000 | Horticulture infrastructure (wholesale markets with cold storage) |
| | | | 19,650,000 | Fisheries (inland landing sites) |
| | | | 4,388,000 | Primary labs |
| **Medium** | **US $ 32,191,500** | Short-term | 85,000 | Plant surveillance |
| | | | 62,000 | Livestock products (regulation) |
| | | | 787,000 | Mycotoxin (silos and drying cribs) |
| | | | 425,000 | Livestock products (center for butchers) |
| | | Medium-term | 1,187,500 | Horticulture infrastructure |
| | | | 2,250,000 | Livestock products (slaughterhouses) |
| | | | 507,500 | Livestock products (dairy and poultry) |
| | | | 24,100,000 | Fisheries (sea-side landing sites and pilot centers for aquaculture) |
| | | | 1,537,500 | Mycotoxin infrastructure |
| | | | 1,250,000 | Plant health (pilot testing of control measures) |
| **Low** | **US $ 5,371,000** | Medium-term | 70,000 | Livestock products (cattle ID system) |
| | | | 1,680,000 | Mycotoxin infrastructure |
| | | | 300,000 | Horticulture infrastructure (model retail shops) |
| | | | 200,000 | Other plant commodity infrastructure |
| | | | 3,121,000 | Back-up labs |

**TOTAL US S 69,980,500**

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