



Republic of Ghana

MINISTRY OF LANDS AND NATURAL RESOURCES

**FOREST INVESTMENT  
PROGRAMME (FIP) - ENHANCING  
CARBON STOCKS IN NATURAL  
FORESTS AND AGROFOREST  
LANDSCAPES**

**PEST MANAGEMENT PLAN  
(PMP)**

**Draft Final Report**

Prepared by  
SAL Consult Ltd, P O Box GP20200, Accra, Ghana  
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**ACRONYMS AND ABBREVIATIONS**

|           |  |
|-----------|--|
| AfDB      | Africa Development Bank  |
| AgSSIP    | Agricultural Services Sub-Sector Investment Program              |
| CBOs      | Community-based Organisations                                    |
| CCMC      | Chemicals Control and Management Centre                          |
| CEPS      | Customs Excise and Preventive Service                            |
| COCOBOD   | Ghana Cocoa Board  |
| Codex     | Code Alimentarius Commission                                     |
| CREMA     | Community Resource Management Area                               |
| CRI       | Crops Research Institute   |
| CRIG      | Cocoa Research Institute of Ghana                                |
| DGM       | Dedicated Grant Mechanism  |
| EPA       | Environmental Protection Agency (Ghana)                          |
| ESMF      | Environmental and Social Management Framework                    |
| EU        | European Union   |
| FAO       | Food and Agriculture Organization of the United Nations          |
| FBOs      | Farmer Based Organisations                                       |
| FC        | Forestry Commission  |
| FCPF      | Forest Carbon Partnership Fund                                   |
| FIP       | Forest Investment Program  |
| FORIG     | Forest Research Institute of Ghana                               |
| FSD       | Forest Services Division   |
| GAABIC    | Ghana Agricultural Associations' Business and Information Centre |
| GAIDA     | Ghana Agro-Input Dealers Association                             |
| GAP       | Good Agricultural Practice                                       |
| GCAP      | Ghana Commercial Agricultural Project                            |
| GFAP      | Ghana Federation of Agriculture Producers                        |
| GHS       | Ghana Health Service   |
| GoG       | Government of Ghana  |
| GSA       | Ghana Standards Authority  |
| HFZ       | High Forest Zone   |
| IFC       | International Finance Corporation                                |
| IPM       | Integrated Pest Management                                       |
| IPPC      | International Plant Protection Convention                        |
| ISO       | International Standards Organisation                             |
| ISPM      | International Standards for Phytosanitary Measures               |
| IUCN      | International Union for Conservation of Nature                   |
| LI/L.I.   | Legislative Instrument   |
| MLNR      | Ministry of Lands and Natural Resources                          |
| MOFA/MoFA | Ministry of Food and Agriculture                                 |
| MRL       | Maximum Residue Limit  |
| MRV       | Monitoring Reporting Verification                                |
| NCRC      | Nature Conservation Resource Centre                              |

|         |   |
|---------|---|
| NGOs    | Non-Governmental Organisations  |
| NPPO    | National Plant Protection Organisation                                  |
| NREG    | Natural Resources and Environmental Governance                          |
| OP      | Operational Policy  |
| PIC     | Project Implementation Committee  |
| PMP     | Pest Management Plan  |
| POP     | Persistent Organic Pollutant  |
| PPRSD   | Plant Protection and Regulatory Services Directorate                    |
| REDD+   | Reducing Emissions from Deforestation and Forest Degradation and others |
| SEEDPAG | Seed Producers Association of Ghana                                     |
| SPS     | Sanitary and Phytosanitary Agreement                                    |
| UK      | United Kingdom  |
| UNIDO   | United Nations International Development Organisation                   |
| VEPEAG  | Vegetable Producers Exporters Association of Ghana                      |
| WB      | World Bank  |
| WRC     | Water Resources Commission  |

## 1.0 INTRODUCTION

### 1.1 Project Background and Aims

The Forest Investment Program (FIP) finances three inter-related projects in Ghana, implemented by the World Bank, the African Development Bank (AfDB) and the International Finance Corporation (IFC). The overall goal of FIP-financed activities in Ghana is to reduce GHG emissions from deforestation and forest degradation, while reducing poverty and conserving biodiversity.

The FIP set of activities collectively aim to

- ensure the integrity, restoration and sustainable forest management of Forest Reserves by introducing more inclusive management and benefit sharing models, financial incentives, and investments;
- restore forest cover in off-reserve areas by securing tree tenure and benefits, forest plantations and landscape restoration, and rehabilitation of degraded forest land; increase trees and enhance carbon stocks in the farming system by promoting sustainable cocoa and agriculture practices; and
- develop viable alternative livelihoods for local communities by addressing a broad range of technical, financial and market incentives, to reduce pressure on existing forests.

The project has triggered the World Bank safeguard policy on Pest Management (OP 4.09) (together with the Environmental and Social Assessment- OP 4.01 and the Process Framework- OP 4.12) resulting in the preparation of this Pest Management Plan. The project will not directly finance the use of pesticides but will promote IPM and application of pesticide to minimize risks to human health and the environment, particularly in situations when pesticide use may increase in association with the project, such as promotion of shift of the existing cocoa farming practices towards climate-smart and resilient 'shade' cocoa, and establishment of experimental timber plantations piloting mix of native species. This Plan has been prepared with this in mind, to ensure that the project does not increase the environmental impacts of pesticide use, and where possible these are managed responsibly, in line with sound environmental and human health protection objectives.

It is also noted that the key environmental and social issues and risks associated with chemical applications in cocoa are part of the analysis undertaken as part of the ESMF prepared for this Project. The ESMF also provides identification of IPM activities linked to the cocoa enhancement activities that are considered important to be supported.

### 1.2 Objectives

The objective of the World Bank safeguard policy on Pest Management (OP 4.09) is to promote the use of biological or environmental control methods and reduce reliance on synthetic chemical pesticides and ensure that health and environmental hazards associated with pesticides are minimized. Pest populations are to be controlled through Integrated Pest Management (IPM) approaches such as biological control, cultural practices, and the development and use of crop varieties that are resistant or tolerant to the pest.

This PMP provides the information to address three key objectives around the OP requirements; (i) promoting the IPM approach for the cocoa sector including the promotion and adaptation of climate

smart cocoa, (ii) summarizing the national pesticide use and management in Ghanaian agriculture and in the cocoa sector in particular and (iii) providing insight and recommendations on the capacity building opportunities for the promotion of IPM and rational use of pesticides in Cocoa production.

The specific objectives of this PMP are to:

- Ensure integration of appropriate pest management techniques into agro-forestry technologies, and cocoa landscapes in the project area.
- Monitor pesticide use and pest issues among participating farmers, admitted farmers within forest reserves, and local communities.
- Promote implementation of an Integrated Crop and Pest Management (IPM) in Cocoa production.

## 2.0 PROJECT DESCRIPTION

### 2.1 Project Components

The Bank's Enhancing Natural Forests and Agro-forest Landscapes Project is designed to address the sectoral and environmental challenges mentioned above through improved policy implementation, improved management practices in targeted landscapes in one corridor of the HFZ, targeted capacity building, and systematic outreach and communications efforts to improve understanding and practices and to prepare for wider replication. The project will have four main components, as follows:

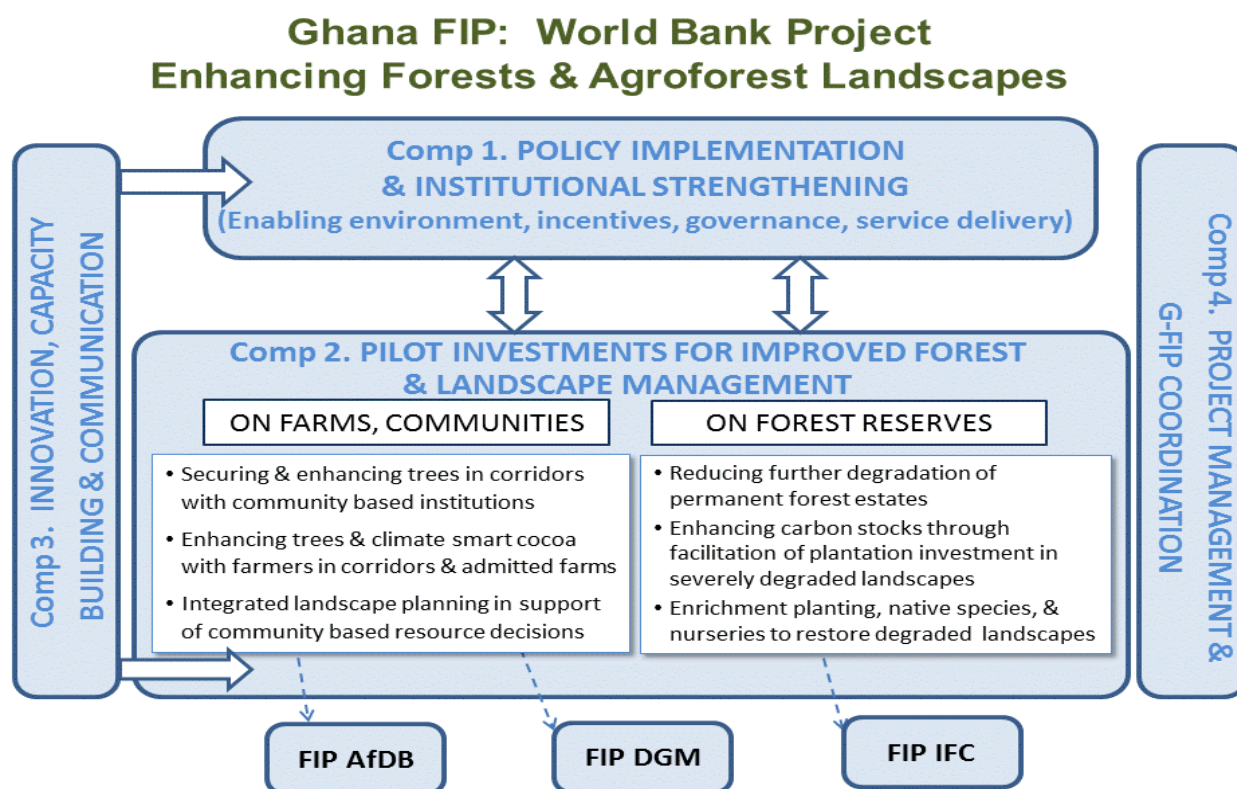
|   |
|---|
| Component 1: Policy Reforms and Institutional Strengthening                 |
| Component 2: Pilot Investments for Improved Forest and Landscape Management |
| Component 3: Innovation, Capacity Building, and Communications              |
| Component 4: Project Management, Monitoring and Coordination                |

The organization and relations among the four components are illustrated below. The core of the project (Component 2) is a set of pilot activities implemented in a few target landscapes designed to address key drivers of deforestation. The policy implementation, institutional strengthening, capacity building, and communications activities in other components aim to support the field demonstration of improved management practices, and lay the ground work for later scale up. A final component covers management, monitoring, and coordination across the range of FIP-financed activities.

**Location of Field Activities:** The map in **Figure 2** shows all the proposed locations for field activities in the Western and Brong Ahafo Regions, as described in **Figure 1**, including work with communities on cocoa and agroforestry in the corridor, enrichment planting in specific forest reserves and model plantation sites. The total area of the corridor is about 195,000 hectares linking the key forest reserves in the Western Region. Each of the components is further described below.

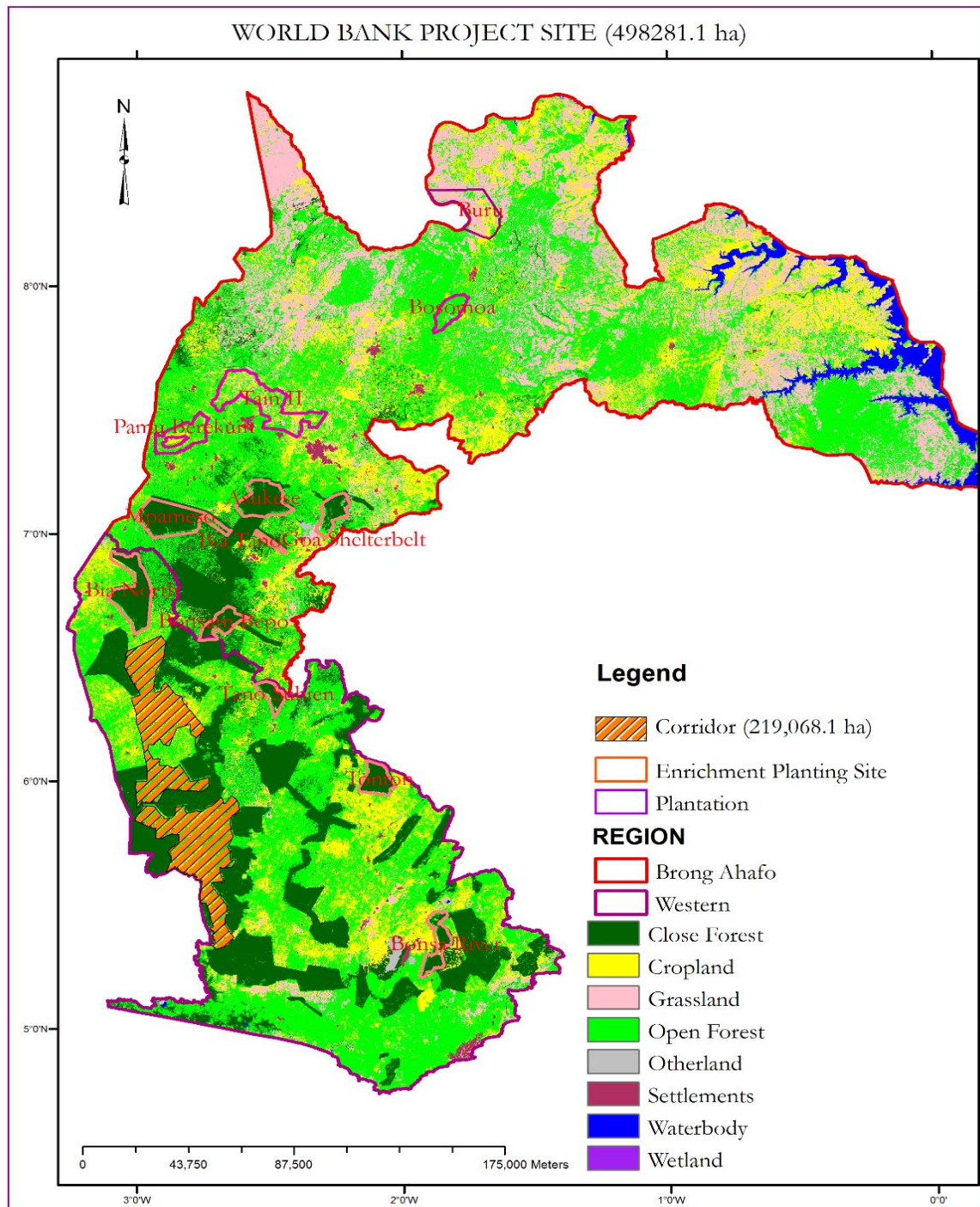
**Component 1: Policy Reforms and Institutional Strengthening:** This component consists of efforts to advance implementation of reformed policies, improve the enabling environment, and strengthen the institutional means to achieve sustainable landscape and forest management. This will involve three main sets of activities: improvements to policy practice and incentives, improvements to the institutional guidance and procedures for implementation, and support for multi-stakeholder governance platforms and consultative processes. The first set of activities will support analysis of options, review of legal frameworks, gathering and dissemination of evidence on the effectiveness of various options, and development of pilot testing approaches in collaboration with stakeholders. Improving policy "practice" means changing the translation and interpretation of the way policies are deployed on the ground – as well as incentives (including delivery of services, capacity, inputs, and information) to improve the enabling environment for sustainable landscape and forest management.





**Figure 1: Schematic Diagram for the Ghana FIP**

The second will strengthen the institutional procedures, guidelines and institutional models to ensure that policy implementation improves on the ground. Changes in institutional practices, embedded in guidance documents and training, will influence the working norms of government officials in their approaches to and interactions with stakeholders (e.g., timely delivery of services and inputs should become a norm). Capacity development activities, based on an institutional needs assessment, will enhance the skills of staff and the quality of service delivery by the Forest Commission to support field implementation and extension activities at landscape level. The third set of activities will provide support to sustain, refine and expand consultation and governance platforms initiated under NREG and FCPF at both national and local level. The MLNR will support and enhance a Stakeholder Forum (Traditional Authorities, Civil society groups, local communities and public sector institutions) to consult and engage toward consensus around the issues and incentives that influence landscape management practices and tree/forest stewardship by communities.



**Figure 2: Ghana FIP World Bank Project Sites in Brong Ahafo and Western Regions**

**Component 2: Pilot Investments for Improved Forest and Landscape Management with Communities.**

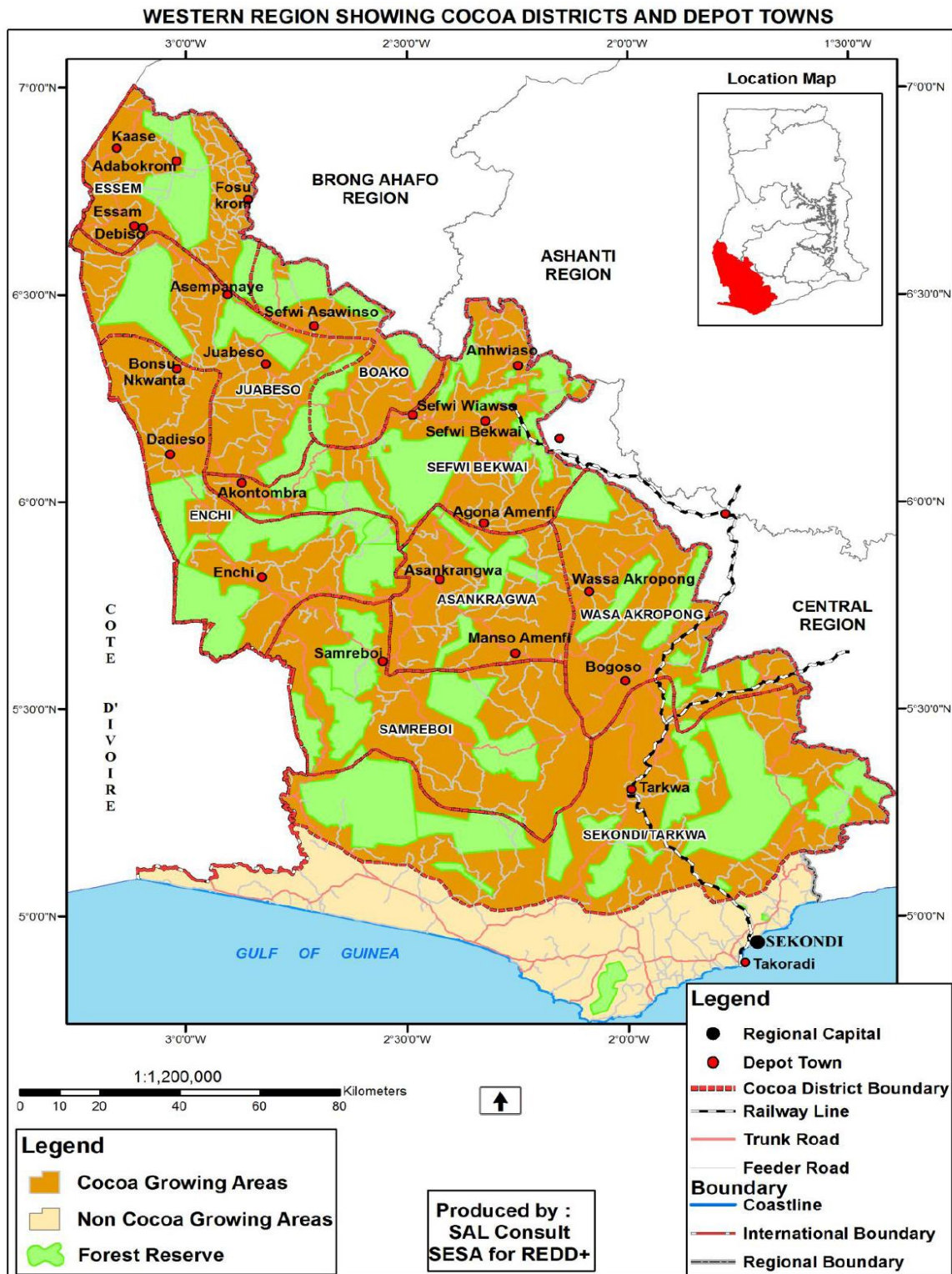
As noted, field- and community-based investments are the core of this Ghana FIP project. These will aim to establish and demonstrate improved forest and landscape management practices, while building the case for wider replication in terms of results. These pilots represent up-front investments required to restore/ protect/ reduce deforestation, and thus build on the REDD+ Readiness Process. Pilots will be supported by efforts to consolidate lessons from implementation to improve policy implementation and

institutional practices, as well as outreach efforts that encourage replication to landscapes beyond the target corridors. Pilot demonstration activities will be implemented in two main landscape areas: on farms and in communities in a specific landscape corridor and on forest reserves as follows.

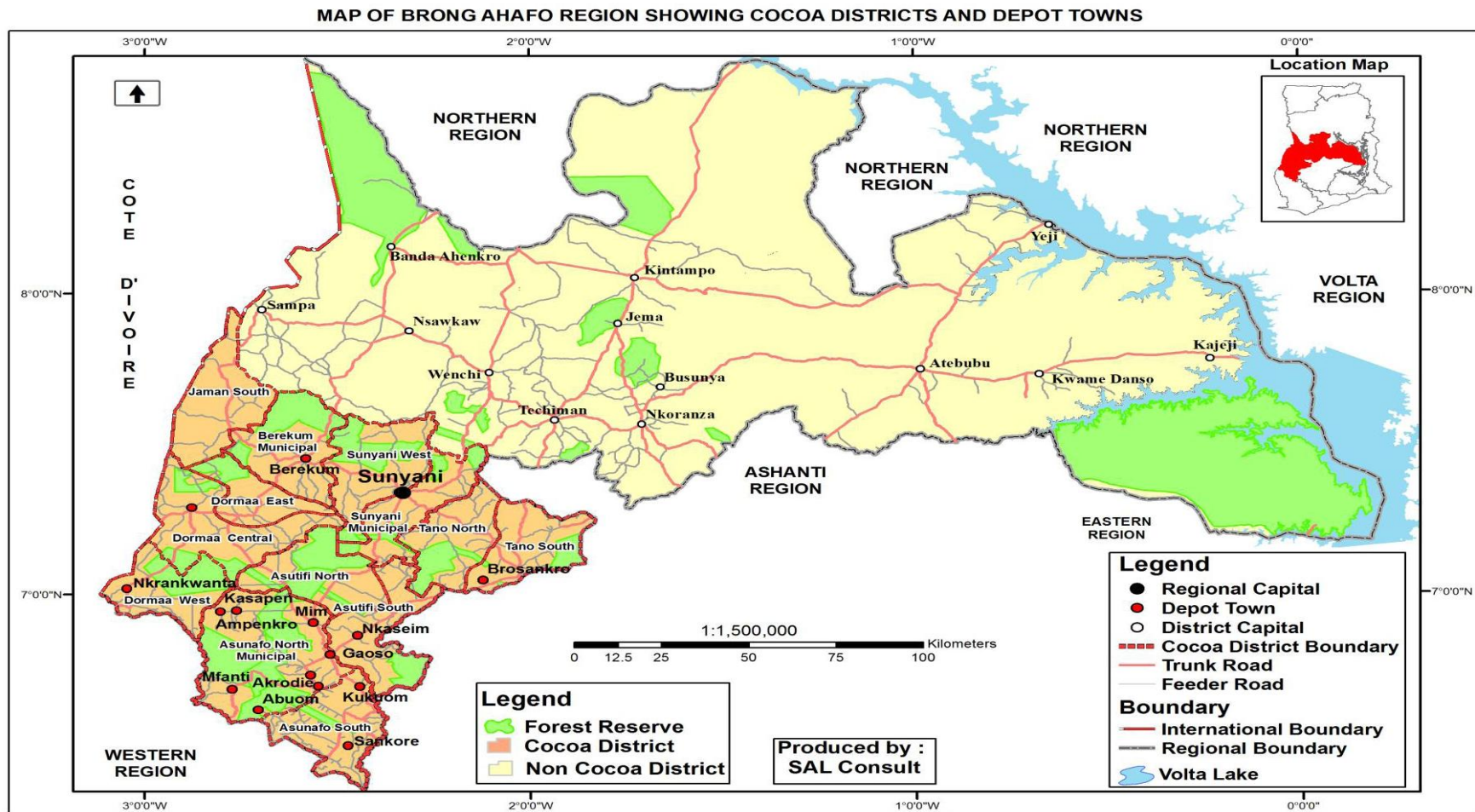
**Pilot 2.1: Enhancing Trees and Climate-Smart Practices in Agroforestry Corridors and Cocoa Landscapes on Farms with Communities.** This pilot will focus on drivers of deforestation and land degradation on community managed agroforestry and cocoa cultivation landscapes in selected corridors in a target corridor linking several Forest Reserves of the HFZ. It aims to secure and enhance trees in corridors with community-based institutions, enhance trees and climate smart cocoa with farmers both in corridor landscapes and on admitted farms, and to deploy integrated landscape planning in support of community based resource decisions. These activities will enhance carbon stocks in the agroforestry and cocoa landscape by scaling up support (a combination of extension, inputs, certification, incentives) to smallholder farmers to increase protection of existing trees, planting of new trees, practicing agroforestry and shade grown climate smart cocoa production. It will aim to improve the care and maintenance of trees on private farmland, by devolving management responsibilities and improving incentives, coupled with extension and communication efforts. Pilot efforts will be developed in consultation with communities and land users in targeted zones indicated on the map and table in this section.

Activities to be financed will cover three main areas: securing and enhancing trees in key landscapes/corridors with communities, enhancing trees and smart cocoa practices in admitted farms within forest reserves, support integrated landscape level planning in support of community based resource use decisions. This includes field equipment and logistical means for delivering goods and services to communities and farmers in remote landscapes and the fringes of forest reserves. This will also increase the presence of FC staff in the field for management and monitoring purposes.





**Figure 3: Western Region showing Cocoa Districts and Depot Towns**



**Figure 4: Brong Ahafo Region showing Cocoa Districts and Depot Towns**

**Pilot 2.2: Pilot Investments on Forest Reserves for Reducing Degradation, Enrichment Planting, Nurseries, and Plantation Development for Restoring Degraded Forest Landscapes.** This pilot will aim to reduce further degradation of permanent forest estates; enhance habitat and carbon stocks through enrichment planting and nursery development with ecologically and commercially important native species to restore degraded landscapes, and facilitate the enabling conditions for plantation investment in severely degraded landscapes, with community involvement. This set of activities will help to address the imbalance in timber supply and demand, improve the enabling environment and investment climate for sustainable forest management and plantation development, particularly on severely degraded forest reserves. This activity will augment the supply of important native species within the high forest ecosystem, while also creating incentives and employment opportunities and markets for native seed stock, for communities and farmers to engage in the planting and preservation of native tree species, rather than encroachment into forests.

Activities to be financed will cover three main areas: reducing further degradation of permanent forest estates (by engagement with admitted farms and CBOs), enhancing carbon stocks through facilitation of plantation investment in severely degraded landscapes, and enrichment planting, nurseries and native species for restoring degraded forest and agricultural landscapes.

**Component 3: Innovation, Capacity Building and Communications.** This component will support communication, capacity building, and monitoring activities to support innovation, engage communities, and provide information relevant for improved landscape management practices. It will support the field demonstration activities described above by supplying information, improved approaches, and training materials needed to achieve improved outcomes. Activities in support of innovation will involve consolidation of economic, environmental and social assessments to provide knowledge and specific cultivation techniques to improve the acceptability and uptake of native trees in landscapes and in plantations. Communication, outreach and dissemination will be supported with development of strategic communication approaches, improving existing communication channels and capacities (in GoG), improving and targeting communication materials aimed at local institutions and stakeholder groups, using practical and efficient dissemination technologies (e.g., mobile phone, radio, etc). Communication efforts will be supplemented by technical know-how developed for practical uptake by farmers and landscape managers at the local institutional level. Research and dissemination efforts will be informed through surveys and feedback from target groups, so that outreach, community relations and management practices can be constantly improved and aimed at the people who need to apply the information to effect change on the ground. This activity will also support development of information materials and campaigns and will aim to engage locally appropriate delivery agents. Links with DGM-financed activities and related institutions are being developed and defined. This component will also include training, development of innovations, communication and MRV.

**Component 4: Project Management, Monitoring and Coordination.** This component will support project management and oversight, project monitoring and evaluation system, and wider coordination of the range of FIP-financed activities, including reporting at the international level. It provides support to the GoG in regular communication and coordination among FIP-financed interventions and related activities, to promote synergies among all FIP projects (WB, AfDB, IFC, DGM), as well as information and knowledge sharing with other FIP countries. The activities to be financed include project coordination, financial management, procurement management, contract management equipment and supplies, and Monitoring and Evaluation.

## **2.2 Implementing and collaborating institutions**

The main responsible ministry is the Ministry of Lands and Natural Resources (MLNR) with the Forestry Commission as the lead implementing agency. The Forestry Commission will work with partners with skills in communication, community engagement, landscape management practices especially those already engaged with CREMA development. Others are stakeholders in the cocoa landscape supply chain and will include COCOBOD, licensed buying companies, private agents and extension agents and service providers (Solidaridad, NCRC, IUCN etc) , research institutions (FORIG and CRIG) .

The project will also support the GoG in regular communication and coordination among FIP financed interventions and related activities, to promote synergies among all FIP projects (WB, AfDB, IFC, DGM) as well as information and knowledge sharing among other FIP countries.



### **3.0 REGULATORY AND INSTITUTIONAL FRAMEWORK**

#### **3.1 Regulatory Framework for Pesticide Management**

##### 3.1.1 National

The relevant laws governing environmental pollution, plant protection, and pest and pesticide management and control include:

- Environmental Protection Agency Act, 1994, Act 490;
- Environmental Assessment Regulations, 1999, LI 1652;
- Plants and Fertilizer Act, 2010, Act 803; and
- Water Resources Commission Act, 1996, Act 522.

##### Environmental Protection Agency Act, 1994, Act 490

This Act establishes and mandates the EPA to seek and request information on any undertaking that in the opinion of the Agency can have adverse environmental effects and to instruct the proponent to take necessary measures to prevent the adverse impacts. This law aims at controlling the volumes, types, components, wastes effects or other sources of pollution elements or substances that are potentially dangerous for the quality of life, human health and the environment.

Part II of the Act 490 deals with pesticides control and management and this was formally an Act on its own (Pesticides Control and Management Act of 1996, Act 528). This section of Act 490 provides the rules for registration, pesticides classification, approval, clearance, using, disposing of and non disclosure of confidential information, the granting of licence, labelling, and pesticides inspections.

The registration authority (EPA) confirms that authorized products are safe and efficacious for intended uses. The EPA is the national authority responsible for the overall pesticide regulatory program in the country. (See **Annex 1** – Copy of Part II of Act 490).

##### Environmental Assessment Regulations, 1999, LI 1652

The Environmental Assessment Regulations 1999, LI 1652 list activities for which an environmental assessment is mandatory. The Regulations describe the procedures to be followed to obtain permits for both existing and proposed undertakings through the conduct of environmental impact assessments and preparation of environmental management plans.

##### Plants and Fertilizer Act 2010, Act 803

The Plants and Fertilizer Act of 2010, combines the Seed Inspection and Certification Decree, NRCDC 100 of 1972 and the Prevention & Control of Pests and Diseases of Plants Act of 1965, Act 307. The Act provides for the efficient conduct of plant protection to prevent the introduction and spread of pests and diseases to regulate imports and exports of plants and planting materials; the regulation and monitoring of the exports, imports and commercial transaction in seeds and related matters; and control and regulation of fertilizer trade.

##### Water Resources Commission Act, 1996, Act 522

The Water Resources Commission Act 522 (1996) conferred on the Water Resource Commission (WRC) the mandate to regulate and control the use of water resources through granting of water rights and water use



permits. The Water Use Regulations, (L.I.1692) provides the procedure for allocating permits for various water uses including domestic, commercial, municipal, industrial, agricultural, power generation, water transport, fisheries (aqua culture), and recreational.

### 3.1.2 Some key International Conventions

The International Plant Protection Convention (IPPC) is an international treaty that aims to secure coordinated, effective action to prevent and to control the introduction and spread of pests of plants and plant products. It takes into consideration both direct and indirect damage by pests, so it includes weeds. It also covers vehicles, aircraft and vessels, containers, storage places, soil and other objects or material that can harbor or spread pests.

The International Plant Protection Convention came into force on 3 April 1952. The Convention has been adopted by the Food and Agriculture Organization of the United Nations. Its implementation involves collaboration by National Plant Protection Organizations (NPPOs) — the official services established by governments to discharge the functions specified by the IPPC — and Regional Plant Protection Organizations (RPPOs), which can act as coordinating bodies at a regional level to achieve the objectives of the IPPC.

Ghana's National Plant Protection Organisation is the Plant Protection and Regulatory Services Directorate of MoFA. Ghana adopted the IPPC convention in February 1991.

Other relevant international conventions ratified by Ghana include:

- International Code of Conduct for the distribution and use of FAO pesticides;
- The Basel International Convention on the Transboundary Movement of Hazardous Waste of March 22, 1989;
- The Rotterdam Convention on Prior Information and Consentment Principle (PIC);
- The Basel Convention on Persistent Organic Pollutants (POP's);
- International Standards for Phytosanitary Measures (ISPM ) FAO; and
- The Montreal Protocol.

## 3.2 National institutions responsible for the safe management of agro-chemicals/pesticides

### 3.2.1 Public sector institutions

The key national institutions responsible for the safe management of agro-chemicals and its related matters are represented below:

#### **Environmental Protection Agency (EPA)**

The Environmental protection Agency has the mandate to regulate, coordinate and manage the environment. The EPA has the oversight responsibility for pest management and control and it has the following prerogatives:

- The registration of pesticides
- The limitation or banning of the use of a pesticide if necessary
- The granting of licences to all categories of pesticides' resellers
- The levying of penalties.

The EPA and in particular its Chemical Control and Management Centre (CCMC), responsible for pesticides control and management, has offices in all regions as well as three district offices. The Agency periodically provides a list of registered pesticides and banned pesticides for public consumption. The recent list is provided in **Annex 2**. The list is periodically updated and there is the need to liaise with the Agency for any updates during project implementation.

### **Ghana Cocoa Board (COCOBOD)**

Ghana Cocoa Board (COCOBOD) is directly under the Ministry of Finance and the functions of COCOBOD centre on the production, research, extension, internal and external marketing and quality control. The functions are classified into two main sectors; Pre-harvest and Post-harvest. The Pre-harvest Sector functions are performed by the Cocoa Research Institute of Ghana (CRIG), the Seed Production Unit (SPU), and the Cocoa Swollen Shoot Virus Disease Control Unit (CSSVDCU).

It is the responsibility of the Cocoa Research Institute of Ghana, to screen all pesticides used in the cocoa industry to ensure that they comply with EU, Japanese and other markets requirements for food safety, Maximum Residual Level (MRL) limits and sanitary and phyto-sanitary standards before they are certified for use on cocoa. The CSSVDCU deals with cocoa swollen shoot viral disease at the farm gate level. It is the responsibility of the Cocoa Extension Services of the COCOBOD to regularly update farmers' skills in the application of pesticides. At the district levels, the CSSVDCU also performs the functions of the cocoa extension services.

The Post-harvest Sector functions are undertaken by the Quality Control Division (QCD) and the Cocoa Marketing Company (CMC) Limited. The Post-harvest activities of COCOBOD start with quality control measures of QCD which farmers must observe to facilitate the acceptance of their produce at the buying centres by the licensed buying companies engaged in internal marketing of cocoa at the time.

### **The Ministry of Food and Agriculture (MoFA)-Plant Protection and Regulation Services Directorate**

The Ministry of Food and Agriculture is responsible for the regulation of pesticides use in the country. The national plant protection policy is the Integrated Pest Management (IPM) Plan. The Plant Protection and Regulation Services Directorate (PPRSD) of MoFA was established in 1965 by an Act of Parliament: Prevention and Control of Pests and Diseases of Plants Act of 1965, Act 307, which is now replaced by "Plants and Fertilizer Act, 2010 (Act 803).

The PPRS is the National Institution with mandate and capacity to organize, regulate, implement and coordinate the plant protection services (including pests management and pesticide use) needed for the country in support of sustainable growth and development of Agriculture.

The PPRS has its headquarters in Pokuase near Accra and there are also regional officers in all the ten regions of the country. It also represented at the main entry and exit points throughout the country. It is not directly represented at the district level but however it collaborates with the district MOFA offices to carry out its functions at that level.

The PPRS is divided into four main Divisions and these include:

- Crop Pests & Disease Management Division
- Pesticide and Fertilizer Regulatory Division
- Ghana Seed Inspection Division

- Plant Quarantine Division

#### Crop Pests & Disease Management Division

The Crop Pests & Disease Management Division (CPDMD) develops Good Agricultural Practices (GAPs), guidelines for Integrated Pest Management (IPM) of food crops. The division also provides information and training on pests and disease situation.

#### Pesticide and Fertilizer Regulatory Division

The Division supervises and trains Regulatory Inspectors, publishes information materials, registers and trains pesticides and fertilizer dealers and applicators, keeps records as well as statistics of pesticides and fertilizers and manages pesticide and fertilizer stocks in the country. It supervises bio-efficacy trials carried out by research.

#### Ghana Seed Inspection Division (GSID)

The Ghana Seed Inspection Division (GSID) is responsible for seed certification for seed growers, seed dealers, seed importers/exporters, and also education and awareness creation among farmers on the benefits of utilization of certified seed/planting materials. It relies on the National Seed Testing Laboratory (NSTL), which is under the division, for carrying out seed sampling and laboratory seed quality tests before seeds are certified for distribution and marketing.

#### Plant Quarantine Division

The Division works closely with the customs authorities (CEPS) at all the official entry points. It supervises and trains Phytosanitary Inspectors, develops and publishes information material, keeps records of plant imports and exports, the importers and exporters, as well as the pests and diseases of quarantine importance. It issues phytosanitary certificates and import permits according to the IPPC format. It inspects plant materials and makes sure they are free from pests. It also operates the National SPS Enquiry Point.

#### **Directorate of Crop Services- MoFA**

The Directorate is responsible for the following among other things:

- Ensuring that there are planting materials (seeds) in adequate quantities at affordable prices and at appropriate times and places.
- Promoting the production of food, industrial and export crops in the country.
- Monitoring the development of the crop sub sector and facilitating the capacity building of staff in the districts.
- Providing technical advice to the public on all crops within our mandate.
- Promoting the sustainable use of soil and water resources for agricultural production.
- Recommending issuance of permits and waivers for the importation of agricultural materials for the crops sub-sector/industry.

The Environment, Land and Water Management Unit is directly responsible for environmental management and monitoring issues.

#### **The Ghana Standards Authority (GSA)**

The GSA, formerly Ghana Standards Board, has the full responsibility of ensuring the quality of the infrastructure including the Metrology, Standards, Assessment/Test and Quality control (MSTQ). It

ensures the goods and services are of acceptable quality for both local and international consumers. The Authority makes routine analyses of pesticides residues in fruits and vegetables in order to facilitate the exportations of these products and also protect the public health and ensure safety.

The GSA has central facilities in Accra and regional offices in Ho (Volta region), Koforidua (Eastern Region), Takoradi (Western and Central Regions), Kumasi (Ashanti and Brong Ahafo Regions) and Tamale (Northern sector). GSA has been supported by the World Bank funded AgSSIP and UNIDO to bring its MRL analysis capacity up to ISO 17025 requirements.

### **The Customs, Excise and Prevention Service (CEPS)**

The CEPS works in close collaboration with the EPA and PPRSD, and reviews the EPA documents, certificates/licences to make sure they concern the importation of approved chemicals, meat and agrochemical products. The importation reports of chemical products are submitted by the CEPS to the EPA on a quarterly basis. The CEPS staff are members to the various technical committees of the EPA including the hazardous waste committee, the pesticide technical Committee and other projects undertaken by the EPA. The CEPS is member of the national Coordination team of the Convention of Stockholm on the POPs.

### 3.2.2 Non-Governmental Organisations/Private Institutions

#### **Farmers' associations**

Private institutions dealing with pest and pesticide issues are mainly involved in crop farming, agro-input trading, and the trade and export of agriculture products. The Ghana Agro-Input Dealers Association (GAIDA) is an apex body for pesticide dealers and distributors in Ghana. Various farmers associations abound but these are weak. The Ghana Federation of Agriculture Producers (GFAP) comprises four major apex farmers associations - the Apex Farmers Organisation of Ghana (APFOG), Farmers Organisation of Ghana (FONG), Peasant Farmers Association of Ghana (PFAG and the Ghana National Association of Farmers and Fishermen (GNAFF) under one umbrella.

Others such as the Vegetable Producers Exporters Association of Ghana (VEPEAG), and the Seed Producers Association of Ghana (SEEDPAG) also exist to take care of members interest. There is the Ghana Agricultural Associations' Business and Information Centre (GAABIC). These organizations take care of members' interest and to support members to meet the requirements of EPA/PPRSD.

#### **Cocoa farmers/stakeholders associations**

The major groups of interest include:

- The Ghana Cocoa Coffee and Shea-nut Farmers Association (COCOSHE)
- Cocoa Abrabopa Association (CAA)
- Kuapa Kokoo
- The Ghana Cocoa Platform
- Private License Buying Companies

#### The Ghana Cocoa Coffee and Shea-nut Farmers Association

The Ghana Cocoa, coffee and Shea-nut farmers association is the parent body for cocoa, coffee and shea-nut farmers in the country. It was officially founded in 1980 during the reign of Dr Hilla Limann to campaign for better price of the crops.

### Cocoa Abrabopa Association

The not-for-profit Cocoa Abrabopa Association (CAA) was officially established in 2008 after being piloted at Bunso Nkwanta in the Western Region of Ghana two years earlier. It is an association of cocoa farmers seeking a better life by using the CAA input and guidance package. The concept started as a farmers program with an input package recommended by the Cocoa Research Institute of Ghana. The associations' headquarters is located at Dunkwa-on-Offin in the Central Region of Ghana, the heart of the cocoa growing regions. Cocoa Abrabopa Association works closely with the Ghana Cocoa Board (COCOBOD).

### Kuapa Kokoo

When internal marketing of cocoa was liberalized in Ghana, a group of farmers led by Nana Frimpong Abrebrese established Kuapa Kokoo as a farmer's cooperative in 1993 with assistance from Twin Limited UK. Two years later, the union received its first Fairtrade certification. The cooperative works at improving the social, economic and political wellbeing of its members. Kuapa Kookoo simply means Good Cocoa Farming. Kuapa Kokoo seeks to develop itself into a formidable farmer-based organisation capable of mobilising quality cocoa products, improving the livelihood of members and satisfying customers. The head-office is located in Kumasi, Ashanti Region.

### The Ghana Cocoa Platform

The Ghana Cocoa Platform is an avenue created by the Ghana Cocoa Board (COCOBOD) with other supporting stakeholders to provide convening and coordination on technical issues beyond the topic of extension and into other thematic areas of the cocoa sector that would benefit from a public private partnership approach to cocoa development. The goal of the Platform is to boost sustainable production in Ghana's cocoa sector through enhanced partnership and cooperation among stakeholders.

The platform, through plenary sessions provides opportunities for a wider inclusion of sector stakeholders to discuss a mirage of issues that will have a positive impact on the Ghanaian cocoa sector. The Platform is to be led by COCOBOD, with UNDP providing technical advice, facilitation and organization support to set up and run the platform.

### Private License Buying Companies (LBCs)

COCOBOD license private companies to purchase cocoa harvest from individual farmers at sanctioned price and conditions. The LBCs e.g. Olam, Armajaro and others, however, provide numerous services to the farmers in their license area, including extension services, inputs, and guidance on application of agrochemicals. The promotion of IPM by the LBCs is an important element of the overall national effort to advance IPM in Ghana.

## **3.3 International Agreements, Conventions and Requirements**

IPPC — the International Plant Protection Convention — is an international treaty that aims to secure coordinated, effective action to prevent and to control the introduction and spread of pests of plants and plant products. It takes into consideration both direct and indirect damage by pests, so it includes weeds. It also covers vehicles, aircraft and vessels, containers, storage places, soil and other objects or material that can harbour or spread pests.

The International Plant Protection Convention came into force on 3 April 1952. The Convention has been adopted by the Food and Agriculture Organization of the United Nations. Its implementation involves collaboration by National Plant Protection Organizations (NPPOs) — the official services established by governments to discharge the functions specified by the IPPC — and Regional Plant Protection Organizations (RPPOs), which can act as coordinating bodies at a regional level to achieve the objectives of the IPPC.

Other relevant international conventions ratified by Ghana include:

- The International Code of Conduct on Pesticide Management (FAO, 2014).
- The Basel Convention on the Transboundary Movement of Hazardous Wastes and their Disposal (adopted in 1989; entered into force in 1992).
- The Rotterdam Convention on the Prior Informed Consent (PIC) Procedure for Certain Hazardous Chemicals and Pesticides in International Trade (adopted in 1998; entered into force in 2004).
- The Stockholm Convention on Persistent Organic Pollutants (POP) (adopted in 2001; entered into force in 2004).
- The Montreal Protocol on Substances that Deplete the Ozone Layer (adopted in 1987; entered into force in 1989).
- The *Codex Alimentarius*, Committee on Pesticide Residues (operational since 1966).
- International Standards for Phytosanitary Measures (ISPM ) FAO.

## 4.0 PESTS AND PESTICIDE USE AND CHALLENGES

### 4.1 Common Pests/Diseases of Cocoa in Ghana and Control Methods

**Table 1** provides the list of common pests and diseases associated with cocoa in Ghana and their control methods. Approved pesticides to treat these and other diseases are listed in **Annex 2**. Non-pesticide based (IPM) approaches to addressing these diseases are included in the cocoa manuals currently in use, which is further described below.

### 4.2 Management and Use of Pesticides

#### 4.2.1 Integrated Pest Management and COCOBOD

Integrated Pest Management is promoted and practiced by Ghana's COCOBOD, a partner agency under FIP. The Cocoa Manual (Cocoa Research Institute of Ghana (CRIG), 2010. [www.crig.org](http://www.crig.org)) outlines the rationale and practice of integrated pest management and integrated crop management in Cocoa in Ghana. A combination of cultural, biological, and chemical control measures is outlined for the major and minor pests and diseases of cocoa trees and pods (Summarized in Table 1 below). It also covers good agricultural practices more generally, including the management of soil, nutrients, water and compost in addition to IPM. Consumer markets and standards are important in shaping pest management approaches in the cocoa landscape. Ghana recognizes that Europe is the major market for cocoa beans and processed cocoa and defines standards for pesticide, herbicide and fungicide use based on European standards (or USA-based standards where those are available). Potential pesticides are screened for use by the COCOBOD and only ones acceptable in environmentally sensitive markets are allowed. COCOBOD also promotes several certification systems for documenting sustainable cocoa production methods. The Cocoa Manual describes five certification systems managed by its partners including UTZ, Rainforest Alliance, Fairtrade, Organic Certificates, and IMO Social and Fair Trade Certification.

Cocoa extension agents and the Cocoa Research Institute promote these pest and disease control measures and provide information, technical assistance to farmers. COCOBOD, mainly through CRIG, also develops and promotes improved varieties of cocoa trees that are more resistant to pests and diseases and distributes these to farmers. COCOBOD, through Cocoa Health and Extension Division (CHED), organizes national campaigns to combat economically destructive diseases, such as Cocoa Swollen Shoot Virus Disease (CSSVD) using non-chemical cultural and physical measures (cutting, burning, and replanting diseased areas). These subdivisions of COCOBOD are further described in detail below.

**Table 1: Common Pests and Diseases of Cocoa in Ghana and their Control Measures**

| Pest/Disease        | Reasons for Control  | Control Measures  | Pesticides Used  | Pesticide Management   |
|---------------------|--|---|--|--|
| Weeds               | <ul style="list-style-type: none"> <li>• Competition for nutrients, water, light</li> <li>• Increase incidence of insects, rodents and diseases</li> <li>• Reduce harvest efficiency</li> </ul>                  | <ul style="list-style-type: none"> <li>• Manual weed control, 3-4 times/yr</li> <li>• Leguminous ground cover</li> <li>• Herbicide, 3x per year</li> </ul>  | <ul style="list-style-type: none"> <li>• Glyphosate</li> <li>• 1.5-2 liters in 100 litres of water per ha</li> </ul>   | <ul style="list-style-type: none"> <li>• Apply with approved backpack sprayer</li> <li>• Avoid contact with cocoa seedlings, food crops</li> <li>• Spray in early morning or late afternoon to avoid drift</li> <li>• Apply with 4 hours of dry weather, not in advance of rain</li> <li>• Wear protective clothing</li> <li>• Do not eat, drink or smoke while spraying</li> <li>• Wash down (clothes, hands, shoes) after use</li> <li>• Avoid contaminating streams or water bodies</li> <li>• Dispose of containers by burying</li> <li>• Do not use containers for water or food</li> </ul> |
| <b>Major Pests</b>  |  |   |  |  |
| Mirids (or Capsids) | <ul style="list-style-type: none"> <li>• Nymphs and adults feed on tender shoots and pods by sucking sap</li> <li>• Cause economic damage by creating lesions that may also result in fungal invasion</li> </ul> | <ul style="list-style-type: none"> <li>• Chemical control is considered most reliable, 5x/year</li> <li>• Botanical control: Aqueous Neem Seed Extract is used on organic cocoa (limited area)</li> <li>• Increase shade: unshaded cocoa is more severely attacked by mirids</li> <li>• Biological control: Mirid sex pheromones and traps are now being assessed.</li> </ul> | <ul style="list-style-type: none"> <li>• Bifenthrin (Akate Master, 500 ml/ha)</li> <li>• Thiomethoxam (Actara), 85 ml/ha</li> <li>• Imidacloprid (Confidor) (200 SL), 150 ml/ha</li> </ul> | <ul style="list-style-type: none"> <li>• Apply with approved backpack sprayer</li> <li>• Do not eat, drink or smoke while spraying</li> <li>• Wash down after use</li> <li>• Avoid contaminating streams or water bodies</li> <li>• Ensure that pesticide containers are disposed of in a safe manner.</li> <li>• Empty containers should be returned to the agro-chemical companies that supplied them for proper disposal, which may include incineration</li> <li>• Alternate pesticides every 2 years to prevent development of resistant strains of mirids</li> </ul>                       |
| Mealybugs           | <ul style="list-style-type: none"> <li>• Colonies suck sap from shoots and pods</li> </ul>   | <ul style="list-style-type: none"> <li>• Biological control: Parasitoids and predators have been tried with little</li> </ul>   | None   | Control of CCSVD is achieved by removing infected trees (see below)  |



|                    |   |  |  |  |
|--------------------|---|--|--|--|
|                    | <ul style="list-style-type: none"> <li>• Mealybugs transmit CCSVD (see below)</li> <li>• Ants may transport mealybugs from tree to tree</li> </ul>  | <p>success, partly because ants provide protection</p> <ul style="list-style-type: none"> <li>• Chemical control: difficult to control with sprays due to the mealy covering, which is water proof</li> <li>• Some systemic pesticides have been banned due to toxicity and residue in cocoa beans</li> </ul>  |  |  |
| Stem borers        | <ul style="list-style-type: none"> <li>• Moth Larvae bore into cocoa stems, branches</li> <li>• Leaves exit holes and dark stains on bark</li> <li>• Weakens the tree leads to yield loss and tree death</li> </ul> | <ul style="list-style-type: none"> <li>• Manual control: Blocking exit hole with twig or cotton stops adults from emerging and further spreading, but is very tedious and not practical for large infestations</li> <li>• Chemical control: Cotton plugs can be treated with recommended pesticides</li> <li>• Using cotton plugs with kerosene is not recommended due to fire danger</li> </ul> | •  | •  |
| Termites           | <ul style="list-style-type: none"> <li>• Important pests at establishment stage</li> <li>• Can eat and damage seedling tissues</li> <li>• Wilting and death may result</li> </ul>                                   | <ul style="list-style-type: none"> <li>• Preventive control: Soil treatment and watering with Confidor solution</li> </ul>   | <ul style="list-style-type: none"> <li>• Imidacloprid (Confidor) (200 SL), 30 ml/11 liters of water</li> </ul> | <ul style="list-style-type: none"> <li>• Apply with approved backpack sprayer</li> <li>• Do not eat, drink or smoke while spraying</li> <li>• Wash down after use</li> <li>• Avoid contaminating streams or water bodies</li> <li>• Ensure that pesticide containers are disposed of in a safe manner.</li> <li>• Empty containers should be returned to the agro-chemical companies that supplied them for proper disposal, which may include incineration</li> </ul> |
| <b>Minor Pests</b> |   |  |  |  |

|   |  |  |   |   |
|---|--|--|---|---|
| Defoliators:<br>Earis and<br>Anomis<br>Caterpillars +<br>Grasshoppers | <ul style="list-style-type: none"> <li>• Feed on leaves and growing shoots, delaying growth and canopy formation</li> </ul>  | <ul style="list-style-type: none"> <li>• Cultural control: Increased shade reduces incidence</li> <li>• Chemical control: only necessary for serious outbreaks</li> <li>• Biological control: a myco pesticide containing <i>Metarhizium anisoplea</i> has proven effective for grasshoppers</li> </ul>  | <ul style="list-style-type: none"> <li>• Insecticides approved by COCOBOD</li> <li>• Pyrethroids</li> </ul> | <ul style="list-style-type: none"> <li>• Same as for mirids, see above</li> </ul> |
| Aphids and<br>Psillids  | <ul style="list-style-type: none"> <li>• Soft bodied insects suck sap from shoots and flowers reducing growth and yield</li> </ul>   | <ul style="list-style-type: none"> <li>• Cultural control: unshaded cocoa is more susceptible to damage</li> <li>• More damage can occur during drought periods, due to desiccation and death of buds, flowers, new shoots</li> </ul>  | <ul style="list-style-type: none"> <li>• Same as for mirids, see above</li> </ul>                           | <ul style="list-style-type: none"> <li>• Same as for mirids, see above</li> </ul> |
| Rodents   | <ul style="list-style-type: none"> <li>• May dig out and eat seedlings in nurseries</li> <li>• May chew cocoa husk and feed on beans</li> </ul>  | <ul style="list-style-type: none"> <li>• Manual control: Weed areas to keep clear of habitat</li> <li>• Poorly maintained farms with undergrowth and excess shade suffer more rodent damage</li> </ul>   | <ul style="list-style-type: none"> <li>• None recommended</li> </ul>  | <ul style="list-style-type: none"> <li>•</li> </ul>                               |
| <b>Major Diseases</b>   |  |  |   |   |
| Cocoa swollen shoot virus disease (CSSVD)                             | <ul style="list-style-type: none"> <li>• Virus lives in plant tissues</li> <li>• Movement is aided by transmission through mealybugs</li> <li>• Causes bleaching of chlorophyll in leaves</li> <li>• Advanced infections lead to swelling of stems, new growth, etc</li> <li>• Stems and shoots may die back reducing growth and yield, threatens entire areas</li> <li>• Can survive also in alternative host plants</li> </ul> | <ul style="list-style-type: none"> <li>• High prevalence in eastern and western regions</li> <li>• Manual control: remove and destroy infected trees (a national campaign managed by COCOBOD)</li> <li>• Cultural control: plant barrier of immune crops around new cocoa areas (mealybugs lose the virus after 48 hours, so this increases the time it takes for mealybugs to reach cocoa trees, reducing the transmission)</li> <li>• Biological control: mild strains of the CCSV have been introduced to provide some cross protection against more virulent forms</li> </ul> <p>Cultural control: breeding for CCSV resistance is underway using rapid screening approaches</p> |   |   |

| <p>Pod rot diseases (black pod, or phytophthora)</p>                                  | <ul style="list-style-type: none"> <li>• Causes browning, blackening and rotting of pods and beans</li> <li>• Causes root rot, stem canker and leaf blight</li> <li>• Pod rot losses are most economically important</li> <li>• Some strains can cause entire crop loss in one season</li> <li>• Fungal spread is aided by direct contact, rain splash, or transmission by insects, animals or man</li> </ul> | <ul style="list-style-type: none"> <li>• Cultural control: Least expensive. Reducing humidity and moisture will reduce incidence and spread. Implies judicious reduction of shade, regular weeding and pruning to admit light.</li> <li>• Harvest every month; Sort harvested pods; destroy diseased pods</li> <li>• Chemical control: spray fungicides beginning in May, then every 3-4 weeks</li> </ul> | <table border="1"> <thead> <tr> <th>Trade name</th> <th>Active ingredient</th> <th>Amount in grammes</th> <th>Dosage (sachets/tank)</th> <th>Dosage (g/15l pneumatic knapsack)</th> </tr> </thead> <tbody> <tr> <td>Ridomil Gold</td> <td>Cuprous Oxide &amp; Mefenoxam</td> <td>250</td> <td>1</td> <td>50g</td> </tr> <tr> <td>Funguran-OH</td> <td>Cupric Hydroxide</td> <td>500</td> <td>1</td> <td>100g</td> </tr> <tr> <td>Metalm 72 WP</td> <td></td> <td>250</td> <td>1</td> <td>50g</td> </tr> <tr> <td>Fungikill 50WP</td> <td></td> <td>375</td> <td>1</td> <td>75g</td> </tr> <tr> <td>Kocide 2000</td> <td>Cupric Hydroxide</td> <td>500</td> <td>1</td> <td>100g</td> </tr> <tr> <td>Nordox 75WG</td> <td>Cuprous Oxide</td> <td>375</td> <td>1</td> <td>75g</td> </tr> <tr> <td>Champion</td> <td>Cupric Hydroxide</td> <td>500</td> <td>1</td> <td>100g</td> </tr> </tbody> </table> <p>Fungicide use and management guidelines, as above for pesticides</p> |                                   | Trade name | Active ingredient | Amount in grammes | Dosage (sachets/tank) | Dosage (g/15l pneumatic knapsack) | Ridomil Gold | Cuprous Oxide & Mefenoxam | 250 | 1 | 50g | Funguran-OH | Cupric Hydroxide | 500 | 1 | 100g | Metalm 72 WP |  | 250 | 1 | 50g | Fungikill 50WP |  | 375 | 1 | 75g | Kocide 2000 | Cupric Hydroxide | 500 | 1 | 100g | Nordox 75WG | Cuprous Oxide | 375 | 1 | 75g | Champion | Cupric Hydroxide | 500 | 1 | 100g |
|---|---|---|--|-----------------------------------|------------|-------------------|-------------------|-----------------------|-----------------------------------|--------------|---------------------------|-----|---|-----|-------------|------------------|-----|---|------|--------------|--|-----|---|-----|----------------|--|-----|---|-----|-------------|------------------|-----|---|------|-------------|---------------|-----|---|-----|----------|------------------|-----|---|------|
| Trade name  | Active ingredient   | Amount in grammes   | Dosage (sachets/tank)  | Dosage (g/15l pneumatic knapsack) |            |                   |                   |                       |                                   |              |                           |     |   |     |             |                  |     |   |      |              |  |     |   |     |                |  |     |   |     |             |                  |     |   |      |             |               |     |   |     |          |                  |     |   |      |
| Ridomil Gold  | Cuprous Oxide & Mefenoxam   | 250   | 1  | 50g                               |            |                   |                   |                       |                                   |              |                           |     |   |     |             |                  |     |   |      |              |  |     |   |     |                |  |     |   |     |             |                  |     |   |      |             |               |     |   |     |          |                  |     |   |      |
| Funguran-OH   | Cupric Hydroxide  | 500   | 1  | 100g                              |            |                   |                   |                       |                                   |              |                           |     |   |     |             |                  |     |   |      |              |  |     |   |     |                |  |     |   |     |             |                  |     |   |      |             |               |     |   |     |          |                  |     |   |      |
| Metalm 72 WP  |   | 250   | 1  | 50g                               |            |                   |                   |                       |                                   |              |                           |     |   |     |             |                  |     |   |      |              |  |     |   |     |                |  |     |   |     |             |                  |     |   |      |             |               |     |   |     |          |                  |     |   |      |
| Fungikill 50WP  |   | 375   | 1  | 75g                               |            |                   |                   |                       |                                   |              |                           |     |   |     |             |                  |     |   |      |              |  |     |   |     |                |  |     |   |     |             |                  |     |   |      |             |               |     |   |     |          |                  |     |   |      |
| Kocide 2000   | Cupric Hydroxide  | 500   | 1  | 100g                              |            |                   |                   |                       |                                   |              |                           |     |   |     |             |                  |     |   |      |              |  |     |   |     |                |  |     |   |     |             |                  |     |   |      |             |               |     |   |     |          |                  |     |   |      |
| Nordox 75WG   | Cuprous Oxide   | 375   | 1  | 75g                               |            |                   |                   |                       |                                   |              |                           |     |   |     |             |                  |     |   |      |              |  |     |   |     |                |  |     |   |     |             |                  |     |   |      |             |               |     |   |     |          |                  |     |   |      |
| Champion  | Cupric Hydroxide  | 500   | 1  | 100g                              |            |                   |                   |                       |                                   |              |                           |     |   |     |             |                  |     |   |      |              |  |     |   |     |                |  |     |   |     |             |                  |     |   |      |             |               |     |   |     |          |                  |     |   |      |
| <p>Minor Diseases</p>   |   |   |  |                                   |            |                   |                   |                       |                                   |              |                           |     |   |     |             |                  |     |   |      |              |  |     |   |     |                |  |     |   |     |             |                  |     |   |      |             |               |     |   |     |          |                  |     |   |      |
| <p>Thread blight, charcoal pod rot, root rot, cushion gall, and mealy pod disease</p> |   | <ul style="list-style-type: none"> <li>• Treated with fungicides, as above, when infestation is severe</li> </ul>   |  |                                   |            |                   |                   |                       |                                   |              |                           |     |   |     |             |                  |     |   |      |              |  |     |   |     |                |  |     |   |     |             |                  |     |   |      |             |               |     |   |     |          |                  |     |   |      |

Source: Cocoa Manual, Cocoa Research Institute of Ghana (CRIG), 2010. [www.crig.org](http://www.crig.org)

COCOBOD's Cocoa Health and Extension Division is responsible for the control of cocoa swollen shoot virus disease, rehabilitation of old and unproductive cocoa farms and extension services in Ghana. Its mission is to control the spread of cocoa swollen shoot virus and black pod diseases, assist farmers to replant their treated and died out farms with improved cocoa varieties in all cocoa growing areas of the country; pursue effective pests control and cocoa rehabilitation programs as well as provide back-up extension services to meet the technical needs of cocoa farmers. Activities include sectoring and surveys in cocoa districts, treatment of infected farms, assisting farmers to replant treated farms with disease tolerant and improved hybrid varieties and conduct periodic re-inspection of treated and replanted farms to forestall re-infection of treated farms.

Activities under the Rehabilitation scheme involve cutting out old unproductive cocoa trees, replanting with improved hybrid varieties as well as reviving productive cocoa farms by assisting farmers to apply fertilizers, remove mistletoe and adopt best agronomic practices. The Division also has the oversight responsibility and management of a new Cocoa Extension system which operates in the context of a Public Private Partnership. It provides an efficient and cost-effective system to cocoa farmers by assisting them to acquire knowledge and skills in good agricultural practices. Farmers are also trained in basic economics to orientate them to consider farming as a business venture which is impacting positively on farmer's productivity, income and livelihood. (Source: <https://www.cocobod.gh/oursubsidiaries.php>).

The Cocoa Research Institute of Ghana (CRIG), though primarily concerned with the development of sustainable cocoa production technologies, has stepped up its extension activities in recent times to meet the information needs of farmers. CRIG recognizes that education and extension are needed to replace traditional beliefs or word of mouth approaches used by farmers, with more modern and tested methods based on evidence. CRIG's farmer educational campaigns involve the use of the radio, on-farm engagements with farmers, production and distribution of education materials including posters, leaflets, production guides and flyers. CRIG even launched a cocoa farmers' newspaper on the management of cocoa pests and diseases. CRIG also uses farmer field schools, on-farm studies and several socio-economic surveys. (Source: Francis Baah, F. and Anchirinah, V. A review of Cocoa Research Institute of Ghana extension activities and the management of cocoa pests and diseases in Ghana, American Journal of Social and Management Sciences, 2011.).

#### 4.2.2 Climate Smart and Sustainable Cocoa Production

The model for climate-smart practices reflects a sustainable intensification strategy that combines increased shade cover (40-50%), as recommended by the Sustainable Tree Crop Programme (STCP), (Asare R. 2013) with the adoption of "best practices", including key elements of the High Tech and CODAPEC programs, that lead to significant yield increases, as has been demonstrated by the Cocoa Abrabopa Association(CAA) (among other organizations). (

Under a CSC production scenario, climate-smart practices would result in higher productivity per unit area, in addition to increases in the climate resilience of the cocoa systems as fertilizer and shade trees

contribute to better litter decomposition rates and higher drought resistance. The climate-smart scenario would also reduce the degradation and deforestation pressure on forest reserves and forest/trees in the off-reserve landscape, leading to the maintenance and enhancement of carbon stocks in the landscape. However, keen enforcement of land-use plans has to be a key measure of “best practice” cocoa management to prevent situations where increasing productivity will increase deforestation. If farmers and farming communities adopt these farm level and landscape scale practices, then they qualify for a range of benefits, including access to risk reduction packages, like cocoa yield insurance and credit, and access to possible climate benefits for community projects.

Available extension methods and training models that have been in use in Ghana since 2000 include the Farmer Fields School (FFS) method, which was originally implemented and monitored by the Sustainable Tree Crops Program (STCP) of the International Institute of Tropical Agriculture (IITA); the Farmer Group & Promoter method in use by Cocoa Abrabopa Association, and the mobile ‘telefony’ platform of CocoaLink, a project of the World Cocoa Foundation. **Table 3** outlines elements of these extension models. **Table 2** provides a full description of projects, the associated extension methods, and the inputs and resources that have been made available to farmers through each project.

At the core of these projects and extension systems are a basic set of recommended cocoa farming practices and input products (with the exception of organic practices), and some farmers also have access to a range of economic resources. The recommended practices and inputs are largely based on CRIG recommendations, while the available economic resources depend on the project.

Certification programmes also draw some of their criteria from these recommended practices, UTZ more so than Rainforest Alliance, which has a stronger focus on meeting a wide range of social and environmental criteria.

The majority of projects that are focused on improving or guiding farm management techniques and practices derive their curriculum from either CRIG recommended practices or the IITA/STCP Good Agricultural Practices (GAP) for sustainable cocoa production (Asare and David 2011). Certification standards, like that of the Fair Trade (FLO 2011), UTZ (UTZ Certified 2009) and Rainforest Alliance (SAN 2010; SAN 2011) standards, also derive some of their code of conduct requirements and recommendations from these sources, but each standard ultimately reflects its individual mission and unique focus, and is set based upon input received through a consultative process with industry stakeholders and experts.

**Table 2: Cocoa Projects and Programs**

| Program/Project<br>(Proponent/Donor)                             | Description   |
|--|---|
| <b>African Cocoa Initiative<br/>(World Cocoa<br/>Foundation)</b> | A public-private partnership that aims to double productivity for 100,000 cocoa farm households in West and Central Africa through the strengthening of local and national institutions, and in doing so raise farmer incomes by 150-200%. Overall goal to institutionalize effective public and private sector models to support sustainable productivity growth and improved food security on diversified cocoa farms in the region. This initiative is implemented from 2011-2016.   |
| <b>Armajaro<br/>Geo-traceability<br/>(Source Trust)</b>          | Project to collect data on small-holder farmers and trace the cocoa bean along the supply chain. Collects personal data on farmers, as well as farm area, geographic location, and information about the management and conditions of the farm. It can then analyse and present results on web-based platform. This project has also tested a rapid biodiversity assessment method.   |
| <b>Kraft Cadbury Cocoa<br/>Partnership</b>                       | In 2008, Cadbury started project to invest £30 million over 10 years in projects in Ghana to help transform cocoa farmers' lives. With funding from Kraft Foods, aim is to ensure that cocoa production is sustained in Ghana, and yield increased by 20% by 2012 and 100% by 2018, that farmers understand farming as a business, and to whip up support of the youth in cocoa farming, while discouraging child labour. Work is in partnership with Cocoa Board, UNDP, VSO, and CARE. As of May 2010, ten thousand farmers and their families in 100 cocoa-farming communities, as well as 55,000 members of the Kuapa Kokoo farmer's co-operative in Ghana, were benefiting from the project. Additional 109 communities have been partnered since 2011. |
| <b>Cocoa Abrabopa<br/>Association</b>                            | Train farmers in farm management and business skills so that cocoa farming becomes more of a business. Farmers are trained in Good Agricultural Practices, based on CRIG recommendations, and given access to credit to purchase and use inputs. Within first 3 years farmers are able to boost production from national average of 3 bags/acre (192 kg/acre or 422 kg/ha) to between 8-12 bags/acre (512-768 kg/acre or 1126-1689 kg/ha).<br><br>Implementing Rainforest Alliance and UTZ standards. CAA holds certificates on behalf of farmers.  |
| <b>CocoaLink (World<br/>Cocoa<br/>Foundation)</b>                | A mobile technology service that delivers farming, social and marketing information to cocoa farmers in 15 communities in western Ghana to improve incomes and livelihoods.<br><br>Pilot phase (2011-2013)  |

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|--|--|
| <b>Cocoa Livelihood Program (World Cocoa Foundation)</b> | <p>Aims to increase farmer income while strengthening local service capacity. Three main objectives:</p> <ul style="list-style-type: none"> <li>• Improve market efficiency and build capacity of farmers and farm organizations;</li> <li>• Improve production and quality of cocoa at the farm level. Specifically, increase productivity to 840kg/ha in 5 years via Good Agricultural Practices;</li> <li>• Improve farmers' competitiveness on diversified farms.</li> </ul> <p>Monitoring of income and productivity. Concentration on shade systems and biodiversity by University of Arkansas scientists. Cocoa production efficiency and quality are reported to have improved at the farm level (over 106,000 farmers have been trained in good agricultural practices and farm management skills; and have increased access to improved cocoa varieties and quality agro-inputs. This is anticipated to contribute to significant yield gains above the average 400 kg/hectare of the cocoa smallholder.</p> |
| <b>Echoes (World Cocoa Foundation, USAID)</b>            | <p>Empowering Cocoa Households with Opportunities and Education Solutions (ECHOES).</p> <p>Strengthens cocoa growing communities by expanding opportunities for youth and young adults through basic and adult education, strengthen capacity of CBOs, and improve cocoa household incomes for livelihood development. Currently supporting 41 communities in Ashanti Region</p>   |

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|---|--|
| <b>Fairtrade Certification (Kuapa Koko, Twin Trading)</b>   | <p>Approximately 5,000 MT of organic cocoa is produced in the Suhum-Craboar-Coaltar district in Ghana's Eastern Region. These beans are purchased by Yayra Glover, and are produced by 4000-plus smallholder farmers. Organic beans can be traced to the particular farm it was produced in.</p>   |
| <b>High Tech Program (Cocoa Board)</b>  | <p>Agro-Eco Louis Bolk supports and works with the Cocoa Organic Farmers Association (COFA) which includes 350 farmers.</p>  |
| <b>Rainforest Alliance Certification- Standard &amp; Climate Module (Rainforest Alliance, Olam, Armajaro, Cocoa Abrabopa Association)</b> | <p>The objective of the SAN Standard is to encourage farmers to analyze and consequently mitigate environmental and social risks caused by agricultural activities through a process that motivates continual improvement. The standard is based on the themes of environmental soundness, social equity and economic viability. It focuses on Social &amp; Environmental Management System, Ecosystem Conservation, Wildlife Protection, Water Conservation, Fair Treatment &amp; Good Working Conditions for Farmers, Occupational Health &amp; Safety, Community Relations, Integrated Crop Management, Soil Management &amp; Conservation, Integrated Waste Management.</p> <ul style="list-style-type: none"> <li>-In Ghana, the goal is to bring large areas of cocoa agroforestry landscapes under sustainable management while increasing cocoa production and securing premium payments for certified beans.</li> <li>-Promoting certified cocoa in Ghana with multiple private sector and public partners</li> <li>-Testing SAN Climate Module to be added to current RA standard.</li> <li>-Farmers organized into groups using lead farmer model. Each group has farmer leader and documentation officer. Both receive training in SAN standards.</li> <li>-833 farmers from 12 communities certified in December 2012. Now being prepared for Climate Module verification. Expansion to 20 more communities. As of Nov 2012, over 50,000 MT RA Certified cocoa from Ghana.</li> </ul> |

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|---|--|
| <b>UTZ Certification (Solidaridad, AbraBopa Conservation Alliance, LBCs) Cocoa Association,</b> | <p>-Started in 2009. Approximately 100,000–150,000 engaged in certification. Create a sustainable supply chain from producer to consumer. Focus is on Good Agricultural Practices, Cocoa Communities, Natural Resources &amp; Biodiversity, Effective Implementation of the Code of Conduct, Product Flow Control, Social Responsibilities, Internal Control System, Internal Inspection and Registration of Producers.</p> <p>-3 way relationship between Solidaridad, Akafo Adamfo and Cargill to support sustainable cocoa production through certification. Farmer groups pursuing certification: AHANSUCOFA, SWACOFA, COMFA, Cocoa AbraBopa, Conservation Cocoa Association</p> |
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(Source: Asare R. (2013))

**Table 3: Description of Extension/Training Systems and Agric Input Resources Available to Farmers from Various Cocoa Projects & Programs**

| Program/Project (Proponent)            | Description of Training / Extension Available to Farmers  | Method  | Agric. Inputs & Resources Available to Farmers   |
|--|---|---|--|
| <b>Armajaro Geotracability</b>         | <p>Data being collected from farmers:<br/>Personal data, personal family data, farm location and area, number of tree species, number trees, DBH, number dead trees standing, adjacent land cover type, species abundance.</p> <p>Data used to inform farmer training and remittance strategies; promote the value of biodiversity, target industry development, inform regeneration programmes</p> | <p>Farmer interviews and farm visits</p>  | <p>Distribution of spray machines, as well as many other non-agricultural resources (like bikes, solar lanterns, bore holes, solar panels, and education materials).</p> <p>Community Challenge Fund established to support community projects work Gh¢ 1.7 million (2010-2012).</p> |
| <b>Kraft Cadbury Cocoa Partnership</b> | <p>Trained and support approximately 12 extension staff for all 100 CCP communities in partnership with Cocoa Board.<br/>Provide book-keeping, management and personal finance tips<br/>Boost access to quality education</p>   | <p>Farmer Field Schools using Training Manual developed by CRIG<br/>Reading Clubs</p> |  |



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|---|--|---|--|
| <b>Cocoa<br/>Abrabopa<br/>Association</b>                             | <p>Working with 16,190 farmers organized into 1,884 farmer groups, covering 43,530 acres (17,616 ha).<br/>44 extension agents called Promoters located across 7 regions. Groups are formed (sign contract with CAA), farmers register, farmers open bank account, groups organized into clusters and inputs supplied at cluster level.</p>   | <p>Extension agents who train and work with farmer groups.</p>  | <p>Groups have access to inputs, repayment following harvest. Inputs from Wienco and Cocoa Board per 1 acre farm include:<br/>3 bag 50kg Asase Wura fertilizer;<br/>1 bag of Nitrobar fertilizer<br/>24 sachets of Ridomil<br/>24 sachets of Nordox<br/>8 bottles (30 ml each) of Confidor<br/>1 matabi newmatic sprayer (1<sup>st</sup> year only)<br/>Measurement of farm area and location via GPS.<br/>Combined RA/UTZ premiums about Gh¢10.6 per bag. Paid directly to farmers. Some groups decide to use it to pay off their input credit.</p> |
| <b>CocoaLink<br/>(World Cocoa Foundation)</b>                         | <p>Mobile technology service that delivers farming, social and marketing information to farmers.<br/>Subscriber farmers (must have a cell phone) receive and share practical information via text or voice messages in English or Twi.<br/>CRIG provides pertinent agriculture and social messages to CocoaLink. Focus on improving farming practices, farm safety, child labor, crop disease prevention, post-harvest production and marketing.</p>   | <p>Mobile phone SMS and voice messages.<br/>Monitoring methods:<br/>literacy training,<br/>cocoa quantity<br/>measures, improved<br/>incomes</p>  | <p>Each community has access to extension agents and trainers to support program success</p>   |
| <b>Cocoa<br/>Livelihoods<br/>Program<br/>(World Cocoa Foundation)</b> | <p>This program uses a variety of extension and training methods.<br/>Trained 35 Cocoa Board Extension Agents. Each agent forms 16 groups of 30 farmers each. Each group selects facilitator and assistant.<br/>It partners with ACDI/VOCA, GIZ and TechnoServe.<br/><br/>Operating through farmer groups, farmers receive farmer business skills training, have access to business service centres (BSC) which provide a hub of services including credit and market information. 13 BSC established to date via public-private partnerships. Hosted by agro-dealers and micro-finance institutions to improve farmers' access to quality inputs.</p> | <p>Farmer Cooperatives<br/>Farmer Field Schools;<br/>Farmer Business<br/>Schools; Business<br/>Service Centres;<br/>Trainings;</p>  | <p>Increased access to inputs and improved planting material (hybrids). Experience showing that timely supply of fertilizer to farmers is problematic due to Cocoa Board bureaucracy.<br/>Working with banks and loan agencies (Opportunity International) to support farmers with credit.<br/>Access to Business Service Centers</p>  |
| <b>ECHOES<br/>(World Cocoa Foundation)</b>                            | <p>Scalable model for education in rural West Africa.<br/>5,481 students in Ghana completed a one-year in-school agriculture training which includes classroom lectures and age-appropriate practical training.<br/>1,347 out of school youth also participated in agriculture vocational training</p>   | <p>Vocational agric training;<br/>Agriculture clubs;<br/>Scholarship Awards;<br/>Teacher and<br/>Community Resource<br/>Centers; Functional<br/>literacy trainings;<br/>Teacher and Admin<br/>trainings</p> |  |

|  |  |   |   |
|--|--|---|---|
| <b>Fairtrade Certification</b>   | Work with farmer cooperatives. Farmers must be registered either as cooperative or with Registrar General as a CBO.<br>Cost of group formation and farmer training is supported by Fairtrade International.  | Trainings via Kuapa farmer groups   | Input costs for 5000 farmers based on average 2 acre/farmer and CRIG's recommended practices is about US\$ 1 million.<br>Gh¢ 2/bag; cutlass, community projects   |
| <b>High Tech Program--Cocoa Board Extension</b>  | A new extension system was initiated in 2009 to try to bridge the gap between potential yields and actual output of cocoa farmers. Funding is through public private partnership.<br>Monitoring and evaluation are conducted by CRIG.<br>With GIZ support, 300 Regional and District coordinators of Cocoa Extension Officers and Community Agents from 6 producer areas trained at Bunso.   | Farmer Field School Method<br><br>Extension agent placed in communities               | 1 free spraying to reduce myrids (akate) or black pod<br>Extension officers in some communities<br>Recommended farming practices based upon CRIG recommendations—promotes the application of: <ul style="list-style-type: none"> <li>• 371 kg ha-1 of 0–18–23 NPK fertilizer plus micronutrients</li> <li>• hybrid cocoa</li> <li>• planted at 1,111 trees per ha</li> <li>• maximum shade tree density of 12–15 trees per ha. (<i>Gockowski, J., and D. Sonwa. 2010.</i>)</li> </ul> |
| <b>International Cocoa Initiative</b>  | January, 2013, Farmer Field School training of trainers (79 participants).<br>Overall goal is that with better farming techniques, farmers can increase their yields and increase their income, which farmers would use to increase their children's access to school and to hire adult labours on farms.  | 10 month Farmer Field School training   |   |
| <b>International Institute of Tropical Agriculture / Sustainable Tree Crops Program.</b> | FFS= farmer centered extension approach that uses discovery learning. Each community has 1-2 farmer leaders, who train 25-30 farmers. 4 week course spread over 10 months based on cropping cycle. Farmer leader trains farmersevery 2 weeks on a demonstration plot (half acre) in the community. Plots divided into farmer practice, integrated crop pest management   | Farmer field School<br>Video Viewing Clubs<br>Farmer Learning<br>Demonstration Groups |   |
|  | (ICPM), and ICPM plus fertilizer, plus 5 trees per stratum.<br>Video Viewing Clubs= community leader (different) chosen to facilitate technical video sessions. Videos contain lessons on GAPs. Guidebook written to accompany videos<br>Farmer demonstration groups for planting, replanting and diversification= focuses on teaching farmers who are establishing new farms. Training in line and pegging, replanting old farms, and setting up nurseries. |   |   |

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|--|--|---|---|
| <b>Organic Certification</b>             |  |   | Some farmers paid Gh¢ 8/64 kg bag, other farmers paid Gh¢20. Depends on LBC.  |
| <b>Rainforest Alliance Certification</b> | Data collected on size of farm, sketch of farm, number of shade trees, self-reported yield (farmer estimate). Group registers with Cooperative Dept.<br>Increasing production and livelihoods good angle for biodiversity conservation and trees in landscape.<br>Certification is an incentive for farmer buy-in, but process is expensive and requires lots of logistics and staff time. | Training of Trainers workshops Farmer Field School method of trainers Train farmer groups | Premiums to farmers--Gh¢ 6.5/64kg bag of cocoa<br>Goal to increase access to credit through sustainable finance initiative  |
| <b>UTZ Certification (Solidaridad)</b>   | Over 4 years, 15,000 farmers will be covered.  | Training of Trainers workshops Farmer Field School method                                 | UTZ certification has started to pay premiums to farmers. Gh¢ 7/64 kg bag of cocoa<br>Farmers paid total of \$164,103 for UTZ certified beans<br>Shade trees will be made available to farmers engaged in replanting. |

(Source: Asare R. (2013))

The finished products are generally imported notably through agents represented at the national or sub regional level. Also active components may be imported to formulate the products. Such agents in Ghana include the Abuakwa Formulation Unit, Wienco, Dizengoff, CHEMICO, Reiss & Co., Calli Ghana.

Every pesticide produced in Ghana and also imported is subjected to formal permitting by the regulatory agencies, the EPA. This constitutes a primary barrier filtering products that enter the country. In order to ensure that it is done efficiently, Phytosanitary Controls are stationed at the borders (sea ports, airports, and roads) which are manned by the PPRSD of the MOFA, and are assisted by Custom officials at the entry points. As noted in Section 3, Ghana has adopted the International code of conduct on pesticide management. This provides a framework for management and capacity building. Project specific capacity building activities will support the government's efforts to implement the recommendations of this code of practice.

The control of pesticides is also done in principle at the distribution level in the small towns/villages through decentralized services offered by MOFA, who see to it that distributors, dealers and resellers abide by the established procedures through the issuance of Sales permits.

#### **4.2.3 Organisation and practices followed in sale and distribution of pesticides**

The distribution channels are mostly privately run. The main suppliers feed the market through distributors who in turn serve the retail traders. Some distribution shops – sales point- are well managed and the products are displayed on shelves in accordance with standard practice. However, at most retailing shops in small towns and villages, their practices are usually sub- standard because of inadequate official monitoring and enforcement.

On account of the low financial capacity of peasant farmers and other buyers, the pesticide products are mostly sold in very small volumes and are therefore usually poured into smaller containers. This practice is carried out with little caution notably during decanting of products. Small time retailers may decant products into smaller containers to meet farmers' purchasing ability. These smaller containers are without the proper labels describing active ingredients and concentration, dosage, handling instructions and hazards, batch and date of expiry.

Some retailers are polyvalent and therefore engage in other types of commerce in the same premises. Distribution is also carried out sometimes without authorisation as required by regulation and with shop attendants not having received any form of training or knowledge on the pesticide products. Indeed many of these 'middlemen' do not have the requisite approvals/permits/license. On the other hand, retailers properly affiliated to recognised suppliers receive training provided by the suppliers themselves.

#### **4.2.4 Abuses in pesticide supply and sales**

The abuses associated with the supply and sale of pesticides include:

- Use of banned and or unregistered pesticides, see Annex;
- Decanting of pesticides into improper containers without appropriate labels;
- Supply and sale by unauthorized persons /persons who do not have EPA/PPRSD license and permits; and

- Supply and sale of adulterated and or expired pesticides

The adulteration of pesticides by some dealers is a source of concern to the Environmental Protection Agency (EPA), Ministry of Food and Agriculture (MoFA) and the general public. Farmers have complained about adulterated and fake pesticide products including alteration of expiry dates, and the preparation and sale of products in already used pesticide containers.

Some dealers exploit the low level of literacy of the peasant farmer who cannot tell the difference between fake and genuine products and because of poverty is inclined towards buying the cheap but fake product.

#### 4.2.5 Use of pesticides by farmers:

In most cases, farmers apply the pesticides by spraying, on their farms. Unfortunately, there is very little personal protection such as hand gloves, overalls etc for these farmers and they are therefore at great health risk without the appropriate personal protective equipment (PPEs). The time of spraying during the day also compounds the risk. Farmers have been observed spraying during hot afternoons when sun is at its peak and such farmers who are usually not in appropriate PPEs are more exposed to contamination through inhalation and skin contacts.

In some situations, the treatment is done too often beyond recommended periods which leads to product wastage and inefficiency. The documentation to allow official monitoring and provide product traceability is very scarce and in some cases nonexistent. There is concern about the presence of residues in products with its attendant risks to public health.

#### 4.2.6 Management of empty pesticide containers

The disposal of empty pesticide containers rests mostly with resellers and farmers because of the inefficient retail sales network. They are not equipped for this responsibility and usually resort to different disposal means, including farmers/buyers reusing empty containers for drinking water storage purposes.

There is currently no workable arrangement for the collection, treatment and disposal of empty containers in the country. An earlier collaborative effort between PPRSD-MOFA/ COCOBOD and EPA and some private sector entities has achieved little success.

#### 4.2.7 Accidents resulting from pesticide use

The Ghana Poison Control Centre keeps records on pesticide poisoning and accidents. Currently, the data on pesticide poisoning and accidents seems to be fragmented and still remains mostly as news items by various newspapers that have reported such cases, and also various hospital records. There is the need to create awareness that will target the different pesticide users in order to avoid accidents and incidents.

### 4.3 General health problems and environmental hazards associated with pesticides

There are acute and chronic health effects and these effects may manifest as local or systemic effects. They include skin irritations, such as itching, rashes, blisters, burns, wounds, irritation of throat leading to cough or difficulty in breathing with or without wheezing or choking, chest pain, burning mouth and throat with pain on swallowing, runny nose, sore throat, head ache, dizziness, sudden collapse with or without unconsciousness. The table below provides a summary of pesticide problems relating to human health, environment and crops.

**Table 4: Pesticide problems relating to health, environment and crops**

| Hazards to health  | Hazards to Environment  | Hazards to crops  |
|--|---|---|
| <p>Acute poisoning: 3 million poisonings including 20,000 unintentional deaths occur annually worldwide (WHO). Symptoms of acute poisoning include severe headaches, nausea, depression vomiting, diarrhoea, eye irritation, severe fatigue and skin rashes.</p> <p>Chronic ill-health problems can affect women and men, girls and boys exposed to pesticides, whether because of their occupation or because they live near areas of use. Such problems can include neurological disorders, cancers, infertility and birth defects and other reproductive disorders.</p> | <p>Contamination of drinking water and ground water.</p> <p>Water contamination kills fish.</p> <p>Soil contamination.</p> <p>Wildlife and domestic animals can be killed by spray drift or drinking contaminated water.</p> <p>Exposure may also cause infertility and behavioural disruption.</p> <p>Persistence in the environment and accumulation in the food chain leads to diverse environmental impacts.</p> <p>Loss of biodiversity in natural and agricultural environments</p> | <p>Pesticide resistance: 520 species of insects and mites, 150 plant diseases; and 113 weeds are resistant to pesticides (FAO). Resistance can create treadmill syndrome, as farmers use increasing inputs to little effect, while elimination of beneficial insects Causes secondary pest outbreaks. High cost of pesticides can lead to falling incomes for farmers: Newer products are often safer, but are more expensive.</p> <p>Farming communities lose knowledge of good horticultural practices and become dependent on expensive external inputs.</p> |

Source: Ghana MoFA GCAP PMP –draft final, November 2011

## **5.0 IMPLEMENTATION STRATEGIES**

FIP will promote IPM in cocoa farming and forestry in the context of a large number of similar initiatives that provide IPM guidance and support IPM implementation on the ground. Some of these are spearheaded by the Government through COCOBOD, MoFA and other entities, others through NGOs like Rainforest Alliance, yet others through private sector companies engaged in cocoa industry. Section 4 provides overview of these. It is important to note that FIP will endeavour to pursue objectives of the Pest Management Policy (OP 4.09) and promote IPM in this context, aiming to synergistically complement rather than substitute or suppress the ongoing efforts. FIP will use the following specific strategies to achieve an effective pest management process.

### **5.1 Planning**

The responsibility for implementing the PMP rests with the Technical Director, Forestry, MLNR who will discharge the corresponding duties through different levels of sector staff. A close collaboration is required and will be established across sectors, particularly among all relevant district and regional Forest Services Divisions (FSDs), all relevant district and regional MoFAs, all relevant district and regional COCOBOD, the EPA regional offices and all relevant farmer based organisations or groups and corresponding LCBs. All site specific activities that may require pesticide use and management will be identified early by the District FSDs through application of the screening guided by the Project ESMF and included in a pest management planning process to be developed in close association with the district MOFA officers and other stakeholders. The regional FSD will compile a database of all key persons in pesticide management from the relevant district and regional MoFA, COCOBOD, farmer groups, NGOs and LCBs which will be shared among all stakeholders.

### **5.2 IPM Capacity Building and Training**

The FIP will collaborate with MoFA and COCOBOD to provide basic training in Integrated Pest Management (IPM) and Good Agricultural Practices (GAP) to beneficiary local farmers within the project areas and key NGOs providing support to cocoa farmers in the area. As much as possible, existing channels within the MoFA and COCOBOD for pest management will be utilised and therefore no new platforms will need to be created. The MoFA/COCOBOD extension officers will be supported by the district FSDs to educate farmers/key NGOs in the cocoa sector on common pests and diseases associated with the food crops grown in the area such as maize, cassava, plantain and vegetables and how to control and manage such pests/diseases through and IPM and GAP approaches in order to minimise the use of pesticides.

The purpose of the capacity building of beneficiary farmers in particular is to encourage farmers to develop their IPM approaches to the management of pests and diseases under the FIP Project. Key NGOs in the cocoa sector trained in IPM will also transfer their knowledge to farmers for improved food crop/production. The success of IPM depends largely on developing and sustaining institutional and human capacity to facilitate informed decision making by farmers and local communities, and empowering them to integrate scientific and traditional knowledge to solve location-specific problems, and respond to market opportunities.

Farmer Field Schools (FFS), Farmer participatory research (FPR) and participatory learning (PL) approaches in capacity building efforts help to bridge this gap and make research results more understandable and useful to farmers and farm assistants. This is particularly the case in knowledge intensive disciplines such as IPM.

The FIP will collaborate with the local government institutions such as the district assembly and the district/regional MoFA as part of the IPM capacity building to train farmers/key NGOs in adoption of ecologically sound and environmentally friendly management practices especially among smallholder farmers in the forest reserves, agro-forestry corridors and cocoa landscape on farms in the two regions. The farmers will learn cultural, biological and ecological processes underpinning IPM options, and use the newly acquired knowledge to choose compatible methods to reduce losses in production and post-harvest storage. In addition to local government institutions, FIP will collaborate with the traditional authorities in the project area to deliver messages and promote IPM on the ground.

#### Training Responsibilities and Materials

The FIP Project Coordinators with input from COCOBOD, CRIG, MoFA, PPRSD and EPA, will liaise with cocoa farmers' associations and key NGOs in the sector to plan training implementation; provide technical support such as in preparing and delivering specific training materials, and evaluating resource materials; identify and select suitable local training resource persons and materials.

Existing training materials in the system will be used and where necessary updated. Some useful materials in the system include:

- Cocoa Manual, A source book for sustainable cocoa production, by CRIG, 2010.
- Cocoa Trainers' Information Sheets – April 2012.
- Sustainable Production of Cocoa by Rainforest Alliance, version 2012.

The COCOBOD (Regional/District Officers) will collaborate with farmers' associations to identify and organize farmers groups for training (i.e. use of farmer field school to teach farmers on the efficient and responsible use of pesticides); prepare, organize and supervise training implementation plan; verify reports of persisting pest problems and farmers training needs; monitor performance of farmer trainers and post-training assignments; and prepare training progress reports.

### **5.3 Education, Awareness Creation and Communication**

The FIP will create awareness among farmers, admitted settlements and local communities around selected forest reserves in the Brong Ahafo and Western Regions on the importance of pest management.

*Availability of Information:* The FIP will ensure that all farmers benefiting from the FIP projects have access to information regarding declared pest plants. The regional and district FSDs will be responsible.

*Education and Training:* The FSD will incorporate pest management awareness into all environmental training programs.



*Communication:* The Regional FSD in collaboration with MOFA will communicate the content of the Pest Management Plan with the relevant agencies at the district assemblies/local government institutions, district COCOBOD and MoFA pest management representatives. The district FSD will inform farmer groups or individuals of its pest management policies, practices and achievements. Importantly, FIP will encourage innovative communication and outreach, such as replication and expansion of the 2011 – 2013 Cocolink communication pilot utilizing mobile technology services to deliver real-time farming extension information to cocoa farmers (together with social and marketing information) sponsored by the World Cocoa Federation. These rely on low-cost and high-coverage of mobile phone usage in Ghana.

#### **5.4 Pest Inventory**

FIP through the district FSDs will collaborate with COCOBOD, MoFA, farmers groups and other stakeholders to identify the types, abundance and location of pest plants and animals by conducting interviews and surveys among farmers, and relevant district level institutions as well as CBOs/community based farmer organisations. This information will be used for fine tuning prevention, IPM application, training and capacity building, and other interventions.

#### **5.5 Prevention of new Pest Infestations**

FIP will endeavour to treat and manage any new pest infestations as soon as they are identified.

*Early Detection and Eradication:* A process for the reporting and identification of unusual plants and animals as already set up by COCOBOD and MOFA will be followed. Local and admitted farmers will be required to report unusual plants, animals and pests to the district FSD, MoFA or COCOBOD extension officers or to the nearest farmer group or association. The district FSD will also collaborate with the district COCOBOD and MoFA extension officers to carry out periodic interviews with farmers on new or strange plants/pests/animals damaging their crops to detect new infestations. A rapid response process for the management of new infestations will be available through COCOBOD, MOFA and the district FSD.

*Prevention of Spread:* The PMP will follow established COCOBOD and MOFA practices and protocols for appropriately managing risks of all human assisted transport of declared pests.

#### **5.6 Management of established Pests**

FIP will encourage that established pest infestations are effectively managed by following protocols developed by MOFA. Priorities for pest management will be regularly reviewed. These will include the reduction of Class 3 pests (environmental weeds) where appropriate. Regional FSDs through MoFA will be required to properly document the current methods in managing established pests, so that such information can be made available to beneficiary farmers to follow and adopt.

#### **5.7 Monitoring and Evaluation**

The district FSD will liaise with the respective district MOFA for regular monitoring and evaluation of control programs to determine the level of progress being made in controlling the spread of any declared plant pests and the reduction of infested areas. The following monitoring indicators will be incorporated into a participatory monitoring and evaluation plan.

**Table 5: Monitoring Indicators**

| No  | Area                                     | Indicators   |
|-----|--|--|
| 1.0 | Training and awareness creation          | Category and number of extension agents and farmers educated or trained on pests and pesticide issues.<br>Practical skills/techniques most frequently demanded by extension agents and farmers.<br>Crop/livestock management practices preferred by farmers.   |
| 2.0 | Technology acceptance/ field application | Category and number of farmers who correctly apply the skills they had learnt.<br>New management practices adopted most by farmers.<br>Types of farmer-innovations implemented.<br>Level of pest damage and losses.<br>Rate of adoption of IPM practices.<br>Impact of the adoption of IPM on production performance of farmers. |
| 3.0 | Project direct benefits                  | Increase in crop/livestock production.<br>Increase in farm revenue.<br>Social benefits: e.g., improvement in the health status of farmers.<br>Level of reduction of pesticide purchase and use.  |

## 5.8 Reporting

Periodic report on the progress of pest management within the selected forest reserves, agro-forestry corridors, and cocoa landscapes on farms will be prepared by district FSDs, and it will form part of the environmental and social reporting framework for the FIP projects. The PMP information will include common pests identified or declared in the project areas, common pesticides used by farmers, sources of pesticides used by farmers, level of success of treatment of pests under the project, the amount and type of herbicide used, IPM knowledge and practices among farmers, etc. District FSDs will be responsible for their respective district reports.

## 5.9 Annual Reviews

The FIP Project Coordinators will undertake annual pest and pesticide control and management reviews to confirm the implementation of the control measures or programmes provided in the PMP. Recommendations from the reviews will help the FIP Project Coordinators refocus and plan effectively towards achieving IPM targets. The management review team will include:

- Representatives of the Ministry of Lands and Natural Resources/Project Coordinators
- Representatives of the Forestry Commission
- Representatives of COCOBOD & CRIG
- Representative of the Minister of Food and Agriculture
- Representatives of the EPA
- Representatives of PPRSD

## 6.0 STAKEHOLDER CONSULTATIONS AND INVOLVEMENT

Preparation of the PMP was informed by an extensive stakeholder engagement and consultation process organized for the broader Ghana Reducing Emissions from Deforestation and Degradation of Forests (REDD+) Program of which FIP is a part. During FIP preparation, the process included several face to face interactions with affected communities in the FIP project area and beyond. Discussion on the issues of pests and pest management were integrated to the consultations undertaken during preparation of the FIP Environmental and Social Management Framework that took place in the Brong-Ahafo and Western Regions in the month of April 2014.

Pest management issues were also part of the REDD+ Readiness SESA consultation process that took place in the Western, Central, Ashanti, Brong-Ahafo, Northern and Upper East Regions between March and June 2014. These consultations included representatives of the local communities, regional Forest Services Division officials, Timber Industry Development Division officials, regional COCOBOD officials, Department of Community Development officials, MOFA officials, Administrator of the Stool Lands officials, forestry professionals from the University of Energy and Natural Resources, Sunyani and other stakeholders.

Key pest-management-related issues raised during these consultations included provision of adequate pesticides for cocoa farmers (the farmers consulted indicated that currently they buy pesticides themselves and outsource the spraying to sprayer gangs); availability of required pesticides on the local market; illegal sale of the pesticides that normally should be provided by the COCOBOD at no cost to cocoa farmers under their extension program; potential increase in use of agrochemicals in agroforestry and its associated effect on soil and water bodies.

Continued stakeholder engagement on promoting IPM in coco farming and forest management is envisaged under FIP through close interaction of District level extension staff with farmers and forest managers, and through the annual reports on PMP implementation planned to be produced under this PMP. PMP will be improved and revised based on this continued engagement and feedback, and to reflect advancement in IPM in Ghana brought about by other actors (COCOBOD, CRIG, EPA, FC, private companies, etc.)

## 7.0 IMPLEMENTATION BUDGET

An annual estimated budget of USD454,000 is required to implement the PMP in four (4) years, and this is provided in the table below.

**Table 5: Budget estimates**

| No.        | Activity/Programme  | Budget, USD                |
|------------|---|----------------------------|
| <b>1.0</b> | <b>Capacity Building</b>  |                            |
| 1.1        | Orientation workshop (on ESMF, PMP, IPM)  | 40,000                     |
| 1.2        | Training of district FSD/MoFA/ COCOBOD extension officers in IPM and PMP          | 10,000 per year            |
| 1.3        | Training of key NGOs/ Farmer Groups in the cocoa sector in IPM to support farmers | 12,000 per year            |
| 1.4        | <i>Sub total</i>  | <i>98,000 for 4 years</i>  |
| <b>2.0</b> | <b>Support/Advisory services</b>  |                            |
| 2.1        | Pest inventory-baseline data  | 12,000 per year            |
| 2.2        | Field guides/ IPM materials by MoFA/ FSD  | 20,000 per year            |
| 2.3        | Public awareness/ sensitization campaigns   | 15,000 per year            |
| 2.4        | Pest/ vector surveillance   | 12,000 per year            |
| 2.5        | <i>Sub total</i>  | <i>236,000 for 4 years</i> |
| <b>3.0</b> | <b>Project management</b>   |                            |
| 3.1        | PMP coordination  | 5,000 per year             |
| 3.2        | Monitoring and evaluation   | 10,000 per year            |
| 3.3        | Reviews and reporting   | 5,000 per year             |
| 3.4        | <i>Sub total</i>  | <i>80,000 for 4 years</i>  |
| <b>4.0</b> | <b>GRAND TOTAL/USD</b>  | <b>454,000</b>             |

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**Annex 1 Part II of EPA Act 490 – Pesticides Control and Management**

PART TWO

*Pesticides Control and  
Management Registration of  
Pesticides*

SECTION

28. Registration.
29. Application for registration.
30. Classification of pesticides.
31. Approval.
32. Provisional clearance.
33. Duration of provisional clearance.
34. Refusal to register pesticide.
35. Duration of registration and renewal of registration.
36. Non-disclosure of confidential information.
37. Power of Agency to amend, ban or suspend pesticides.
38. Register of pesticides.
39. *Gazette* publication.

*Pesticides Dealers*

40. Licence to deal in pesticides.
41. Exemptions.
42. Application for dealers licence.
43. Issue of dealer's licence.
44. Safeguards for use of pesticides.
45. Suspension, cancellation of licence.
46. Appeals.
47. General regulatory power.
48. Conformity to registered pesticides.
49. Advertising of registered pesticides.
50. Containers and packaging of pesticides.
51. Records and reporting.
52. Exercise of function by the Board.
53. The Pesticides Technical Committee.

*Enforcement*

54. Powers of inspectors.
55. Analysis and certificate.
56. Obstruction of inspectors.
57. Other offences and penalties.
58. Sale of pesticides.
59. Offences by body of persons.
60. Forfeiture.

*Miscellaneous*

61. Customs officer.
62. Regulations.



(4) A person shall not be convicted of an offence by virtue of subsection (3) if it is established that the offence was committed without that person's knowledge or connivance and that due care and diligence was exercised to prevent the commission of the offence having regard to the circumstances.

## PART TWO

### *Pesticides Control and Management*

#### *Registration of Pesticides*

#### **28. Registration**

(1) A person shall not import, export, manufacture, distribute, advertise, sell or use a pesticide unless the pesticide has been registered by the Agency in accordance with this Act.

(2) Despite subsection (1), the Agency may authorise the importation of an unregistered pesticide

(a) if the pesticide is

(i) meant for experimental or research purposes and not for distribution,  
or

(ii) for use in the event of national emergency, or

(iii) in direct transit through the Republic and the Board is satisfied that the pesticide is permitted to enter the country of destination, or

(b)' if the Minister by legislative instrument so prescribes.

(3) The Agency may authorise the manufacture of an unregistered pesticide for export if

(a) the pesticide would be manufactured in accordance with specifications provided by the importer, and

(b) the specifications satisfy the requirements applicable for the purpose in the country to which it is to be exported.

(4) In determining whether or not to approve the registration of a pesticide and the classification of a registered pesticide, the Board shall consider

(a) the characteristics of the pesticide formulation, such as the acute dermal, oral or inhalation toxicity;

(b) the persistence, mobility and susceptibility to biological concentration of the pesticide;

(c) the experience gained from the use of the pesticide, such as the likelihood of its misuse and any good safety record which is contrary to available laboratory toxicological information;

3. This Part was enacted as the Pesticides Control and Management Act, 1996 (Act 528).

- (d) the relative hazards of its patterns of use, such as granular soil applications, ultra low volume or dust aerial applications or air blast sprayer applications;
- (e) the extent of the intended use;
- (f) the supporting data and any other technical information that the Agency may request from the applicant or from a public institution; and
- (g) any other matter relevant to the control or management of pesticides.

### **29. Application for registration**

(1) A person may apply to the Agency for the registration of a pesticide.

(2) The application shall be in the prescribed form, and shall be supported by the prescribed fee, information, samples and any other material determined by the Agency.

### **30. Classification of pesticides**

(1) The Agency shall, for the purposes of registration, classify a pesticide as being

- (a) for general use if, having regard to section 28 (3), it considers that the pesticide when applied for the use for which it is registered will not have an unreasonable adverse effect on the environment;
- (b) for restricted use or suspended use if it considers that its use in accordance with widespread commonly recognised practice in the absence of additional regulatory restrictions may cause unreasonable adverse effect on people, animals, crops or on the environment; or
- (c) a banned pesticide.

(2) Pesticides classified under subsection (1) as restricted, suspended or banned are subject to the prior informed consent procedure defined in section 63.

### **31. Approval**

The Agency may approve a pesticide subject to the prescribed conditions and may only register a pesticide if it is satisfied

- (a) that the pesticide is safe and effective for the use for which it is intended,  
and
- (b) that the pesticide has been tested for efficacy and safety under local conditions.

### **32. Provisional clearance**

(1) Where in respect of an application for registration of a pesticide, the Agency is satisfied

- (a) that most of the information required for its registration has been provided to the Agency, and
- (b) that the pesticide does not present a toxicological risk to people, animals, crops or the environment,

it may provisionally clear the pesticide for use without the registration, which shall be temporary pending the registration of the pesticide.

(2) A provisional clearance is subject to the conditions specified in writing by the Agency.

(3) The Agency shall cancel a provisional clearance if the application for the registration of the pesticide is refused.

### **33. Duration of provisional clearance**

(1) A provisional clearance for a pesticide is valid for a period not exceeding one year as determined by the Board.

(2) The Agency may require

(a) the submission of an information, and

(b) the analysis of a sample,

which appears to the Agency to be necessary to determine whether and under what conditions a provisional clearance shall be granted.

### **34. Refusal to register pesticide**

On refusing to register a pesticide the Agency shall, within fourteen days of the decision, inform the applicant in writing of the refusal, and the grounds for the refusal.

### **35. Duration of registration and renewal of registration**

(1) A pesticide registration remains valid for a period not exceeding three years from the date of registration.

(2) The Agency may, where it is satisfied that a registered pesticide remains safe and effective for use in the Republic, renew the registration for further periods of three years at a time.

(3) The renewal of a pesticide registration is subject to

(a) the submission of the information, analysis or samples which the Agency may require, and

(b) any other conditions determined by the Agency.

### **36. Non-disclosure of confidential information**

Information furnished by an applicant in respect of the registration of a pesticide or its renewal which is agreed to by the Agency and the applicant as confidential shall not be disclosed by the Agency unless authorised by law.

### **37. Power of Agency to amend, ban or suspend pesticides**

The Agency, if satisfied that a registered pesticide under the existing conditions of its registration or provisional clearance

(a) is not effective, or

(b) may cause hazard to people, animals, crops or the environment,

may by publication in the *Gazette* amend the classification, suspend or ban the pesticide or cancel the registration or provisional clearance at any time after the registration or during the period of a provisional clearance.

**38. Register of pesticides**

(1) The Agency shall maintain a register of pesticides in which the Agency shall record the names and particulars of registered and provisionally cleared pesticides.

(2) The contents of the register of pesticides shall be reviewed periodically by the Agency.

**39. Gazette publication**

The Agency shall publish annually in the *Gazette*

- (a) registered pesticides and their classification,
- (b) provisionally cleared pesticides,
- (c) suspended or banned pesticides, and
- (d) amendments made to the classification of pesticides.

*Pesticides Dealers*

**40. Licence to deal in pesticides**

(1) A person shall not import, export, manufacture, distribute, advertise or sell a pesticide except in accordance with a licence issued under this Act.

(2) A licence issued under this Act is subject to the conditions specified in writing by the Agency.

**41. Exemptions**

The Agency may, by legislative instrument, exempt from the requirement of a licence under section 40 a pesticide specified in the instrument.

**42. Application for dealers licence**

An application to import, export, manufacture, distribute, advertise or sell a pesticide shall be made to the Agency in the prescribed form supported by the prescribed fee and information required by the Agency.

**43. Issue of dealer's licence**

The Agency may issue a licence authorising the applicant to import, export, manufacture, distribute, advertise or sell pesticides if it has reasonable grounds to believe that the applicant will comply with the conditions required under the licence.

**44. Safeguards for use of pesticides**

(1) A person shall not use or require an employee to use a pesticide in a manner that is inconsistent with this Act or the Regulations.

(2) A person concerned with the use of a pesticide shall inform any other person who uses a pesticide of the dangers involved in the misuse of pesticides.

(3) Where the Regulations require that a pesticide shall be applied by or under the supervision of a person authorised in that behalf by the Agency, a person shall not apply that pesticide unless authorised or supervised.

(4) A person shall not require or permit an employee to handle or use a pesticide in the course of employment without providing and requiring the employee to use the protective facilities and clothing which will permit safe handling of the pesticide.

(5) Where protective facilities and clothing are required as a condition for a licence, an employer whose employees use or handle pesticides to which the licence relates shall provide and require the use of the facilities and clothing.

(6) A person shall not harvest or offer for sale a foodstuff on which pesticides have been used except in compliance with the prescribed practices including the interval between the application of pesticides and the harvest.

#### **45. Suspension, cancellation of licence**

The Agency may suspend or cancel a licence

- (a) if it has reasonable grounds to believe that the licensee had failed or refused to comply with this Act, the Regulations or any other conditions for the licence, or
- (b) if it considers that the cancellation or suspension appears necessary to prevent or remove a hazard to human beings, crops, animals or the environment.

#### **46. Appeals**

(1) A licensee aggrieved by a suspension or cancellation of the licence may appeal to the Minister.

(2) The Minister shall determine the matter within thirty days after the receipt of a written notification of the grievance.

(3) A licensee may appeal to the High Court if aggrieved

- (a) by the failure of the Minister to determine the matter within the thirty days,  
or
- (b) by the decision of the Minister.

#### **47. General regulatory power**

The Agency may restrict or prohibit the use of a registered pesticide in designated areas during specified periods of time.

#### **48. Conformity to registered pesticides**

(1) A person shall not alter a pesticide so as to change its formulation, composition or usage or alter it in any other manner.

(2) A person shall not sell a registered or provisionally cleared pesticide or an unregistered pesticide imported under section 28 (2) (b) if because of

- (a) a fault in manufacture,
- (b) a deterioration, or
- (c) an accident or any other cause,

the pesticide fails to meet the conditions of the registration or of the provisional clearance or the conditions of the authorisation.

#### **49. Advertising of registered pesticides**

A person shall not advertise a registered or provisionally cleared pesticide in a manner which

- (a) is false,
- (b) is misleading or inconsistent with the information supplied to the Agency at the time of the application, or
- (c) omits warnings prescribed by the Agency.

#### **50. Containers and packaging of pesticides**

(1) The Agency may prescribe the containers, labels and the manner for packaging of pesticides at the wholesale and the retail levels.

(2) Where a container, label or packaging is prescribed by the Agency for a registered pesticide, a person shall not

- (a) manufacture, import, export, distribute, advertise or sell a registered pesticide otherwise than in a package or container prescribed for the pesticide, or
- (b) alter the label of a pesticide so as to misrepresent the nature of the pesticide.

#### **51. Records and reporting**

A person who imports, exports, manufactures, distributes or sells a pesticide shall make a record of the quantities of pesticides imported, exported, manufactured, distributed or sold by that person and the record shall be

- (a) maintained for ten years from the time it is made, and
- (b) made available to the Agency at its request at the time and in the manner required by the Agency.

#### **52. Exercise of function by the Board**

(1) The functions conferred on the Agency under this Act shall be exercised by the Board.

(2) The Board may delegate any of its functions under this Act to a committee of the Board, a member of the Board or to any other person.

**53. The Pesticides Technical Committee**

(1) There is hereby established as a committee of the Board the Pesticides Technical Committee consisting of

- (a) the chairman appointed by the Board,
- (b) the Head of the Chemistry Department of the National Nuclear Research Institute of the Ghana Atomic Energy Commission,
- (c) one representative who has expertise in pesticides from the Cocoa Services Division of the Ghana Cocoa Board not below the rank of an executive director,
- (d) the director of the Plant Protection and Regulatory Services of the Ministry of Food and Agriculture,
- (e) the director of the Veterinary Services Department of the Ministry of Food and Agriculture,
- (j) one representative from the Ministry of Health,
- (g) one representative of the Ghana Standards Board not below the rank of a senior scientific officer,
- (h) one representative from the laboratory of the Customs, Excise and Preventive Service not below the rank of principal collector,
- (i) one representative from the Association of Ghana Industries,
- (j) one representative of the Ghana National Association of Farmers and Fishermen,
- (k) one representative from the Ministry responsible Lands and Forestry,
- (l) one representative from the Agency not below the rank of a senior programme officer who shall be the secretary to the Committee, and
- (m) one representative of the Ministry responsible for the environment.

(2) The Committee shall perform the functions assigned to it by the Board.

(3) The quorum for a meeting of the Committee is seven members.

(4) The Committee shall regulate its own procedure.

*Enforcement***54. Power of inspectors**

(1) A member of the relevant sub-committee of a District Assembly so authorised or an inspector appointed under section 15 may

- (a) inspect an equipment used or to be used in applying pesticides;
- (b) inspect the storage or disposal facilities or areas used for the storage or disposal of pesticides;
- (c) inspect land actually, or reported to be, exposed to pesticides;
- (d) investigate complaints of injury to human beings and animals, or damage to land and pollution of water bodies resulting from the use of pesticides;



- (e) take samples of pesticides applied or to be applied;
  - (j) monitor the sale and use of pesticides;
  - (g) examine and take copies of a licence or any other documents required by this Act or the Regulations.
- (2) An inspector who has reasonable cause to believe that an offence has been committed under this Act or against the Regulations may, without warrant,
- (a) enter and search premises, other than premises used exclusively as a place of residence, in which the inspector believes on reasonable grounds that the offence has been committed or that a pesticide which has been illegally used is being stored;
  - (b) stop and search a vehicle which the inspector believes is being used in the commission of the offence;
  - (c) seize the equipment, pesticide or appliance which the inspector believes on reasonable grounds is being used in the commission of the offence;
  - (d) arrest a person who the inspector believes on reasonable grounds has committed the offence.
- (3) The inspector shall give a written receipt where reasonably practicable, for an article or a thing seized pursuant to subsection (1), and the reasons for the seizure shall be stated in the receipt.
- (4) A person arrested under subsection (1) shall be taken before a Court within forty eight hours.
- (5) An inspector shall produce evidence of authority before the inspector enters and searches any premises and in any other case produce it on request.

#### **55. Analysis and certificate**

- (1) A sample of a pesticide taken for the purpose of analysis shall be submitted to and analysed by an analyst appointed by the Agency.
- (2) In proceedings under this Act, the production of a certificate signed by an analyst appointed by the Agency is prima facie evidence of the facts stated in the certificate.

#### **56. Obstruction of inspectors**

A person who

- (a) obstructs an inspector in the exercise of a power conferred under this Act or the Regulations, or
  - (b) fails to comply with a lawful enquiry or requirement made by an inspector in accordance with section 54,
- commits an offence and is liable on conviction to a fine not exceeding two hundred penalty units or to a term of imprisonment not exceeding six months or to both the fine and the imprisonment.

**57. Other offences and penalties**

(1) A person who,

- (a) except as provided in section 28 (2) or otherwise exempted, imports, exports, manufactures, distributes, advertisers, sells or uses a pesticide which has not been registered,
- (b) contrary to section 40 (1), imports, exports, manufactures, distributes, advertises or sells a pesticide without a licence, or
- (c) uses a pesticide or requires an employee to use a pesticide contrary to a provision in section 44, or
- (d) alters a pesticide so as to change its formulation, composition or usage in a manner contrary to section 48 (1), or
- (e) sells contrary to section 48 (2), a registered or provisionally cleared pesticide which by reason of a fault of manufacture, deterioration, accident or any other reason fails to meet the conditions required by this Act, or
- (j) contravenes a requirement provided under section 50 (2) for the presentation of pesticides, commits an offence and is liable on conviction to a fine not exceeding five hundred penalty units or to a term of imprisonment to not exceeding two years or to both the fine and the imprisonment, and in the case of a continuing offence, to an additional fine not exceeding twenty-five penalty units in respect of each day during which the offence continues.

(2) A person who contrary to section 49,

- (a) advertises a pesticide in a manner which is false, misleading or inconsistent with the information supplied to the Agency at the time of registration, or
  - (b) includes on the label or accompanying instructions of a pesticide misleading or fictitious claim,
- commits an offence and is liable on conviction to a fine not exceeding two hundred and fifty penalty units or to a term of imprisonment not exceeding one year, and in the case of a continuing offence, to an additional fine not exceeding ten penalty units in respect of each day during which the offence continues.

(3) A person who

- (a) fails or refuses to maintain or submit the contents of records to be maintained, or
  - (b) deliberately or negligently makes a false record, or
  - (c) submits a false or a misleading statement,
- commits an offence and is liable on conviction to a fine not exceeding two hundred penalty units or to a term of imprisonment not exceeding twelve months, and in the case of a continuing offence, to an additional fine not exceeding ten penalty units in respect of each day during which the offence continues.

(4) A person who discloses, otherwise than as provided by this Act, a proprietary information acquired by that person in the performance of a function under this Act commits an offence and is liable on conviction to a fine not exceeding two hundred penalty units or to a term of imprisonment not exceeding twelve months or to both the fine and the imprisonment.

**58. Sale of pesticides**

It is not a defence for a person charged with the sale of a pesticide contrary to section 28 to plead

(a) that at the time of the sale there was a reasonable belief that the pesticide was registered or did not differ in any way from the purported contents of the container, or

(b) that the pesticide otherwise did not fail to meet the requirements of this Act.

**59. Offences by body of persons**

(1) Where a body of persons is convicted of an offence under this Act,

(a) in the case of a body corporate, other than a partnership, every director or officer of that body shall be deemed to have committed that offence;

(b) in the case of a partnership, every partner or officer of that body shall be deemed to have committed that offence.

(2) A person shall not be convicted of an offence by virtue of subsection (1) if that person proves

(a) lack of knowledge or connivance in the commission of the offence, and

(b) the exercise of due care and diligence to prevent the commission of the offence having regard to the circumstances.

**60. Forfeiture**

Where a person is convicted of an offence under this Act or the Regulations, the Court may, in addition to any other penalty imposed, order that the equipment, pesticide or appliance used in the commission of the offence shall be forfeited to the Republic and that a licence issued under this Act shall be suspended for the period directed by the Court or be cancelled.

*Miscellaneous*

**61. Customs officer**

(1) A customs officer

(a) shall assist in the enforcement of this Act, and

(b) shall prevent the importation of a pesticide where the importation is contrary to this Act.

(2) The Agency shall provide the Commissioner of Customs, Excise and Preventive Service with a list of licensed importers and a list of registered and banned pesticides.

(3) The Commissioner shall keep records of imported pesticides and shall, at the regular periods directed by the Agency, submit copies to the Agency.

**62. Regulations**

(1) The Minister may, on the advice of the Board, by legislative instrument, make Regulations for

- (a) standards and code of practice relating to the protection, development and rehabilitation of the environment;
- (b) the category of undertakings, enterprises, constructions or developments in respect of which environmental impact assessment or environmental management plan is required by the Agency;
- (c) the type, quantity, conditions or concentration of substances that may be released into the environment;
- (d) the manufacture, importation, use, collection, storage, recycling, recovery or disposal of substances which may be hazardous to the environment;
- (e) the disposal of waste generally;
- (j) the protection of any particular species of fauna and flora;
- (g) matters in respect of which fees are payable and the amount payable;
- (h) matters for which permits are required under this Act; and
- (i) generally for giving effect to this Act.

(2) Despite section 9 of the Statutory Instruments Act, 1959 (No. 52), Regulations made under this section may impose a penalty not exceeding two hundred and fifty penalty units or a term of imprisonment not exceeding one year or to both the fine and the imprisonment, and in the case of a continuing offence an additional penalty not exceeding ten penalty units in respect of each day during which the offence is continued.

(3) The Minister may, on the advice of the Board and in consultation with Minister responsible for Food and Agriculture, by legislative instrument, make Regulations prescribing matters relating to

- (a) the manufacture, importation, exportation, distribution and sale of pesticides;
- (b) the reporting of significant pesticide accidents or incidents to a designated person or office and the procedure for the reporting;
- (c) the procedure for the storage, transportation and disposal of a pesticide or pesticide container which is considered likely to cause injury to human beings, vegetables, crops, livestock, wildlife or beneficial insects or which is likely to pollute the environment;
- (d) the form and contents of pesticide labels;
- (e) the method of packaging of registered pesticides;
- (j) pesticide containers and their disposal;
- (g) the advertising of pesticides;
- (h) the purpose for, and the manner in which the pesticide may be used;
- (i) the licensing of premises where pesticides are used or dealt in;

- (j) the practices, including pre-harvest intervals, for the harvest of crops and the slaughter and milking of animals following exposure to pesticides;
- (k) the application of pesticides that are to be made under the supervision of an authorised person and the provision for the authorisations;
- (l) the analyses of pesticides;
- (m) the facilities and clothing to be used or worn while handling pesticides; (n) the disposal of pesticides;
- (o) the records to be maintained by persons importing, manufacturing, formulating, distributing or selling pesticides;
- (p) the aerial application of pesticides;
- (q) pesticide applicators;
- (r) the exemption of the importation of certain specified categories and quantities of pesticides from the requirement of a licence;
- (s) the prescription of fees in respect of the registration of pesticides and the licensing of dealers by the Board; and
- (t) generally for giving effect to this Act.

(4) The Regulations may prescribe in relation to a contravention of a provision in it, penalties not exceeding a fine of two hundred and fifty penalty units or a term of imprisonment not exceeding one year or both the fine and the imprisonment, and for additional penalties not exceeding ten penalty units for each day in respect of a continuing offence.

### **63. Interpretation**

In this Act, unless the context otherwise requires,

**"advertising"** means the promotion of the sale and use of pesticides by print or electronic media, signs, displays, gifts, demonstration or word of mouth;

**"Agency"** means the Environmental Protection Agency established under section 1;

**"banned pesticide"** means a pesticide for which registered use has been prohibited by the Agency or for which registration has not been granted by the Agency for health or environmental reasons;

**"Board"** means the governing body provided for under section 4 (1);

**"chairman"** means the chairman of the Board;

**"Committee"** means the Pesticides Technical Committee provided for under section 53;

**"Court"** means court of competent jurisdiction;

**"dealer"** means a person who imports, exports, manufacturers, distributes, advertises or sells pesticide;

**"defoliant"** means a substance or mixture of substances which when applied to a plant causes the leaves or foliage to drop from the plant with or without abscission;

"**desiccant**" means a substance or a mixture of substances which when applied to a plant, accelerates the drying of the tissue of the plant;

"**distribute**" means to supply commercially, to transport, store or sell;

"**District Assembly**" includes a Municipal and a Metropolitan Assembly;

"**formulation**" means the combination of various ingredients designed to render the product useful and effective for the purpose claimed, or the form of pesticide as purchased by users;

"**functions**" includes powers and duties;

"**Fund**" means the National Environmental Fund established under section 16;

"**inspector**" includes a person appointed under section 15 by the Board and a member of the relevant sub-committee of a District Assembly authorised under section 54;

"**label**" includes a writing, printing or an illustration made on, attached to, included in, belonging to or accompanying a pesticide or its container;

"**manufacture**" in relation to a pesticide means

(a) to prepare, compound, make the active or other ingredients,

(b) to add substances, mix, formulate, package or re-package, label or otherwise treat the active ingredient with a view to its sale,

but does not include the carrying on of a bona fide research or experiment relating to a pesticide or the doing of an act or a thing that forms part of or is incidental to that research or experiment;

"**member**" means a member of the Board;

"**Minister**" means the Minister responsible for the Environment;

"**person responsible**" includes, in relation to an undertaking, enterprise, a construction or development, a person at whose order or on whose behalf the undertaking, enterprise, construction or development is being done or will be done;

"**pest**" means an insect, a rodent, bird, fish, mollusk nematode, fungus, weed, micro-organism, virus or any other kind of plant or animal life that is injurious to human or animal health, crops, stored produce, processed foods, wood, cloths, fabrics or any other inanimate objects;

"**pesticide**" means

(a) a substance or mixture of substances intended for preventing, destroying, repelling or reducing the destructive effects of a pest, or

(b) a substance or mixture of substances intended for use as a plant regulator, defoliant, desiccant or wood preservative;

"**plant regulator**" means a substance or mixture of substances which, when applied to ornamental or crop plants or to their produce, causes, through physiological action, the acceleration or retardation of the rate of growth or otherwise alters the behaviour of those plants or their produce, but does not include substances intended for

use as plant nutrients, trace elements, nutritional chemicals, plant inoculants or soil amelioration;

**"premises"** includes a building, land, ship, an aircraft, a caravan, other than a building or place used exclusively as a dwelling house;

**"prescribed"** means prescribed by the Regulations;

**"prior informed consent procedure"** means the international operation procedure for exchanging, receiving and handling notification information by the Agency on restricted, suspended and banned pesticides for reasons of health and the environment;

**"regional capital"** means the administrative capital of the Region;

**"Regulations"** means the Regulations made under this Act;

**"sell"** includes to offer for sale and to provide pesticide as part of a service of pest control although the pesticide is described as free or included in the service;

**"unreasonable adverse effect on the environment"** means an effect which is injurious to human, animal or plant life or which renders the environment unsafe for human, animal or plant life.

#### **64. Repeals and vesting**

(1) The Environmental Protection Agency Act, 1994 (Act 490) and the Pesticides Control and Management Act, 1996 (Act 528) are repealed.

~2) Despite the repeal under subsection (1),

(a) an instrument, a permit or an order issued under any of the repealed enactments and in force at the commencement of this Act shall continue in force until altered or revoked under this Act;

(b) the members of the Board established under section 4 of the Environmental Protection Agency Act, 1994 (Act 490) shall continue in office until the expiration of the term of officers specified under section 5 of that Act.

(3) The rights, assets, properties, obligations, liabilities held for or on behalf of the dissolved Environmental Protection Agency and the persons employed for or by that Agency are by this section transferred to the Agency established under this Act.

#### **65. Transitional provisions**

After six months from the coming into force of this Act, pesticides shall be registered in compliance with this Act and licences for dealing in pesticides shall be issued in compliance with this Act.

**ANNEX 2: LIST OF BANNED AND PERMITTED PESTICIDES IN GHANA**

Environmental Protection Agency, Accra, Revised Register of Pesticides as at December 2009 under the Part II of the Environmental Protection Agency Act, 1994 (Act 490).

**(A) FULLY REGISTERED PESTICIDES (FRE)**

**(A1) Insecticides**

| No. | Trade Name                      | Registration No. / Date of Issue | Concentration of Active Ingredient              | Hazard Class | Crops/Uses   | Company                           |
|-----|---------------------------------|----------------------------------|---|--------------|--|-----------------------------------|
| 1.  | Abate 500E                      | FRE/0908/00250G<br>March 2009    | Temephos (500g/l)                               | III          | Larvicide for control of mosquitoes and guinea worm  | Dizengoff (Ghana) Limited, Accra  |
| 2.  | Acteco Super 25 EC              | FRE/0843/00228G<br>November 2008 | Pirimiphos methyl (250g/l)                      | II           | Insecticide for the control of insect pests in stored produce such as cereals, cowpea and soybean.                             | Kumark Trading Enterprise, Kumasi |
| 3.  | Actellic Super Dust             | FRE/0906/00239G<br>January 2009  | Pirimiphos methyl (16g/kg) + Permethrin (3g/kg) | III          | Insecticide for the control of insect pests in stored produce such as cowpea, soybean and maize                                | Calli Ghana Company Limited, Tema |
| 4.  | Akate Suro 50 EW                | FRE/0908/00249G<br>March 2009    | Diazinon (500g/l)                               | II           | Insecticide for the control of capsids on cocoa  | Dizengoff (Ghana) Limited, Accra  |
| 5.  | Bayer Advance Home Pest Control | FRE/0751/00140G<br>August 2007   | Cyfluthrin (0.1%)                               | II           | Insecticide for Public Health purposes.  | Mozart Global Technologies, Accra |
| 6.  | Betallic Super                  | FRE/0825/00224G<br>November 2008 | Pirimiphos methyl (400g/l) + Permethrin(75g/l)  | II           | Insecticide for the control of insect pests in stored produce such as maize and cowpea   | Benronic Productions, Kumasi      |
| 7.  | Bossmate 2.5 EC                 | FRE/0935/00231G<br>January, 2009 | Lambda-cyhalothrin (25g/l)                      | II           | Insecticide for the control of insect pests in vegetables, cowpea & soybean  | K. Badu Agrochemicals, Kumasi     |
| 8.  | Callidim 400EC                  | FRE/0506/00154G<br>March 2008    | Dimethoate (400g/l)                             | II           | Insecticide for the control of mealybugs, mites, thrips, greenflies and borer larvae in vegetables, pineapples and ornamentals | Calli Ghana Company Limited, Tema |
| 9.  | Cocoprid 20 SL                  | FRE/0805/00172G<br>April 2008    | Acetamiprid (20g/l)                             | II           | Insecticide for the control of capsid bugs in cocoa  | Chemico Limited, Tema             |
| 10. | Confidor 200SL                  | FRE/0701/00122G<br>July 2007     | Imidacloprid (200g/l)                           | III          | Insecticide for the control of cocoa pests   | Wienco Limited, Accra             |
| 11. | Consider 200 SL                 | FRE/0823/00171G<br>April 2008    | Imidacloprid (200g/l)                           | III          | Insecticide for the control of insect pests on vegetables  | Thorncof Enterprise, Kumasi       |



|     |                            |                                  |  |     |   |   |
|-----|----------------------------|----------------------------------|--|-----|---|---|
| 12. | Cymethoate Super EC        | FRE/0805/00206G<br>November 2008 | Dimethoate (400g/l) + Cypermethrin (36g/l)             | II  | Insecticide for the control of aphids, caterpillars, whitefly, grasshoppers, bollworms in vegetables and cotton | Chemico Limited, Tema                               |
| 13. | Cypadem 43.6% EC           | FRE/0857/00216G<br>November 2008 | Cypermethrin (36g/l) + Dimethoate (400g/l)             | II  | Insecticide for the control of insect pests of vegetables and field crops                                       | Sunshine (Ghana) Agric Products & Trading Co. Accra |
| 14. | Cypercal 50EC              | FRE/0706/00125G<br>July 2007     | Cypermethrin (50g/l)                                   | II  | Insecticide for the control of pests in cotton  | Calli Ghana Company Limited, Tema                   |
| 15. | Cypertex 10 EC             | FRE/0824/00212G<br>November 2008 | Cypermethrin (10%)                                     | III | Insecticide for the control of pests in cotton and vegetables   | Saro AgroSciences, Accra                            |
| 16. | Cypex Maxi Smoke Generator | FRE/0902/00259 G<br>March 2009   | Cypermethrin (13.5% w/w) + Potassium Chlorate(20% w/w) | II  | Insecticide smoke generator for general indoor disinfection   | Agrimat Limited, Madina, Accra                      |
| 17. | Decis 25 EC                | FRE/0858/00180G<br>April 2008    | Deltamethrin (25.5g/L)                                 | II  | Insecticide for the control of insect pests of vegetables   | Golden Stork Ghana Limited, Tema                    |
| 18. | Degesch Plate              | FRE/0701/00126R<br>July 2007     | Magnesium phosphide (56%)                              | 1b  | Insecticide for the control of pests in stored grain.   | Wienco Limited, Accra                               |
| 19. | Delete 2.5 SC              | FRE/0752/00117G<br>February 2007 | Deltamethrin (2.5%)                                    | III | Insecticide for public health purposes  | Newlife Medical Centre, Tamale                      |
| 20. | Detia Gas Ex-B             | FRE/0701/00127R<br>July 2007     | Aluminium phosphide (57%)                              | 1b  | Insecticide for the control of pests in stored grain.   | Wienco Limited, Accra                               |
| 21. | Diazol 50 EW               | FRE/0708/00121G<br>March 2007    | Diazinon (500g/l)                                      | II  | Insecticide for the control of pests in vegetables  | Dizengoff (Ghana) Limited, Accra                    |
| 22. | Dice 2.5 EC                | FRE/0956/00257G<br>March 2009    | Deltamethrin (2.5%)                                    | II  | Insecticide for control of residual insect pests of dry cocoa beans and other residual insects                  | Sidalco Limited, Spintex, Accra                     |
| 23. | Dizen-combi SC             | FRE/0708/00412G<br>August 2007   | Fenvalerate (10%) + Fenithrothion (20%)                | III | Insecticide for the control of insect pests in stored produce   | Dizengoff (Ghana) Limited, Accra                    |
| 24. | Diz-Lambda 2.5 EC          | FRE/0908/00252<br>March 2009     | Lambda Cyhalothrin(25g/L)                              | III | Insecticide for control of pests in vegetables and flowers  | Dizengoff Ghana Limited, Accra                      |
| 25. | Durshan 4 E                | FRE/0805/00200G                  | Chlorpyrifos   | II  | Insecticide for the   | Chemico   |

|     |                    |                                  |   |     |  |                                  |
|-----|--------------------|----------------------------------|---|-----|--|----------------------------------|
|     |                    | November 2008                    | (480g/L)  |     | control of scale, borers, in cereals, vegetables ornamentals and for public health purposes  | Limited, Accra                   |
| 26. | Engeo 247 SC       | FRE/0806/00156G<br>March 2008    | Thiamethoxam (141g/l) + Lambda-cyhalothrin (106g/l) | III | Insecticide for the control of sucking and chewing pests in vegetables   | Reiss and Co. Limited, Accra     |
| 27. | Evisect S          | FRE/0906/00241G<br>January 2009  | Thiocyclam Oxalate(500g/kg)                         | II  | Insecticide for the control of leaf miner in oil palm  | Calli Ghana Company Limited,Tema |
| 28. | Falcon 10 EC       | FRE/0927/00272G<br>March 2009    | Cypermethrin (10%)                                  | II  | Insecticide for the control of Aphids, Worms and Borers  | Multivet Enterprise, Accra       |
| 29. | Fast Track 100 SC  | FRE/0802/00178G<br>April 2008    | Alpha-cypermethrin (100g/l)                         | II  | Insecticide for the control of mosquitoes, cockroaches and other public health pests   | Agrimat Limited, Accra           |
| 30. | Fendona 5 WP       | FRE/0708/00120G<br>March 2007    | Alpha-cypermethrin (50g/kg)                         | III | Insecticide for Public Health Purposes   | Dizengoff Limited, Accra         |
| 31. | Fenitrothion 50 EC | FRE/0802/00189G<br>November 2008 | Fenitrothion (50%)                                  | III | Insecticide for the control of chewing, sucking and boring insects and flies in tropical fruits, cereals, vegetables and animal houses | Agrimat Limited, Accra           |
| 32. | Frankocylon 2.5 EC | FRE/0739/00136G<br>July 2007     | Lambda-cyhalothrin (2.5%)                           | II  | Insecticide for the control of insect pests in pulses  | Frankatson Limited, Accra        |
| 33. | Frankofen 20 EC    | FRE/0739/00135G<br>July 2007     | Fenvalerate (20%)                                   | II  | Insecticide for the control of insect pests in cotton, cowpea, soyabeans, vegetables and fruit crops                                   | Frankatson Limited, Accra        |
| 34. | Goliath Gel        | FRE/0908/00255G<br>March 2009    | Fipronil (0.05%)                                    | II  | Insecticide for public health purposes   | Dizengoff Ghana Limited, Accra   |
| 35. | Hockli Combi 40 EC | FRE/0802/00190G<br>November 2008 | Fenvalerate (10%) + Fenitrothion (30%)              | III | Insecticide for the control of aphids, mites and weevils in cotton, fruits and vegetables  | Agrimat Limited, Accra           |
| 36. | Icon 10 CS         | FRE/0710/00115G<br>February 2007 | Lambda-cyhalothrin (100g/l)                         | III | Insecticide for Public Health purposes   | Reiss and Co. Limited, Accra     |
| 37. | ICONMAXX           | FRE/0810/00221G<br>November 2008 | Lambda-cyhalothrin (100g/l)                         | II  | Insecticide for Public Health purposes   | Reiss and Co. Limited, Accra     |

|     |                              |                                   |  |     |   |                                   |
|-----|------------------------------|-----------------------------------|--|-----|---|-----------------------------------|
| 38. | Kilsect 2.5 EC               | FRE/0825/00222G<br>November 2008  | Lambda-cyhalothrin (25g/l)   | II  | Insecticide for the control of Insect pests in vegetables                       | Bentronic Productions, Kumasi     |
| 39. | Kombat 2.5 EC                | FRE/0924/00267G<br>March 2009     | Lambda-Cyhalothrin (2.5%)  | II  | Insecticide for the control of insect pests in vegetables and pulses            | Saro AgroSciences, Accra          |
| 40. | K-Otab                       | FRE/0702/00129G<br>July 2007      | Deltamethrin (25%)   | II  | Insecticide for Public Health purposes  | Agrimat Limited, Accra            |
| 41. | K-Othrine Moustiquaire SC 1% | FRE/0702/00130G<br>July 2007      | Deltamethrin (1% w/w)  | III | Insecticide for Public Health purposes  | Agrimat Limited, Accra            |
| 42. | Kuzithrine 2.5 EC            | FRE/0929/00238G<br>January 2009   | Lambda-cyhalothrin (25g/l)   | II  | Insecticide for the control of insect pests in vegetables cowpea, soybean, etc. | Kusiwaa Agrochemicals ,Kumasi     |
| 43. | Lambda Super 2.5 EC          | FRE/0943/00230G<br>January 2009   | Lambda-cyhalothrin (25g/l)   | II  | Insecticide for the control of Insect pests in vegetables                       | Kumark Trading Enterprise, Kumasi |
| 44. | Marshal 480 EC               | FRE/0805/00205G<br>November 2008  | Carbosulfan (480g/l)   | II  | Insecticide for the control on scale, nematodes and symphyliids in pineapples   | Chemico Limited, Tema             |
| 45. | Mitox 200 EC                 | FRE/0825/00211G<br>November 2008  | Fenvalerate (20%)  | II  | Insecticide for the control of pests in vegetables                              | Bentronic Productions, Kumasi     |
| 46. | Mosquiron 10 EC              | FRE/0708/00141G<br>August 2007    | Novaluron (100g/l)   | III | Insecticide for Public Health purposes  | Dizengoff Ghana Limited, Accra    |
| 47. | Mostyn BA 15 ULV             | FRE/0801/00181G<br>November 2008  | Permethrin (10.8%) + S-Bioallethrin (0.15%) + Piperonyl Butoxide (11.0%) | III | Insecticide for Public Health purposes  | Wienco Limited, Accra             |
| 48. | Orthene 75 SP                | FRE/0806/00153G<br>March 2008     | Acephate (75%)   | III | Insecticide for the control of insect pests in tobacco and ornamentals          | Calli Ghana Company Limited, Tema |
| 49. | Ortho Home Defense Max       | FRE/0751/00139G<br>August 2007    | Bifenthrin (0.05%)   | II  | Insecticide for Public Health purposes  | Mozart Global Technologies, Accra |
| 50. | Pawa 2.5 EC                  | FRE/0805/00204G<br>November 2008  | Lambda-cyhalothrin (25g/l)   | II  | Insecticide for the control of pests in cereals, vegetables and ornamentals.    | Chemico Limited, Tema             |
| 51. | Perfekthion                  | FRE/0808/00184G<br>November, 2008 | Dimethoate (400g/l)  | II  | Insecticide for the control of sucking insects, biting insects and spider mites | Dizengoff Ghana Limited, Accra    |
| 52. | Polygard Kilit Aerosol       | FRE/0856/00196G<br>November 2008  | D'allethrin (0.06% w/w) + D'tetramethrin (0.135% w/w) + Cypermethrin     | III | Insecticide for public health purposes  | Evergreen Limited, Kumasi         |



|     |                      |                                   |   |     |  |  |
|-----|----------------------|-----------------------------------|---|-----|--|--|
|     |                      |                                   | (0.46% w/w)                                     |     |  |  |
| 53. | Pyrical 480 EC       | FRE/0806/00147G<br>March 2008     | Chlorpyrifos ethyl (480g/l)                     | II  | Insecticide for the control of insect pests in pineapple   | Calli Ghana Company Limited, Tema                    |
| 54. | Pyriforue 180 EC     | FRE/0958/00275G<br>March 2009     | Chlorpyrifos ethyl (480g/l)                     | II  | Contact insecticide for the control of a wide range of insect in agriculture and public health         | Golden Star Ghana, Limited, Tema                     |
| 55. | Regent 50 SC         | FRE/0808/00182G<br>November 2008  | Fipronil (50g/l)                                | II  | Insecticide for the control of worms and termites in cabbage, maize and rice                           | Dizengoff Ghana Limited, Accra                       |
| 56. | Responsar Hot Fog    | FRE/0961/00265G<br>March 2009     | Cyfluthrin(50g/l)                               | II  | Insecticide for public health  | Huge Limited, Accra                                  |
| 57. | Sicofidor 30.5 EC    | FRE/0956/00256G<br>March 2009     | Imidacloprid(30.5 %)                            | II  | Insecticide for the control of residual insect pests of dry cocoa beans and other residual insects     | Sidaleo Limited, Spintex Accra                       |
| 58. | Sulphur 80 WP        | FRE/0802/00193G<br>November 2008  | Sulphur(80%)                                    | III | Insecticide for the control of insect pests and fungal diseases in ornamental plants and other crops   | Agrimat Limited, Accra                               |
| 59. | Sumico 20 EC         | FRE/0843/00227G<br>November 2008  | Fenvalerate (200g/l)                            | II  | Insecticide for the control of insect pests of vegetables and pulses in cowpea, soybean and vegetables | Kumark Trading Enterprise, Kumasi                    |
| 60. | Sumitox 20 EC        | FRE/0948/00235G<br>January 2009   | Fenvalerate (20%)                               | II  | Insecticide for the control of insect pests in vegetables, cowpea etc                                  | Yawwusma Ventures Kumasi                             |
| 61. | Suncombi 30% EC      | FRE/0857/00218G<br>November 2008  | Fenitrothion (25%) + Fenvalerate(5%)            | II  | Insecticide for the control of insect pests of vegetables and public health purposes                   | Sunshine (Ghana) Agric Products & Trading Co., Accra |
| 62. | Sunhalothrin 2.5% EC | FRE/0857/00219G<br>November 2008  | Lambda-cyhalothrin(25g/l)                       | II  | Insecticide for the control of insect pests of vegetables and public health purposes                   | Sunshine (Ghana) Agric Products & Trading Co., Accra |
| 63. | Sunpyrifos 48% EC    | FRE/0857/00217G<br>November 2008  | Chlorpyrifos-ethyl (480g/l)                     | II  | Insecticide for the control of insect pests of field crops and public health                           | Sunshine (Ghana) Agric Products & Trading Co., Accra |
| 64. | Super Guard 50 EC    | FRE/0802/00187G<br>November, 2008 | Pirimiphos methyl (400g/l) + Permethrin(100g/l) | III | Insecticide for the control of larger grain weevils, meal moths in stored                              | Agrimat Limited Accra                                |

|     |                  |                                  |   |     |  |  |
|-----|------------------|----------------------------------|---|-----|--|--|
|     |                  |                                  |   |     | produce  |  |
| 65. | Tanalith C3310   | FRE/0932/00271R<br>March 2009    | Cupric oxide(11.29%)<br>+Arsenic pentoxide(17.3%) + Chromium trioxide(30.29%) | II  | Insecticide for wood treatment   | Du Paul Wood Treatment Gh. Limited, Takoradi |
| 66. | Termidor 25 EC   | FRE/0908/00251G<br>March 2009    | Fipronil(25g/l)   | II  | Broad spectrum insecticide for control of insects in cabbage, onion, egg plant, maize, and for termite control     | Dizengoff Ghana Limited                      |
| 67. | Trigger 10 CS    | FRE/0708/00143G<br>August 2007   | Lambda - cyhalothrin (10%)  | II  | Insecticide for Public Health purposes   | Dizengoff (Ghana) Limited, Accra             |
| 68. | ULV 600 S        | FRE/0714/00133G<br>July 2007     | Tetramethrin (6%) + Piperonyl butoxide (10%)                                  | II  | Insecticide (fumigant) for the control of pests in stored produce  | Afropa (Ghana) Limited, Accra                |
| 69. | ULV 810 IC       | FRE/0914/00242G<br>January 2009  | Pyrethrum (12g/l) +Alpha-cypermethrin (24g/l)                                 | III | Insecticide for the control of flying and crawling insect pests in cocoa stored produce and public health purposes | Afropa (Ghana) Limited, Accra                |
| 70. | ULV 900 IC       | FRE/0814/00176G<br>November 2008 | Pyrethrum (12g/l) +Alpha-cypermethrin (24g/l)                                 | II  | Insecticide for the control of flying and crawling insect pests in cocoa beans                                     | Afropa (Ghana) Limited, Accra                |
| 71. | Vectoguard 40 WP | FRE/0802/00192G<br>November 2008 | Pirimiphos methyl (400g/kg)   | III | Insecticide for Public Health purposes   | Agrimat Limited, Accra                       |
| 72. | Wreko 2.5 EC     | FRE/0823/00169G<br>April 2008    | Lambda-cyhalothrin (2.5%)   | II  | Insecticide for the control of insect pests of vegetables  | Thomhcof Enterprise, Kumasi                  |

#### A2): Fungicides

| No. | Trade Name    | Registration No. / Date of Issue | Concentration of Active Ingredient | Hazard Class | Crops/Uses  | Company                          |
|-----|---------------|----------------------------------|------------------------------------|--------------|---|----------------------------------|
| 1.  | Athlete 80 WP | FRE/0958/00262G                  | Fosetyl Aluminium(800g/kg)         | III          | Fungicide for the control of mildew and phytophthora diseases of vegetables, fruits tree crops and pineapples | Golden Stork Ghana Limited, Tema |
| 2.  | Benco 80 WP   | FRE/0825/00223G<br>November 2008 | Mancozeb(800g/kg)                  | III          | Fungicide for control of leaf spots, mildew, leaf blight and scab in  | Benronic Productions, Kumasi     |

|     |                     |                                  |                              |     |   |                                   |
|-----|---------------------|----------------------------------|------------------------------|-----|---|-----------------------------------|
|     |                     |                                  |                              |     | vegetables, fruits and ornamentals  |                                   |
| 3.  | Calliete 80 WP      | FRE/080600152G<br>March 2008     | Fosetyl aluminium (800g/kg)  | III | Systemic fungicide for the control of phytophthora diseases in pineapple                      | Calli Ghana Company Limited, Tema |
| 4.  | Callis 400 OL       | FRE/0806/00144G<br>March 2008    | Thiophanate methyl (400g/l)  | III | Fungicide for the control of yellow and black sigatoka in bananas                             | Calli Ghana Company Limited, Tema |
| 5.  | Carbendazim 50 WP   | FRE/0802/00195G<br>November 2008 | Carbendazim (500g/kg)        | III | Fungicide for the control of diseases in mangoes, pineapples and vegetables                   | Agrimat Limited, Accra            |
| 6.  | Champion 80 WP      | FRE/0705/00124G<br>July 2007     | Copper Hydroxide (77%)       | III | Fungicide for control of diseases in cocoa and coffee   | Chemico Limited, Tema             |
| 7.  | Creosote Substitute | FRE/0831/00210G<br>November 2008 | Dichlofluanid (3.96g/l)      | IV  | Fungicide and algacide for wood preservation  | TM3, Accra                        |
| 8.  | Dithane M45         | FRE/0805/00198G<br>November 2008 | Mancozeb (800g/kg)           | III | Fungicide for the control of leaf spots, mildew, leaf blight and scab in vegetables and mango | Chemico Limited, Tema             |
| 9.  | Foko 80% WP         | FRE/0823/00165G<br>April 2008    | Mancozeb (800g/kg)           | III | Fungicide for the control of fungal diseases of vegetables                                    | Thomhcof Enterprise, Kumasi       |
| 10. | Fungukill 80WP      | FRE/0905/00260G<br>March 2009    | Copper(35%) + Metalaxyl(15%) | III | Fungicide for the control of brown rot in cocoa   | Chemico Limited, Tema             |
| 11. | Funguran-OH 50WP    | FRE/0708/00128G<br>July 2007     | Copper Hydroxide (77%)       | III | Fungicide for control of cocoa diseases.  | Dizengoff Ghana Limited, Accra    |
| 12. | Ivory 80WP          | FRE/0806/00150G<br>March 2008    | Mancozeb (800g/kg)           | III | Protective fungicide for the control of diseases in pineapple, rubber and vegetables          | Calli Ghana Company Limited, Tema |
| 13. | Kadmaneb            | FRE/0833/00209G<br>November 2008 | Maneb (800g/kg)              | III | Fungicide for the control of leaf spots, mildew, leaf blight, and scab in vegetables          | Adu & Yeboah Enterprise, Kumasi   |
| 14. | Kilazeb 80 WP       | FRE/0843/00229G                  | Mancozeb (800g/kg)           | III | Fungicide for the control of leaf   | Kumark Trading                    |

|     |             |                                 |                          |     |   |                                  |
|-----|-------------|---------------------------------|--------------------------|-----|---|----------------------------------|
|     |             | November 2008                   |                          |     | spots, mildew, leaf blight, and scab in vegetables, fruits, ornamentals and field crops | Enterprise, Kumasi               |
| 15. | Kocide 2000 | FRE/0906/00245G<br>January 2009 | Cupric hydroxide (53.8%) | III | Fungicide for the control of cocoa diseases   | Reiss and Company Limited, Accra |

| No. | Trade Name              | Registration No. / Date of Issue  | Concentration of Active Ingredient     | Hazard Class | Crops/Uses  | Company  |
|-----|-------------------------|-----------------------------------|--|--------------|---|--|
| 16. | Metalm 72 WP            | FRE/0916/00261G                   | Metalaxyl(12%) + Copper oxide(60%)     | III          | Fungicide for control of black pod disease in cocoa   | Kurama Company Limited, Accra                        |
| 17. | Nordox Super 75 WP      | FRE/0701/00131G<br>July 2007      | Cuprous Oxide (86.2%)                  | III          | Fungicide for control of diseases in cocoa and coffee.  | Wienco (Ghana) Limited, Accra                        |
| 18. | Nordox 75 WP            | FRE/0701/00112G<br>January 2007   | Cuprous Oxide (86%)                    | III          | Fungicide for control of diseases in cocoa and coffee   | Wienco (Ghana) Limited, Accra                        |
| 19. | Ridomil Gold 66 Plus WP | FRE/0701/00123G<br>July 2007      | Metalaxyl-M (6%) + Cuprous oxide (60%) | III          | Fungicide for control of cocoa diseases   | Wienco (Ghana) Limited, Accra                        |
| 20. | Suncozeb 80 WP          | FRE/0857/00220G<br>November, 2008 | Mancozeb (800g/kg)                     | III          | Fungicide for control of leaf spots, mildew, leaf blight, and scab diseases in vegetables, fruits and ornamentals | Sunshine (Ghana) Agric Products & Trading Co., Accra |
| 21. | Tilt                    | FRE/0806/00146G<br>March 2008     | Propiconazole (250g/l)                 | III          | Fungicide for the control of fungal diseases in banana  | Calli Ghana Company Limited, Tema                    |
| 22. | Trimangol 80 WP         | FRE/0805/00197G<br>November 2008  | Maneb (80%)                            | III          | Fungicide for the control of leaf spots, downy mildew, fruit rots in cereals, vegetables and ornamentals          | Chemico Limited, Tema                                |
| 23. | Victory 72 WP           | FRE/0908/00253G<br>March 2009     | Metalaxyl(8%) + Mancozeb(64%)          | III          | Systemic fungicide for the control of blight and rots in vegetables and pineapple                                 | Dizengoff Ghana Limited, Accra                       |



**A3: Herbicides**

| No. | Trade Name        | Registration No. / Date of Issue  | Concentration of Active Ingredient | Hazard Class | Crops/Uses  | Company                           |
|-----|-------------------|-----------------------------------|------------------------------------|--------------|---|-----------------------------------|
| 1.  | Ado Wura SL       | FRE/0962/00274G<br>March 2009     | Glyphosate(41% w/w)                | III          | Herbicide for the control of annual, perennial grasses and broadleaf weeds in cereals and vegetables  | North Gate Agrochemicals, Tebiman |
| 2.  | Adom 480 SL       | FRE/0954/00243G<br>January 2009   | Glyphosate (480g/l)                | III          | Herbicide for the control of annual, perennial grasses and broadleaf weeds in cereals and vegetables  | Jakess Agro Company Ltd, Kumasi   |
| 3.  | Agil 100EC        | FRE/0808/00162G<br>April 2008     | Propaquizafop (100g/l)             | III          | Herbicide for the control of grasses  | Dizengoff Ghana Limited, Accra    |
| 4.  | Agristomp 500 E   | FRE/0802/00194G<br>November 2008  | Pendimethalin(500 g/l)             | III          | Herbicide for the control of pre-emergence weeds in maize, rice, cotton and soybean                   | Agrimat Limited, Accra            |
| 5.  | Alligator 400 EC  | FRE/0858/00161G<br>April 2008     | Pendimethalin(400 g/l)             | II           | Herbicide for control of grasses and weeds in rice  | Golden Stork Ghana Limited, Tema  |
| 6.  | Basagran 480 SL   | FRE/0808/00183G<br>November, 2008 | (Bentazon 480g/l)                  | II           | Herbicide for the control of broadleaf weeds, nutsedges in beans, groundnut and maize                 | Dizengoff Ghana Limited, Accra    |
| 7.  | Basta 200 SL      | FRE/0958/00264G<br>March 2009     | Glufosinate Ammonium(200g/l )      | II           | Herbicide for the control of narrow and broad leaf weeds in banana                                    | Golden Stork Ghana Limited, Tema  |
| 8.  | Bextra - 72% SL   | FRE/0825/0022G<br>November, 2008  | 2,4 D Amine (720g/l)               | II           | Selective herbicide for the control of broadleaf weeds in maize, rice and sorghum                     | Bentronics Productions, Kumasi    |
| 9.  | Chemosat e 360 SL | FRE/0705/00114G<br>February 2007  | Glyphosate (360g/l)                | III          | Herbicide for the control of annual and perennial weeds in cereals                                    | Chemico Limited, Tema             |
| 10. | Chemovar 80 WP    | FRE/0805/00208G<br>November 2008  | Bromacil (800g/kg)                 | III          | Selective herbicide for the control of annual and perennial grasses and broadleaf weeds in pineapples | Chemico Limited, Tema             |
| 11. | Chemuron 80 WP    | FRE/0805/00207G<br>November 2008  | Diuron(80%)                        | III          | Herbicide for the control of grass weeds in pineapples, avocados, citrus and mangoes                  | Chemico Limited, Tema             |



| No. | Trade Name      | Registration No. / Date of Issue | Concentration of Active Ingredient | Hazard Class | Crops/Uses   | Company                           |
|-----|-----------------|----------------------------------|------------------------------------|--------------|--|-----------------------------------|
| 12. | Diuron 80 WP    | FRE/0802/00191G<br>November 2008 | Diuron (82.5% w/w)                 | III          | Herbicide for the control of weeds in sugarcane and cotton                                       | Agrimat Limited, Accra            |
| 13. | Fusilade Forte  | FRE/0806/00148G<br>March 2008    | Fluazifop-p-butyl (150g/l)         | III          | Selective herbicide for the control of annual and perennial grasses in broadleaf crops           | Calli Ghana Company Limited, Tema |
| 14. | Gallant Super   | FRE/0805/00203G<br>November 2008 | Haloxypop (108g/l)                 | III          | Post emergence herbicide for the control of broadleaf weeds in vegetables                        | Chemico Limited, Tema             |
| 15. | Garlon 2        | FRE/0805/00202G<br>November 2008 | Triclopyr (240g/l)                 | III          | Herbicide for the control of annual and perennial weeds and grasses                              | Chemico Limited, Tema             |
| 16. | Garlon 4        | FRE/0805/00201G<br>November 2008 | Triclopyr (480g/l)                 | III          | Herbicide for the control of woody plant and broad leaf weeds in oil palm and pastures           | Chemico Limited, Tema             |
| 17. | Gramoxone Super | FRE/0806/00149R<br>March 2008    | Paraquat (200g/l)                  | II           | Contact herbicide for the control of grasses and other weeds                                     | Calli Ghana Company Limited, Tema |
| 18. | Glycel 41% SL   | FRE/0910/00248G<br>January 2009  | Glyphosate (41%)                   | III          | Non-selective herbicide for the control of annual and perennial broad leaf weeds and grasses     | Reiss and Company Limited, Accra  |
| 19. | Glycot 41% SL   | FRE/0958/00236G<br>January 2009  | Glyphosate (41%)                   | III          | Herbicide for control of annual and perennial weescereals and vegetables                         | Afcott Ghana Limited, Kumasi      |
| 20. | Glygold         | FRE/0753/00118G<br>February 2007 | Glyphosate (41%)                   | III          | Herbicide for control of annual and perennial weeds  | L'espoir Company Limited, Accra   |
| 21. | Glyphader 75 SG | FRE/0858/00158G<br>April 2008    | Glyphosate (680g/kg)               | III          | Herbicide for the control of emerged annual and perennial broad leaved weeds, sedges and grasses | Golden Stork Ghana Limited, Tema  |

| No. | Trade Name       | Registration No. / Date of Issue | Concentration of Active Ingredient | Hazard Class | Crops/Uses   | Company                          |
|-----|------------------|----------------------------------|------------------------------------|--------------|--|----------------------------------|
| 22. | Glyphader 480 SL | FRE/0858/00159G<br>April 2008    | Glyphosate (480g/l)                | III          | Herbicide for the control of emerged annual and perennial broad leaved weeds, sedges and grasses | Golden Stork Ghana Limited, Tema |
| 23. | Glyphos 41% SL   | FRE/0802/00174G<br>April 2008    | Glyphosate (41%)                   | III          | Herbicide for control of annual and perennial broad leaved weeds and                             | Agrimat Limited, Accra           |

|     |                   |                                  |                      |     |   |                                   |
|-----|-------------------|----------------------------------|----------------------|-----|---|-----------------------------------|
|     |                   |                                  |                      |     | grasses   |                                   |
| 24. | Gramoquat Super   | FRE/0943/00246G<br>January 2009  | Paraquat (20%)       | II  | Contact herbicide for the control of grasses and other weeds  | Kumark Trading Enterprise, Kumasi |
| 25. | Herbextra         | FRE/0943/00247G<br>January 2009  | 2,4-D Amine (720g/l) | II  | Selective herbicide for the control of broadleaf weeds in rice, maize, sorghum, millet and sugarcane              | Kumark Trading Enterprise, Kumasi |
| 26. | Komanda 41% SC    | FRE/0827/00163G<br>April 2008    | Glyphosate (41%)     | III | Herbicide for the control of annual and perennial broadleaved weeds and grasses                                   | Multivet, Accra                   |
| 27. | Kamaxone 20 SL    | FRE/0935/00233R<br>January 2009  | Paraquat (200g/l)    | III | Herbicide for the control of annual and perennial broadleaved weeds and grasses                                   | K. Badu Agrochemicals, Kumasi     |
| 28. | Kamolcel 41% SL   | FRE/0929/00237G<br>January 2009  | Glyphosate (41%)     | III | Foliar acting herbicide for the control of annual, perennial grasses and broadleaf weeds in cereals and vegetable | Kusiwaa Agrochemicals, Kumasi     |
| 29. | Kalach Extra 70SG | FRE/0806/00155G<br>March 2008    | Glyphosate (700g/kg) | III | Herbicide for the control of deep rooted annual, biannual, perennial grasses and broadleaved weeds                | Calli Ghana Company Limited, Tema |
| 30. | Kalach 360 SL     | FRE/0806/00157<br>March 2008     | Glyphosate (360g/l)  | III | Herbicide for control of annual and perennial broad leaf weeds and grasses  | Calli Ghana Company Limited, Tema |
| 31. | Kum Nnwura        | FRE/0725/00116G<br>February 2007 | Glyphosate (360g/l)  | III | Herbicide for the control of annual and perennial grasses and broadleaved weeds                                   | Bentronic Productions, Kumasi     |
| 32. | Kwatriqua 276 SL  | FRE/0802/00175R<br>April 2008    | Paraquat (276g/l)    | II  | Herbicide for the control of grasses and broadleaved weeds  | Agrimat Limited, Accra            |

| No. | Trade Name       | Registration No. / Date of Issue | Concentration of Active Ingredient | Hazard Class | Crops/Uses   | Company                           |
|-----|------------------|----------------------------------|------------------------------------|--------------|--|-----------------------------------|
| 33. | Londax 60 DF     | FRE/0706/00134G<br>July 2007     | Bensulfuron methyl (60%)           | III          | Herbicide for the control of broadleaf and grass weeds in rice                                       | Calli Ghana Company Limited, Tema |
| 34. | Osagyefo 72 SL   | FRE/0823/00166G<br>April 2008    | 2,4-D Amine (720g/l)               | III          | Herbicide for the control of broadleaved weeds   | Thomhcof Enterprise, Kumasi       |
| 35. | Ogyatanaa 41% SL | FRE/0935/00232G<br>January 2009  | Glyphosate (41%)                   | III          | Herbicide for the control of annual, perennial grasses and broadleaf weeds in cereals and vegetables | K. Badu Agrochemicals, Kumasi     |

|     |                   |                                  |   |     |   |                                   |
|-----|-------------------|----------------------------------|---|-----|---|-----------------------------------|
| 36. | Power 41% SL      | FRE/0945/00234G<br>January 2009  | Glyphosate (41%)                                  | III | Herbicide for the control of annual, perennial grasses and broadleaf weeds in cereals and vegetables      | J. K. Duku Enterprise, Kumasi     |
| 37. | Propanil 36 EC    | FRE/0802/00188G<br>November 2008 | Propanil (35% w/w)                                | III | Herbicide for the control of grasses and weeds in rice  | Agrimat Limited, Accra            |
| 38. | Ristar 435 EC     | FRE/0806/00213G<br>November 2008 | Propanil (260g/l) + 2,4-D-Isocetyl ester (175g/l) | II  | Selective herbicide for the control of annual and perennial grasses and broadleaf weeds in rice           | Calli Ghana Company Limited, Tema |
| 39. | Rondo 48 SL       | FRE/0734/00113G<br>January 2007  | Glyphosate (41%)                                  | III | Herbicide for the control of annual and perennial weeds in cereals  | C. Woermann Ghana Limited, Accra  |
| 40. | Round Up 360 SL   | FRE/0708/00132G<br>July 2007     | Glyphosate (360g/l)                               | III | Herbicide for the control of annual and perennial broad leaf weeds and grasses                            | Dizengoff (Ghana) Limited, Accra  |
| 41. | Roundup 450 Turbo | FRE/0808/00173G<br>April 2008    | Glyphosate (450g/l)                               | III | Herbicide for the control of annual and perennial broadleaved weeds and grasses                           | Dizengoff Ghana Limited, Accra    |
| 42. | Sarosate 360 SL   | FRE/0924/00269G<br>March 2009    | Glyphosate (360g/l)                               | III | Herbicide for the control of annual and perennial broad leaf weeds and grasses                            | Saro AgroSciences Co., Kumasi     |
| 43. | Select 720 SL     | FRE/0924/00244G<br>January 2009  | 2,4-D Amine (720g/l)                              | II  | Selective herbicide the control of broadleaf weeds in rice, millet, maize, sorghum and sugarcane          | Saro AgroSciences Co., Kumasi     |
| 44. | Sharp 480 SL      | FRE/0843/0022G<br>November 2008  | Glyphosate (480g/l)                               | III | Herbicide for the control of annual and perennial grasses and broadleaved weeds in cereals and vegetables | Kumark Trading Enterprise, Kumasi |

| No. | Trade Name  | Registration No. / Date of Issue  | Concentration of Active Ingredient | Hazard Class | Crops/Uses   | Company                                 |
|-----|-------------|-----------------------------------|------------------------------------|--------------|--|---|
| 45. | So Far SL   | FRE/0755/00138G<br>August 2007    | Glyphosate (41%)                   | III          | Herbicide for the control of annual and perennial grasses and broad leaf weeds | Adu and Yeboah Agrochem Limited, Kumasi |
| 46. | Stam F34    | FRE/0805/00199G<br>November 2008  | Propanil (360g/l)                  | II           | Herbicide for the control of post emergent annual weeds in rice                | Chemico Limited, Tema                   |
| 47. | Stomp 500 E | FRE/0808/00186G<br>November, 2008 | Pendimethalin (500g/l)             | II           | Herbicide for the control of broadleaf weeds and grasses in maize, cotton and  | Dizengoff Ghana Limited,                |



|     |                           |                                  |                         |     |  |   |
|-----|---------------------------|----------------------------------|-------------------------|-----|--|---|
|     |                           |                                  |                         |     | tomatoes   | Accra   |
| 48. | Sun-2,4 D Amine<br>72% SL | FRE/0857/00215G<br>November 2008 | 2,4 D Amine<br>(720g/l) | II  | Selective herbicide for post emergence weed control in rice, maize and sorghum   | Sunshine (Ghana) Agric Products & Trading Co., Limited, Accra |
| 49. | Sunphosate 360 SL         | FRE/0857/00214G<br>November 2008 | Glyphosate (360g/l)     | III | Non-selective systemic herbicide for control of annual and perennial grasses and broadleaf weeds in cereals and vegetables | Sunshine (Ghana) Agric Products & Trading Co., Limited, Accra |
| 50. | Supersate 41% SC          | FRE/0817/00164G<br>April 2008    | Glyphosate (41%)        | III | Herbicide for the control of annual and perennial grasses and broadleaved weeds  | Julius and Adu Trading Enterprise, Kumasi                     |
| 51. | Supraxone 200 SC          | FRE/0858/00160R<br>April 2008    | Paraquat (200g/l)       | II  | Herbicide for the control of annual and perennial broad leaved weeds and grasses   | Golden Stork Ghana Limited, Tema                              |
| 52. | Tempra 80 WP              | FRE/0806/00151G<br>March 2008    | Diuron (800g/kg)        | III | Herbicide for the control of a wide variety of annual and perennial broadleaf and grassy weeds                             | Calli Ghana Company Limited, Tema                             |
| 53. | Thomabest Super 200 SL    | FRE/0823/00167R<br>April 2008    | Paraquat (200g/l)       | II  | Herbicide for the control of grasses and broadleaved weeds   | Thomhof Enterprise, Kumasi                                    |
| 54. | Touch down                | FRE/0960/00258G<br>March 2009    | Glyphosate (41%)        | III | Herbicide for the control of annual and perennial broad leaf weeds and grasses   | Liyank Trading Enterprise, Kumasi                             |
| 55. | Uproot 360 SL             | FRE/0924/00268G<br>March 2009    | Glyphosate (360g/l)     | III | Herbicide for the control of annual and perennial broad leaf weeds and grasses   | Saro AgroSciences Co., Kumasi                                 |

| No. | Trade Name       | Registration No. / Date of Issue | Concentration of Active Ingredient | Hazard Class | Crops/Uses  | Company                          |
|-----|------------------|----------------------------------|------------------------------------|--------------|---|----------------------------------|
| 56. | Weedmasta 41% SL | FRE/0857/00170G<br>April 2008    | Glyphosate (41%)                   | III          | Herbicide for the control of annual and perennial broad leaf weeds and grasses  | Obek Agro Services, Suame-Kumasi |
| 57. | Winner 41% SL    | FRE/0823/00168G<br>April 2008    | Glyphosate (41%)                   | III          | Herbicide for the control of annual and perennial broadleaved weeds and grasses | Thomhof Enterprise, Kumasi       |

**(A4): OTHERS (Rodenticides, Desiccants, Growth Regulators and Biocides)**

| No. | Trade Name | Registration No. / Date of Issue | Concentration of Active Ingredient | Hazard Class | Crops/Uses | Company |
|-----|------------|----------------------------------|------------------------------------|--------------|------------|---------|
|-----|------------|----------------------------------|------------------------------------|--------------|------------|---------|

|    |                |                                  |                        |     |  |                                   |
|----|----------------|----------------------------------|------------------------|-----|--|-----------------------------------|
| 1. | Boni Rat Pasta | FRE/0908/00254G<br>March 2009    | Difenacoum (0.005%)    | I   | Rodenticide for the control of rodents           | Dizengoff Ghana Limited, Accra    |
| 2. | Callet 5% PA   | FRE/0906/00240G<br>January 2009  | Ethephon(5%)           | III | Plant Growth regulator for degreening pineapple  | Calli Ghana Company Limited, Tema |
| 3. | Raccumin       | FRE/0961/00266G<br>March 2009    | Coumatetralyl(0.0375%) | III | Rodenticide for the control of rodents and mites | Huge Limited, Accra               |
| 4. | Storm BB       | FRE/0808/00185G<br>November 2008 | Flocoumafen (0.005%)   | III | Rodents  | Dizengoff Ghana Limited, Accra    |

**B): PROVISIONALLY CLEARED PESTICIDES (PCL)**

**(B1): Insecticides**

| No. | Trade Name      | Provisional Clearance Permit No. / Date of Issue | Concentration of Active Ingredient           | Hazard Class | Crops/Uses   | Company              |
|-----|-----------------|--|--|--------------|--|----------------------|
| 1.  | Bushroller SL   | PCL/0961/00147G<br>January 2009                  | Glyphosate (48%)                             | III          | Non-selective herbicide for the control of annual and perennial weeds            | Nadom Farms, Accra   |
| 2.  | Combicot 505 EC | PCL/0958/00145G<br>January 2009                  | Chlorpyrifos (500g/l) /+Cypermethrin (50g/l) | II           | Broad spectrum contact insecticide for use on vegetables and horticultural crops | Afcott Ghana, Kumasi |
| 3.  | Cyperdicot EC   | PCL/0958/00146G<br>January 2009                  | Cypermethrin (30g/l)+ Dimethoate (250g/l)    | II           | Broad spectrum contact insecticide for use on vegetables and horticultural crops | Afcott Ghana, Kumasi |

**(B2): Fungicides**

| No. | Trade Name       | Provisional Clearance Permit No. / Date of Issue | Concentration of Active Ingredient | Hazard Class | Crops/Uses  | Company                            |
|-----|------------------|--|------------------------------------|--------------|---|------------------------------------|
| 1.  | Reference 250 EC | PCL/0955/00138G<br>January 2009                  | Propiconazole (250g/l)             | III          | Systemic fungicide for the control of black and yellow sigatoka | Golden Stork (Ghana) Limited, Tema |

**(B3): Herbicides**

| No. | Trade Name             | Provisional Clearance Permit No. / Date of Issue | Concentration of Active Ingredient     | Hazard Class | Crops/Uses   | Company                                  |
|-----|------------------------|--|--|--------------|--|--|
| 1.  | Atrazina 500 SC        | PCL/0902/00136G<br>January 2009                  | Atrazine (500g/l)                      | III          | Herbicide for the control of annual perennial grass and broadleaf weeds                      | Agrimat Limited, Madina-Accra            |
| 2.  | Atraxine 50 SC         | PCL/0960/00142G<br>January 2009                  | Atrazine (50%)                         | III          | Contact herbicide for the control of grasses and other weeds                                 | Chinese Woman Agrochemicals, Kumasi      |
| 3.  | Atrazine Super 80 WP   | PCL/0902/00137G<br>January 2009                  | Atrazine (800g/kg)                     | III          | Herbicide for the control of annual, perennial grass and broadleaf weeds                     | Agrimat Limited, Madina-Accra            |
| 4.  | Atrazine 80 WP         | PCL/0905/00130G<br>January 2009                  | Atrazine (800g/kg)                     | III          | Herbicide for the control of annual perennial grass weeds in maize, sorghum, pineapples etc  | Chemico Limited, Tema                    |
| 5.  | Atrazine 500 SC        | PCL/0905/00129G<br>January 2009                  | Atrazine (500g/l)                      | III          | Herbicide for the control of annual perennial grass weeds in maize, sorghum, pineapples etc. | Chemico Limited Tema                     |
| 6.  | Atrazila 80 WP         | PCL/0843/00154G<br>January 2009                  | Atrazine (800g/kg)                     | III          | Herbicide for the control of broadleaved weeds and annual grasses                            | Kumark Trading Enterprise, Kumasi        |
| 7.  | Atrazila 500 SC        | PCL/0943/00153G<br>January 2009                  | Atrazine (500g/l)                      | III          | Herbicide for the control of broadleaved weeds and grasses                                   | Kumark Trading Enterprise, Kumasi        |
| 8.  | Balton 2, 4 D Amine SL | PCL/0908/00155G<br>March 2009                    | 2, 4 D Amine(720g/l)                   | II           | Selective herbicide for post emergence weed control in rice, maize and sorghum               | Dizengoff Ghana Limited, Accra           |
| 9.  | Bellazine 500 SC       | PCL/0905/00131G<br>January 2009                  | Atrazine (250g/l) + Cyanazine (250g/l) | III          | Herbicide for the control of annual perennial grass weeds in maize, sorghum, pineapples etc  | Chemico Limited, Tema                    |
| 10. | Cotraxine 500 SC       | PCL/0958/00143G<br>January 2009                  | Atrazine (500g/l)                      | III          | Herbicide for the control of annual, perennial grass and broadleaf weeds                     | Afcott Ghana Limited, Kumasi             |
| 11. | Dragon 24 SC           | PCL/0959/00133R<br>January 2009                  | Paraquat (24%w/w)                      | II           | Herbicide for the control of annual, perennial grass and broadleaf weeds                     | West Africa Cotton Company Limited Accra |
| 12. | Gramafast              | PCL/0960/00141G                                  | Paraquat (20%)                         | II           | Contact herbicide for  | Chinese                                  |

|     |                      |                                 |                    |     |  |   |
|-----|----------------------|---------------------------------|--------------------|-----|--|---|
|     | Super 20 SL          | January 2009                    |                    |     | the control of grasses and other weeds                                   | Woman Agrochem., Kumasi                       |
| 13. | Kb Super Traz 500 SC | PCL/0935/00135G<br>January 2009 | Atrazine (500g/l)  | III | Herbicide for the control of annual, perennial grass and broadleaf weeds | K. Badu Agrochemicals, Kumasi                 |
| 14. | Sun-Atrazine 80 WP   | PCL/0957/00148G<br>January 2009 | Atrazine (800g/kg) | III | Herbicide for control of broadleaves and annual grasses                  | Sunshine Agric. Products & Trading Co., Accra |

| No. | Trade Name          | Provisional Clearance Permit No. / Date of Issue | Concentration of Active Ingredient | Hazard Class | Crops/Uses   | Company                                       |
|-----|---------------------|--|------------------------------------|--------------|--|---|
| 15. | Sun-Atrazine 500 SC | PCL/0957/00149G<br>January 2009                  | Atrazine (500g/l)                  | III          | Herbicide for control of broadleaves and annual grasses                      | Sunshine Agric. Products & Trading Co., Accra |
| 16. | Sun-Paraquat 200 SL | PCL/0957/00150R<br>January 2009                  | Paraquat Dichloride (200g/l)       | II           | Non-selective broad spectrum herbicide                                       | Sunshine Agric. Products & Trading Co., Accra |
| 17. | Trazine 80 WP       | PCL/0925/00152G<br>January 2009                  | Atrazine (800g/kg)                 | III          | Herbicide for control of broadleaves and annual grasses                      | Bentronic Productions, Kumasi                 |
| 18. | Trazine 500 SC      | PCL/0925/00151G<br>January 2009                  | Atrazine (500g/l)                  | III          | Herbicide for control of broadleaves and annual grasses                      | Bentronic Productions, Kumasi                 |
| 19. | Vinash 41% SL       | PCL/0959/00134G<br>January 2009                  | Glyphosate (41%w/w)                | III          | Herbicide for the control of annual, perennial grasses and broadleaved weeds | West Africa Cotton Company Limited, Accra     |

#### Summary of Register Update December 2009

| Category     | FRE        | PCL       | Total      |
|--------------|------------|-----------|------------|
| Insecticides | 72         | 3         | 75         |
| Fungicides   | 23         | 1         | 24         |
| Herbicides   | 57         | 19        | 76         |
| Others       | 4          | -         | 4          |
| <b>Total</b> | <b>156</b> | <b>23</b> | <b>179</b> |



### (C) BANNED PESTICIDES

1. 2,4,5-T and its salts and esters
2. Aldrin
3. Binapacryl
4. Captafol
5. Chlordane
6. Chlordimeform
7. Chlorobenzilate
8. DDT
9. Dieldrin
10. Dinoseb and its salts and esters
11. Dinitro-*ortho*-cresol (DNOC) and its salts (such as ammonium salt, potassium salt and sodium salt)
12. Endrin
13. HCH (mixed isomers)
14. Heptachlor
15. Hexachlorobenzene
16. Parathion
17. Pentachlorophenol and its salts and esters
18. Toxaphene
19. Mirex
20. Methamidophos (Soluble liquid formulations of the substance that exceed 600 g active ingredient/l)
21. Methyl-parathion (emulsifiable concentrates (EC) with at or above 19.5% active ingredient and dusts at or above 1.5% active ingredient)
22. Monocrotophos (Soluble liquid formulations of the substance that exceed 600 g active ingredient/l)
23. Parathion (all formulations - aerosols, dustable powder (DP), emulsifiable concentrate (EC), granules (GR) and wettable powders (WP) - of this substance are included, except capsule suspensions (CS))
24. Phosphamidon (Soluble liquid formulations of the substance that exceed 1000 g active ingredient/l)
25. Dustable powder formulations containing a combination of Benomyl at or above 7%, Carbofuran at or above 10% and Thiram at or above 15%

#### Legend to Register of Pesticides

|  |   |
|--|---|
| Full registration certificate (3 years)          | The Agency may approve and register a pesticide subject to such other conditions as it may determine and may only register a pesticide if it is satisfied that the pesticide is safe and effective for the use for which it is intended and that the pesticide has been tested for efficacy and safety under local conditions (Section 8, Part II of Act 490)   |
| Provisional clearance permit (Maximum of 1 year) | Where in respect of an application for registration of a pesticide, the Agency is satisfied that most information required for its registration has been provided to the Agency, and the pesticide does not present a toxicological risk to people, animals, crops or the environment, it may clear the pesticide for use without the registration, and this clearance shall be known as provisional clearance and shall be temporary pending the registration by the Agency of the pesticide (Section 9, Part II of Act 490) |
| Experimental permit                              | The Agency may authorise the importation of unregistered pesticide if the pesticide is imported for experimental or research purposes and not for distribution Section 2, (1), (a), (i).  |
| General use pesticides (G)                       | Pesticides when applied for the use for which it is registered will not have unreasonable adverse effects on people, animals, crops or on the environment (Section 5, Part II of Act 490)   |
| Restricted use pesticides (R)                    | Pesticide when used in accordance with widespread commonly recognized practice in the absence of additional regulatory restrictions may cause unreasonable adverse effect on people, animals, crops or on the environment (section 6, Part II of Act 490). Such pesticides are restricted for use on only selected crops by competent pesticide applicators and should be sold by dealers licensed to handle restricted pesticides  |
| Banned Pesticides                                | Pesticide when used in accordance with widespread commonly recognized practice even in the presence of additional regulatory restrictions will cause unreasonable adverse effect on people, animals, crops or on the environment. Such pesticides are prohibited for use in the country.  |