

REPUBLIC OF GHANA



COCOBOD

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SELF-ASSESSMENT GUIDE FOR COCOA IN GHANA



GHANA COCOA BOARD



QUALITY CONTROL COMPANY LTD



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PREAMBLE

Ghana has since 1879, when cocoa was introduced to the then Gold Coast, been synonymous with the crop. The cocoa industry is the mainstay and the life-wire of the Ghanaian economy, with exports accounting for about 40% of the country's foreign exchange earnings contributing about 10% -15% to the GDP. Ghana is presently the world's second largest producer of cocoa estimated at 20% of the world production. Ghana's cocoa sets the standard for grading, determined by the number of defective beans per 100grams.

The industry is dominated by thousands of small-holder producers cultivating less than 2 hectares per farm, but has shown phenomenal expansion in production reaching about 1,000,000 Mt. of dried cocoa in the 2011/2012 crop season, up by 37.5% from about 750,000 Mt. in 2005/2006 crop season. According to the Bank of Ghana, receipts from cocoa products export for the first quarter of 2011 was \$859.4 million, accounting for about 61 percent of total export earnings as compared with \$682.5 million at 48.8 percent in 2010. The industry employs over a million people in six growing regions, In Ghana, the livelihood of about 6 million people depends on cocoa and the crop therefore is invaluable to the country's economy.

Despite its huge economic importance, cocoa, like other types of food exported to the EU, is increasingly coming under the scrutiny of the consumers who need to be assured that the food they eat is safe and traceable. The global cocoa markets now require minimum residue levels of pesticides, mycotoxins, PAH (Poly-aromatic hydrocarbon) heavy metals etc, in cocoa and non compliance with these are likely to lead to loss of access to the export market, erosion of foreign exchange earnings, hence, loss of livelihood and income to millions of farmers. Food safety has thus become a thorny and non-negotiable global issue and the cocoa industry cannot wait but has no option but play by the same rules if the industry is to survive.

To ensure that the cocoa industry survives, and grows in the dynamics of the emerging concern for food safety compliance, mitigating the harmful effects of pesticides residues, the implementation by each operator in the cocoa supply chain of a self-assessment measure becomes crucial. The institution of a self assessment system in the cocoa supply chain ensures the efficient and ongoing control of all risk factors which may lead to high levels of pesticides residues, heavy metals (cadmium), mycotoxin (ochratoxin A) in cocoa. In order to facilitate the setting up of a self-assessment system at each stage of cocoa production, this guide for the Cocoa Industry in Ghana has been compiled at the request of Ghana Cocoa Board (COCOBOD) with the support of COLEACP/EDES Program and financed by the European Union (EU).

TERMINOLOGY

Glossary

In this Self-Assessment Guide, '**operator**' refers to anyone directly involved in the cocoa sector and who may therefore have an impact on the product's quality and safety, namely:

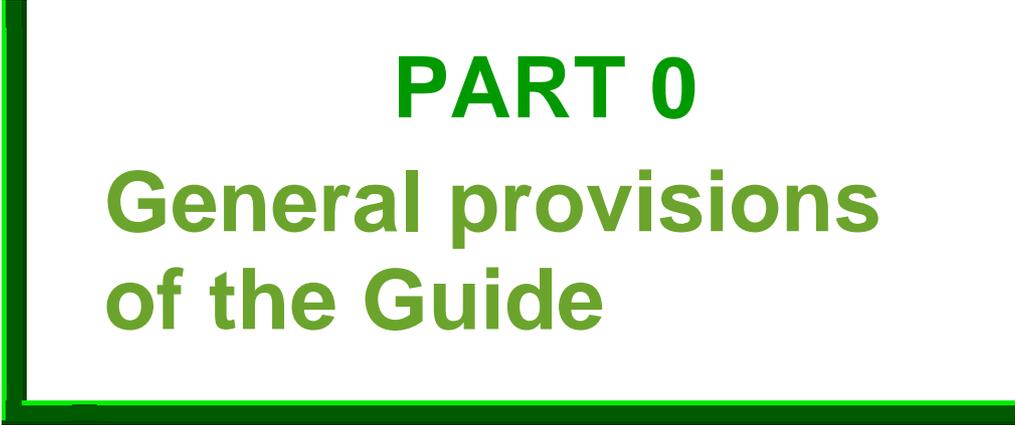
- Producers, who are farmers operating mainly on small-scale production level, medium-scale farmers and High Technology farmers. These producer categories are identified on the basis of the use they make of technologies developed by the Cocoa Research Institute of Ghana (CRIG).
- Transport operators, who are often subcontracted by Licensed Buying Companies to transport the beans from the farm gate/societies to the Central grading centres depot at the district level, and also from the district depot to the take-over-centres (ports) for storage and shipment.
- Cocoa Marketing Company Limited (CMC) receives the graded cocoa into warehouses at the take-over-centres (TOCs) and exports same for destination markets.

Definitions and abbreviations used in the Guide

CCP	Critical Control Point: this stage or step which requires a specific control action and 'control' of risk in a process
Checklist	Tool comprising a complete inventory of the points to be checked, which is completed by the inspectors on the basis of what they inspect and observe.
COCOBOD	Ghana Cocoa Board
HACCP (Hazard Analysis Critical Control Points)	This control system offers two major benefits: <ul style="list-style-type: none">• Prevention, which guarantees or improves the safety and quality of produce ;• Proof, in the event of any incidents, that all possible measures were taken to ensure the safety of the produce and that the operator assumed their responsibilities effectively
Hazard	Any chemical, biological or physical agent with the potential to cause an adverse effect on health of the consumer
QCC	Quality Control Company Limited
ICB	Independent (or 'third party') Certification/Control Body. Accredited certifier.
IPPC	International Plant Protection Convention
ISPM	International Standards for Phytosanitary Measures
GSA	Ghana Standards Authority
PPRSD	Plant Protection and Regulatory Services Directorate of the Ministry of Food and Agriculture

MRL	Maximum Residue Level. Maximum level of pesticide residue permitted in a foodstuff
NC	Non-conformity (= a requirement is not met)
OJ	Official Journal of the European Union
PC	Point of concern in a process: this step requires particular attention with regard to the ensuing risks
LBC	License Buying Company. A cocoa buying company licensed for the Internal marketing of cocoa in Ghana.
PPE	Personal Protective Equipment used to prevent contamination from pesticides or biocides (gloves, boots, overalls, masks etc.)
Risk	The probability that a hazard will appear.
SAS	Self-Assessment System
SASG	Self-Assessment System Guide
Self-assessment	Set of measures taken by operators to ensure that the products they manage at all production, processing and distribution stages meet food safety legal requirements and product quality and traceability requirements. They must also ensure that these requirements are actually met.
CCMC	Chemical Control and Management Center
CODAPEC	Cocoa Diseases and Pests Control Programme
GCCSFA	Ghana Cocoa Coffee and Shea nut Farmers Association
GRA	Ghana Revenue Authority – Customs Division





PART 0
**General provisions
of the Guide**

A. DESIGNING AND DRAFTING THE GUIDE

This Guide was designed and drafted by a Technical Working Group and a Steering Committee including representatives from the Ghana Cocoa Board (COCOBOD), the Licensed Buying Companies (LBCs), Food & Drugs Board (FDB), Quality Control Company (QCC), Cocoa Research Institute of Ghana (CRIG), Plant Protection and Regulatory Services Directorate of Ministry of Food and Agriculture (PPRSD; MoFA) with the assistance of a local technical consultancy firm and EDES/COLEACP experts.

A.1. Composition of the Steering Committee

The Steering Committee consists of operators/exporters, members of COCOBOD, representatives of Licensed Buying Companies of cocoa beans, Regulatory Agencies of agro-chemicals, fertilizers, farmer-based organizations, Research Institutions and experts in the cocoa industry, transporters and selected commercial partners in the cocoa sector.

This Steering Committee serves as the Board of Directors providing direction and guidance for the operations of the Technical Committee within its prescribed mandate. The steering committee formulates reviews and approves policies and procedures as well as performing oversight supervisory function for feed-back and reporting performance progress to ensure the attainment of good results of the work of the Technical Working Group. The Steering Committee also ensures effective and efficient delivery of its mandate including the reporting and validating the results of the work of the Technical Working Group throughout the process of compiling this Self-Assessment Guide for cocoa industry in Ghana.

Name & contact details	Body	Role	Mandate in the Steering Committee
Dr Yaw Adu-Ampomah	COCOBOD	Deputy CE (A&QC)	Chairman-,
Mr. K. Gorkeh-Sekyim	COCOBOD	M.D. QCCL (On retirement)	Nat. Co-ordinator of SPS Africa Cocoa Project
Dr. W. A. Jonfia-Essien	COCOBOD	Deputy Manager, Research Dep. QCCL	Member
Dr. A. R. Cudjoe	CRIG	Head, Entomology Division	Member
Mr. K. Obeng-Adjina	CODAPEC	Nat. Co-ordinator, CODAPEC (On retirement)	Member
Mrs. Prudence Asamoah-Bonti	Ghana Standards Authority	Representative of GSA	Member
Mr. John A. Pwamang	EPA	Director CCMC/EPA	Member
Nana Adjei Kramoh	GCCSFA	Farmer's Rep	Member
Mr. Lawrence Ayisi Botwe	Cocoa Merchants (GH) Ltd	LICOBAG	Member
Mr. Emmanuel Tetteh	GRA – Customs Division	Representative of Law enforcement Agencies	Member
Mr. Vesper Suglo,	PPRSD/MOFA	Director	Member

CCMC stands for Chemical Control and Management Centre

A.2. Composition of the Technical Working Group

Name & contact details	Body	Role and competences	Activities
William Azalekor, +233262267242	Quality Control Company Ltd	Technical Specialist/ Entomologist.	
George Okyere, +233208130498	Quality Control Company Ltd (now transferred to CODAPEC)	Senior Technical Manager. Group Leader	
Samuel T. Lowor, +2333889880	Cocoa Research Institute of Ghana	Biochemist/ Residues Analyst	
Kwasi Gorkeh-Sekyim, +233244250857/208173482	Retired Managing Director, Quality Control Company Ltd	Technical Specialist (Quality Control Systems)	
Francis Enyan +233200301520/ +233244865326	Quality Control Company Ltd	Acting Deputy Manager/Technical Expert	
Nana Kwasi Ofori	GCCSFA	Central Regional Chief Farmer	
Percy Yalley	Akuafu Adamfo Marketing Co. Ltd (AAMC)	In Charge of Quality Assurance	
Samuel K. Adane	COCOBOD	Economist	
John Oppong-Otoo	Ghana Standards Authority (GSA)	Biochemist	
Eric K. Adjei	CSSVD-CU	Technical Manager	
Dr Isaac Yaw Opoku	Deputy Managing Director (Operations); Quality Control Company	Plant Pathologist	
E. A. Kwakye	Global Haulage Ltd	Director	

A.3. External expertise used

Name & contact details	Body	Role and competences	Activities

A.4. Representativeness of the cocoa sector

Ghana Cocoa Board (COCOBOD), Licensed Buying Companies (LBCs), Food and Drugs Authority (FDA), Quality Control Company (QCC), Cocoa Research Institute of Ghana (CRIG), Plant Protection Regulatory Services Directorate (PPRSD), the Steering and Technical Committees with the assistance of a local Technical Consultancy and EDES/COLEACP experts which initiated the drafting of the Self-Assessment System Guide for the Cocoa sector, represents major stakeholders in Ghana.

A.5. Management, distribution, revision and publication of the Guide

Export Ghana cocoa is driven by the dynamics of the internal and external markets. In the circumstance the management, revision and publication of the Guide takes cognisance of the information needs of both clienteles. The Guide is available and accessible in both hard and electronic copies for the information of stakeholders.

C. GENERAL INTRODUCTION

C.1. What is self-assessment?

These are the series of measures which you must be taken, as an 'operator', to ensure that at each stage of production, harvesting, transport, bagging (packaging) and shipment, your '**products**' meet:

- regulatory requirements on **food safety** in general
- regulatory requirements on the **quality of the products**;
- requirements on **traceability** and **monitoring** of actual compliance with these requirements.

Depending on the production, harvesting, fermentation, bagging and warehousing, there are risks with regard to non-conformity, for products arriving in Europe.

- ☞ Control measures and procedures to ensure that production is hazard-free (an overall analysis of the hazards as outlined in this Guide is strongly recommended).
- ☞ Establishment of full and precise traceability of your operations and products ('traceability file') must be ensured.

First and foremost, it is the farm/company which performs a self-assessment: **you must carry out your own hazard analysis and it is up to you to organise your own monitoring** by implementing procedures, control points and traceability.

In the context of a **food safety and plant health management process, self-assessment is therefore based on:**

- ✓ **risk assessment** according to working conditions (those which are specific to you)
- ✓ **monitoring** your work and
- ✓ **the checks performed** in your own farm/company (during production, harvesting, fermenting, drying, transporting, bagging and shipment) and the level of performance achieved (meeting standards and regulatory requirements).

For international authorities, this approach is currently the best method for:

- ▶ Making food industry professionals aware of their responsibilities;
- ▶ Guaranteeing the safety of foodstuffs placed on the market;
- ▶ Reassuring consumers;
- ▶ Ensuring better prevention of food crises; implementing withdrawals and/or targeted recalls of products if incidents occur.
- ▶ Implementing withdrawals and/or targeted recalls of products if incidents occur.

C.2. Objectives of the Self-Assessment System Guide

The guide has been designed with **two objectives** in mind:

- ☞ Specifying the general sanitation/hygiene, food safety and commercial quality requirements for cocoa beans.
- ☞ Helping all actors working at different stages of the process (producers, purchasing clerks, Licensed Buying Company, Quality Control Company Limited, transport operators, Cocoa Marketing Company and other exporters) to comply with these requirements.

This Self-Assessment System Guide for cocoa production for the export market, particularly to Europe should be viewed as a **practical tool**.

The Self-Assessment Guide will specifically focus on the requirements relating to the production, primary processing and export of dried cocoa beans. The guide will focus on production, harvesting, pod-breaking, fermentation, drying, bagging, storage or warehousing and fumigation/fogging conditions at the depots and bulking and warehousing activities, within the value-chain in view of the need to comply with the mandatory requirement of MRL (Maximum Residue Levels) of plant protection products, heavy metals and mycotoxins.

C.3. What are the advantages of implementing the Self-Assessment System Guide and why is it useful?

Having a Self-Assessment System Guide (SASG) for the cocoa sector in Ghana offers operators the opportunity to familiarise themselves with the prescribed norms and rules governing national and international regulatory requirements and standards on the one hand, while also formalising the control measures governing the different stages of cocoa production, harvesting, fermenting, drying, bagging, warehousing, transporting and export. The system fosters collaboration and cooperation for participation of all actors to achieve a common and mutually beneficial objective. It allows the validation of the sanitary/hygiene

control plans implemented by the food business Operators (FBOs) of the sector in respect of the requirements of the target markets.

The SASG summarises all the technical requirements governing cocoa production and export in Ghana. It also compiles and supplements the main technical and educational manuals as well as providing information on the tools for Good Agriculture Practice (e.g. List of approved agro-chemicals, application rate, drying procedure, fumigation/fogging and warehousing conditions....) produced by support bodies such as ICCO, COCOBOD, Cocoa Marketing Company, Cocoa Research Institute, CRIG, PPRSD and QCC.

By implementing the Self-Assessment System Guide:

- ☞ ***You will have implemented the self-assessment measures defined through consultation with all the actors in the sector***
- ☞ ***You will be able to demonstrate the relevance of your self-assessment system more easily.***
- ☞ ***You will be able to reassure your customers that your produce is safe and of good quality***

You are responsible for the safety of your produce/products!

Self-assessment is one of the ways you can prove and measure the quality of your work (or the qualities and faults in your processes). By regularly supplying compliant products, you will reassure your customers and be encouraged to manage your processes more effectively.

- ☞ ***You will have more control over your production process***

By detecting non-conformities and failings as soon as possible (particularly when the dried beans are received at the depots/warehouses and when products are shipped) you will enjoy **financial benefits thanks to the savings you will make.**

Rapid searching and detection of non-conformities via systematic checks on production operations will improve your compliance with regulatory and commercial specifications.

You will have an alternative or an addition to your private certifications such as Rainforest Alliance, UTZ Certified and Fair Trade, whilst guaranteeing at least equivalent level of food safety.

- ☞ ***You will reduce the cost of checks on your products***

Better targeting of checks allows you to reduce the number of analyses (particularly the most costly ones such as residue analyses).

The Guide is validated by the public authorities and all sector professionals!

Following the requirements and practices suggested in this Guide reassures all operators in the industry that, the operations performed and the food safety measures implemented within each unit are sufficient to ensure safe consumption of the products and that these operations and measures will be constantly monitored.

The Guide will be regularly updated to take into account changes to regulations and national and international technical requirements.

The Guide will be regularly updated to take into account changes to regulations, market dynamics, national and international technical requirements.

D. SCOPE OF THE GUIDE

This Guide is aimed at you, as **an actor in the sector** whose activities may have an **impact on the quality and/or the safety** of cocoa beans, particularly if you perform one (or several) of the following roles:

- ▶ You are a **producer** who produces, harvests, ferments and dries cocoa beans but who may also carry out the temporary storage, bagging and primary transport to the society depot at the District for sale;
- ▶ You are a **purchasing clerk of a Licensed Buying Company** who receives the dried cocoa beans from the farmers, carries out the sorting, grading, reprocesses and bags the beans;
- ▶ You are a **transport operator** who evacuates the dried beans right through the supply chain;
- ▶ You are a **Quality Control Officer who inspects the premises for warehouse, grades, issues quality and purity certificates**, supervises the fumigation, fogging or spraying of stored beans, or an **internal auditor** or an **inspector and certifier** for the self-assessment system, whose responsibility is to make an objective assessment of the system.

This Guide offers cocoa sector professionals, producers, transporters and the buyer/exporter (Cocoa Marketing Company) the means and methods for controlling the safety and quality of dried beans from the production through the harvesting stage right up to when they are loaded onto ships for specific export destination (for example USA, Japan and Europe).

Products

This Guide governs the production of dried cocoa beans intended to be exported to Europe. Processed cocoa products, namely, (powders, cocoa butter, liquor, cake, chocolate etc) **do not fall within the scope** of this Guide.

Activities covered by the Guide

This Self-Assessment Guide for the cocoa sector in Ghana covers the **following successive activities**:

- ▶ Production and Harvesting – (Pre-establishment and establishment of farm, maintenance, harvesting gathering at breaking point and pod breaking.
- ▶ Post harvest (pod breaking, fermentation and drying of beans)
- ▶ Bagging and Storage (farmer level, marketing centres and take-over centers)
- ▶ Evacuation or Transport (primary evacuation from Marketing centres to District Depots, secondary evacuation from depots to Take-over-centres)
- ▶ Evacuation to the port and shipment for export..

- ❖ The shipment of cocoa beans from Ghana to Europe is not covered by this Guide.
- ❖ Operators' use of this Guide is on a voluntary basis, but is strongly recommended for all actors to avert the danger of the rejection of and subsequent banning of Ghana for non-compliance to export market regulatory requirements.

E. OVERVIEW OF THE GUIDE

The Guide consists of 7 parts

□ Part 0

This covers broadly general information pertaining to the Guide, spelling out the various governance structures and brief on the evolution process of the Guide and the various institutions and persons that have made an input into the production of the Guide. This part also covers some key definitions, acronyms as preludes to the understanding of the words and functionality of terminologies used.

□ Part 1

Part 1 covers the **international and national legislative and regulatory requirements and standards** governing the production of cocoa beans. There are also information of the self assessment systems and certification.

□

Part 2

Part 2 lists the **General Good Practices to follow**, the **General information**, the **Generic diagram of the process**, the **Risk-assessment** and **Self-assessment measures** and the **Useful appendices** for the **Production of cocoa beans**. It contains the information which will help you in the practical implementation of all the essential provisions which are prerequisites that must be satisfied, in order to reduce the risk of non-conformity and control food safety and plant health for your products.

□ Part 3

Part 3 covers the **General Good Practices to follow**, the **General information**, the **Generic diagram of the process**, the **Risk-assessment** and **Self-assessment measures**, the **Monitoring, Corrective actions and Verification** and the **Useful appendices** for the bagging and warehousing and **Shipment of cocoa beans**.

□ Part 4

Part 4 of the Guide covers the **Sampling plan** for the sector.

This provides operators with recommendations for scheduling their checks and devising their sampling plan.

□ Part 5

Part 5 of the Guide covers the procedures for **Managing Crises and Mandatory Notification** implemented in the event of non-conformity.

□ Part 6

Part 6 and final part of the Guide covers notes and internal documents for operators.

F. HOW TO USE THE GUIDE

After describing practices at the different stages of the three links in the production chain: **Production/Harvesting/post-harvest, Bagging/storage, transport/evacuation and Shipment**, on the basis of risk assessment and traceability requirements, the Guide informs the operator, internal or external auditor about:

1. **What you need to know:** the main biological, chemical or physical risks or risks of non-conformity linked to the criteria for market and regulatory quality.
2. **What you need to perform:** the main measures for prevention or control in order to manage the significant risks previously identified.
3. **What you need to record:** the main information that must be recorded.
4. **Useful appendices:** documentation, educational or information tools which can be used to implement the self-assessment system.



What do you need to know?

At this level, it is a matter of describing the main hazards that can occur and which pose a risk of non-conformity with the applicable regulatory or commercial requirements, and which must be subject to appropriate checks.

These hazards can be of a **biological, chemical or physical nature** or relate to **commercial quality criteria** (grading).



What do you need to perform?

Requirement level

This consists of proposing prevention or control measures which can be implemented in order to ensure the prevention or control of risks identified previously.

Depending on the extent of the risk, in other words, the probability that the hazard will occur and the severity of its impact, the prevention or control measure is given a rating.

The rating system has three requirement levels:

- **MAJOR requirements**
- **MINOR requirements**
- **Recommendations**

‣ **MAJOR requirements**

These refer to prevention or control measures which, if they are not implemented, will be very likely to cause a non-conformity, the impact of which may be critical with regard to food safety, plant health or commercial requirements (exceedance of MRLs of pesticide residues, presence of mycotoxins, and presence of heavy metals).

They also refer to prevention or control measures which, if not implemented, will cause a non-conformity, the impact of which may result in serious consequences on consumer health or the commercial quality of the beans (e.g. the beans have serious quality problems with high levels of ochratoxins upon arrival in Europe).

‣ **MINOR requirements**

These refer to prevention or control measures which, if not implemented, may cause a non-conformity whose impact may be more or less serious on the food safety or commercial quality of the beans (e.g. improper fermentation, or inadequate drying of the produce , non-uniformity of bean sizes).

‣ **RECOMMENDATIONS**

These refer to control measures which, if not implemented, do not cause any significant adverse effect on food safety, plant health or the commercial quality of the produce .



What do you need to record?

Traceability is a regulatory requirement for all foodstuffs, including cocoa exported to Europe (EC178/2002). Traceability must make it possible to locate a product/produce and isolate it if necessary (for example: if any non-conformity is detected).

Meeting traceability requirements is one of the objectives of the Self-Assessment System Guide.

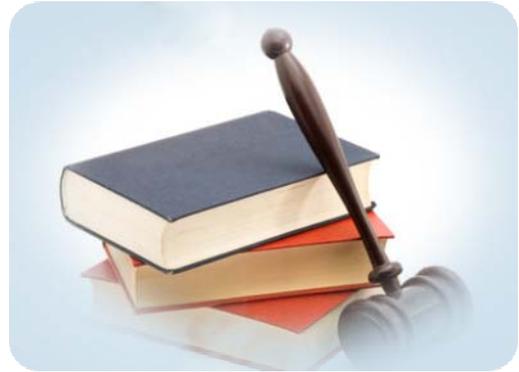
The aim is to define all the data or information which should be recorded or documented.

Useful Appendices

These aim to provide the operator with documentation or tools which are designed to facilitate the introduction of or control the implementation of the self-assessment system.

They include:

- ✓ References to scientific or technical publications
- ✓ Educational or information tools (illustrated sheets, brochures, posters)
- ✓ Good Practice Guides
- ✓ Sample traceability tools
- ✓ Sample checklists for performing a self-assessment



PART 1

Summary of requirements in legislation, regulations and standards

1.1. National regulations

❑ Governing legislation in Ghana

Cocoa is the mainstay of the Ghanaian economy and because of that, several laws and decrees have been issued for the production and marketing of cocoa in Ghana. Most of the decrees focus on purchase, inspection, grading and sealing of merchantable beans. These inter-ministerial laws or legislative instruments include:

Ghana Cocoa Board Law, 1984, (PNDC L.81): The main tasks of Ghana Cocoa Board (COCOBOD) include the following: - to purchase, market and export cocoa produced in Ghana which is graded and sealed under the provisions of Cocoa Industry (Regulation) Consolidation Decree, 1968 (NLCD. 278) or any other enactment, and to secure the most favorable arrangements for the purchase, inspection, grading, sealing and certification, sale and export of cocoa, coffee and sheanuts.

Under S.4 (6) of the said PNDC Law 81, no person shall market or export any cocoa unless:

- ☞ it is cocoa which is the property of COCOBOD; or
- ☞ It is cocoa which has been graded and sealed, the export of which has been authorized in writing by the certifying authority of the Board.

1.2. European regulations

For the export of cocoa (products) to the EU, the produce (products) must comply with the requirements relating to cocoa and chocolate products intended for human consumption. Any product that does not comply with any of the requirements cannot be placed on the EU market.

Most of the requirements are in the areas of health control (food law, hygiene, microbial criteria, contaminants and pesticide residues), plant health control (harmful organisms) and marketing standards.

General food law and hygiene in Europe

International regulations that apply to exported cocoa beans:

- ☞ Regulation (EC) No 178/2002 of 28 January 2002 lays down procedures in matters of food safety and indicates that: the traceability of foodstuffs shall be established at all stages of production, processing and distribution (cf. Chapter II, Section 4, Article 18 of the Regulation).
- ☞ Directive 2000/36/EC lays down requirements relating to cocoa and chocolate products intended for human consumption. The Directive defines sales names, definitions, characteristics and labeling specifications for each of the cocoa products covered by the legislation. Only cocoa products in compliance with the requirements of the Directive may be marketed in the EU.
- ☞ Directive 91/414/EEC concerns pesticide use in the EU. Regulation 91/414/EEC was repealed on the 14 June 2011 and replaced by EC 1107/2009, which has now been adopted.

- ☞ Regulation (EC) No 882/2004 of the European Parliament and of the Council of 29 April 2004 on official controls performed to ensure the verification of compliance with feed and food law, animal health and animal welfare rules (Official Journal L 191 Of 28 May 2004, p1).
- ☞ Regulation (EC) No 852/2004 of the European Parliament and of the Council of 29 April 2004 on the hygiene of foodstuffs; stipulates the general implementation of procedures based on the HACCP principles, together with the application of good hygiene practice and good practice guides. This regulation applies to all stages of production, processing and distribution of foodstuffs as well as exports; cocoa included.

Regulations governing pesticide residues

- ☞ European Commission Regulation (EC) N° 396/2005 of the European Parliament and the Council of 23 February 2005 on Maximum Residue Levels (MRL) of pesticides permitted in foodstuffs including cocoa beans- Annex 1. Official Journal 70 of 16 March 2005).
- ☞ Regulation 149/2008/EC of January 2008 as Annexes to 396/2005/EC which deals with MRLs to a large number of products of which cocoa is one.
- ☞ Regulation 1099/2010: updates the list of the products of the reinforced controls.

European regulations governing the control of plant health (harmful organisms)

The main Directives or Regulations relating to safety which might be of interest to exporters from countries outside the EU are:

- ☞ Council Directive 2000/29/EC of 8 May 2000 on protective measures against the introduction into the Community of organisms harmful to plants or plant products and against their spread within the Community and its amending acts (Official Journal 169, of 10 July 2000, p.1-112).
- ☞ Commission Directive 2004/102/EC of 5 October 2004 on protective measures against the introduction into the Community of organisms harmful to plants or plant products and against their spread within the Community describes the phytosanitary measures necessary to reduce the risk of introducing and/or spreading quarantine pests associated with wood packaging material made of coniferous and non-coniferous raw wood (including dunnage wood) in use in international trade.
- ☞ Commission Directive 2004/105/EC of 15 October 2004 determining the models of official phytosanitary certificates for re-export accompanying plants, plant products or other objects from third countries and listed in Council Directive 2000/29/EC

European regulations governing biological contaminant

- ☞ Council Regulation 315/93/EEC establishes the control procedures of the European Community for food contaminants.
- ☞ Commission Regulation (EC) 1881/2006 of 19 December 2006, sets the maximum levels for certain contaminants in foodstuffs. This Regulation sets the maximum quantities of certain contaminants: nitrates, mycotoxins (aflatoxin, ochratoxin A, patulin, deoxynivalenol, zearalenone fumonisins, toxins T-2 and HT-2), heavy metals

(lead, cadmium, mercury, inorganic tin), dioxins and PCB, polycyclic aromatic hydrocarbons:

- ☞ Concerning human health, regulation (EC) No. 1881/2006 was amended and replaced in section 6 by regulation **(EC) No. 835/2011** of 19th August 2011 and came into effect 1st September 2012. The regulation sets the new maximum levels for Polycyclic Aromatic Hydrocarbons (PAHs) in foodstuffs. The new limit is the sum of four PAHs such as benzo(a)pyrene, ben(a)anthracene, benzo(b)fluoranthene, and chrysene, in addition to benzo(a) pyrene monitoring which was done in the past. Polycyclic hydrocarbons (PAHs) are a group of environmental pollutants resulting from incomplete combustion of organic matter such as oil, wood, garbage, and coal. These compounds can also contaminate cocoa and other food products such as dairy products, fruits, vegetables, coffee, cereals, and vegetable oil through soil, water, and air. Apart from environmental sources of contamination, PAHs also occur from food processing, from smoking, roasting, baking, drying, grilling and from packaging materials.. This new regulation recognized that PAHs should be measured by the sum of four PAH substances: benzo(a)pyrene, benz(a)anthracene, benzo(b)fluoranthene, and chrysene for cocoa beans and derived products (35g/kg fat as from 1.4. 2013 until 31.3.2015, 30 mg/kg fat as from 1.4.2015) and that the level benzo(a)pyrene to be reported separately should be 5mg/kg fat as from 1.4.2013.

1.3. Plant health aspect of the SPS Agreement

Around thirty (32) international standards are listed in the publication:

- ☞ ISPM n° 1 (2006) Phytosanitary principles for the protection of plants and the application of phytosanitary measures in international trade
- ☞ ISPM n° 2 (2007) Guidelines for pest risk analysis
- ☞ ISPM n° 3 (2005) Guidelines for the export, shipment, import and release of biological control agents and other beneficial organisms
- ☞ ISPM n° 4 (1995) Requirements for the establishment of pest free areas
- ☞ ISPM n° 5 (2009) Glossary of phytosanitary terms
- ☞ ISPM n° 6 (1997) Guidelines for surveillance
- ☞ ISPM n° 7 (1997) Export certification system
- ☞ ISPM n° 8 (1998) Determination of pest status in an area
- ☞ ISPM n° 9 (1998) Guidelines for pest eradication programmes
- ☞ ISPM n° 10 (1999) Requirements for the establishment of pest free places of production and pest free production sites
- ☞ ISPM n° 11 (2004) Pest risk analysis for quarantine pests, including analysis of environmental risks and living modified organisms
- ☞ ISPM n° 12 (2001) Guidelines for phytosanitary certificates
- ☞ ISPM n° 13 (2001) Guidelines for the notification of non-compliance and emergency action
- ☞ ISPM n° 14 (2002) The use of integrated measures in a systems approach for pest risks management
- ☞ ISPM n° 15 (2009) Guidelines for regulating wood packaging material in international trade

- ☞ ISPM n° 16 (2002) Regulated non-quarantine pests: concept and application
- ☞ ISPM n° 17 (2002) Pest reporting
- ☞ ISPM n° 18 (2003) Guidelines for the use of irradiation as a phytosanitary measure
- ☞ ISPM n° 19 (2003) Guidelines on lists of regulated pests
- ☞ ISPM n° 20 (2004) Guidelines for a phytosanitary import regulatory system
- ☞ ISPM n° 21 (2004) Pest risk analysis for regulated non-quarantine pests
- ☞ ISPM n° 22 (2005) Requirements for the establishment of areas of low pest prevalence
- ☞ ISPM n° 23 (2005) Guidelines for inspection
- ☞ ISPM n° 24 (2005) Guidelines for the determination and recognition of equivalence of phytosanitary measures
- ☞ ISPM n° 25 (2006) Consignments in transit
- ☞ ISPM n° 27 (2006) Diagnostic protocols for regulated pests
- ☞ ISPM n° 28 (2009) Phytosanitary treatments for regulated pests
- ☞ ISPM n° 29 (2007) Recognition of pest free areas and areas of low pest prevalence
- ☞ ISPM n° 31 (2008) Methodologies for sampling of consignments
- ☞ ISPM n° 32 (2009) Categorization of commodities according to their pest risk

1.4. Regulations in the United States of America (USA).

In the USA, the Food Quality Protection Act (FQPA) of 1996 which established the Environmental Protection Agency (EPA) is considered approximately equivalent to 91/414/EEC (<http://www.epa.gov/opp00001/regulating/laws/fqpa/backgrnd.htm>), but regulates the amount of pesticide residues permitted on food for consumption. The EPA also requires that all approved pesticides are clearly labeled with instructions for proper use, handling, storage and disposal. <http://www.fda.gov/Food/GuidanceComplianceRegulatoryInformation/GuidanceDocuments/ChemicalContaminantsandPesticides/default.htm>), with specific 'Level 2' guidance about dates, affected food commodities with a residue of a given pesticide chemical on: <http://www.fda.gov/Food/FoodSafety/FoodContaminantsAdulteration/Pesticides/default.htm>.

1.5. Regulations in the Far East (Japan)

The Ministry of Health, Labour and Welfare (MHLW) has established new legislation, the Food Sanitation Law, which was modified on 29th May 2006, with analysis of cocoa included on a "positive list" published by the Ministry of Health, Labour and Welfare. The MRL list has been updated since February 5, 2007 and is on: <http://www.mhlw.go.jp/english/topics/foodsafety/positivelist060228/dl/index-1a.pdf>.

1.6. Codex Alimentarius standards: reference standards on the quality of cocoa beans

- ☞ Codex has listed MRLs for cocoa beans (the Codex MRLs for deltamethrin, fenitrothion and lindane were revoked by 2003 and two of those remaining are subject to review.
- ☞ There is a Codex General standard for contaminants and toxins in food and feed: CODEX STAN 193-1995 (Rev. 1 – 1997). This standard contains the main principles

and procedures used and recommended by the *Codex Alimentarius* in dealing with contaminants and toxins in food and feed and lists the maximum levels of contaminants and natural toxicants in food and feed which are recommended by the *Codex Alimentarius* Commission to be applied to commodities moving in international trade.

1.7. West African Economic and Monetary Union (WAEMU)

☞ Regulation 0007/2007/CM/WAEMU of 23 March 2007 on plant and food safety in the WAEMU

This Regulation sets out to establish the general principles and organizational provisions and procedures making it possible to ensure healthy plants, animals and food at Community level and domestic level. It sets up the cooperation structures and mechanisms in the field of food safety within the Union. It applies to each stage in the production, processing and distribution of plants, animals and food placed on the market.

1.8. International and European quality standards governing cocoa beans

Quality is the key to international markets. Commercial quality standards are used as a common trading language for buyers and sellers and as a reference for quality control. Commercial quality of cocoa beans covers a range of parameters describing the internal and external characteristics of the produce that are necessary to ensure transparency in trade and obtain good levels of flavor.

Ghana Cocoa Specification

The minimum quality standards set by the Ghana Cocoa Board exceed the benchmark standards set in the international cocoa market for the trade in Good Fermented Cocoa.

Cocoa is graded on the basis of the count of defective beans in the cut test. Defective beans should not exceed the following limits:

Grade I

- ✓ Mouldy beans, maximum 3% by count;
- ✓ Slaty beans, maximum 3% by count;
- ✓ Insect-damaged, germinated or flat beans, total maximum 3% by count.

Grade II

- ✓ Mouldy beans, maximum 4% by count;
- ✓ Slaty beans, maximum 8% by count;
- ✓ Insect-damaged, germinated or flat beans, total maximum 6% by count.

Sub-Standard (SS)

- ✓ All cocoa which fails to reach the standard of Grade II will be regarded as sub-standard cocoa and marked 'SS'

The International Cocoa Standards require cocoa of merchantable quality to be fermented, thoroughly dried, free from smoky beans, free from abnormal or foreign odour and free from

evidence of adulteration. It must be reasonably free from live insects, broken beans, and fragments. and pieces The beans must be reasonably uniform in size. Throughout the world the standards against which all cocoa is measured are those of Ghana cocoa.

✓

1.9. International Cocoa Organization guide: pesticide use in Cocoa.

Pesticide Use in Cocoa A Guide for Training Administrative and Research Staff 1st Edition: August 2008. 2nd Edition: December 2009 (revised March 2010). www.icco.org; www.dropdata.org/cocoa . APPENDIX 3 : 3A Lists of strategic / recorded pesticides for use in cocoa.

1.10. Self Assessment Inspection and Certification Systems

1.10.1. Self Assessment

The self-assessment or internal audit is carried out by a member of your association, company (or a subcontractor you have hired) who:

- ▶ is appointed based on his/her qualifications and experience in the sector;
- ▶ is not directly involved in the process.

The self-assessment includes:

- ☞ examination of the documentation (including registers and results of inspections);
- ☞ assessment of current practices (understanding and application);
- ☞ an audit report;
- ☞ if necessary, a follow-up audit of the corrective actions.

It is up to you to decide on the organisation and frequency of self-assessments or internal audits.

1.10.2. External Inspection

The aim of the inspection by the Independent Certification Body (ICB) is to validate the self-assessment system established by your association or company based on the legal requirements applicable to your sector. In addition to the legal requirements on food safety and hygiene, the inspector will check certain legal requirements on the quality of your produce , in relation to the defined quality criteria.

A contractual agreement should be established between your company and the ICB setting out the scope of the assessment. Strict confidentiality is required from the inspectors and the ICB.

The inspectors must be able to show proof of their qualifications and references. In particular, they must be able to show their knowledge of the cocoa sector in Ghana.

The inspection by the ICB will include:

- ☞ Information prior to the visit (inspection date, name and qualifications of the inspector, documents to be collated, length etc.)
- ☞ An introductory meeting (presentation of the inspection method, schedule etc.)
- ☞ Review of your documentation
- ☞ Review of the implementation of all the requirements outlined in the Self-Assessment Guide (visits, interviews, FAQs etc.) in your company
- ☞ A meeting to discuss any non-conformities identified
- ☞ An inspection report stating corrective action if any to be taken and time frame for implementation.

The management team and all personnel members may be interviewed. Furthermore, during the inspection the Independent Certification Body (ICB) may decide to take and analyse samples, particularly if the 'sampling plans' are not deemed satisfactory by the ICB.

The length of the inspection will depend on the following parameters:

- ✓ initial inspection, monitoring or supervision
- ✓ size of the company, including the number of production sites
- ✓ type of process
- ✓ nature of the products
- ✓ number of workers
- ✓ number of non-conformities identified during the previous inspection.

For a **combined inspection**, the ICB will always have to conduct the inspection of your SAS first, **before** those of the other certification schemes (e.g. UTZ Certified, Fair trade, Rain Forest Alliance etc.)

1.10.3. Certification of the Self-assessment system

In order to obtain certification for your self-assessment system (SAS), you must be subject to:

- ☞ An **initial inspection**: this aims to show that your SAS meets the requirements of the Guide.
- ☞ Your traceability system shall be audited in great detail and a complete inspection shall be performed, with an in-depth visit to the production sites, buildings and premises, storage spaces, transport facilities etc to check for compliance with the requirements.
- ☞ A **monitoring inspection**: the inspection of your SAS takes place once a year to check whether the SAS still meets legal requirements. The SAS certification will be

valid for one year after the date it is issued by the ICB (after approval of the inspection report); however, it will remain valid until the actual date of the next inspection performed by the ICB.

- ☞ **A follow-up inspection:** if major non-conformities are found during an inspection (cf.: 'Requirement levels' in this Guide), the ICB may decide to conduct a 'follow-up' inspection in order to check whether suitable corrective actions have been implemented following the inspection report.

If your company has successfully passed its SAS inspection, you will receive a '**Self-Assessment System Certificate**' according to a template established with the competent national authority. The certificate will have an operational timeframe which will require periodic surveillance of the SAS to ensure compliance. Sanctions of varying nature may be prescribed if the firm is found wanting during the validity period of the certificate including withdrawal of certificate in the worst form of non-compliance .

PART 2

General Good Practice applicable



□ General points

In order to control chemical, physical or biological hazards or procedural hazards, the different actors in the cocoa sector must first be aware of the general hygiene requirements and implement the necessary control measures

The Ishikawa concept defines five potential sources of process contamination which it classifies as the 5Ms. The 5Ms, which are considered as the critical sources for food safety management system according to Ishikawa are described as follows:

- ☞ Milieu (environment) – working areas, whether in the field or packing station
- ☞ Material (raw material)
- ☞ Manpower (Every person handling the produce and third parties are potential carriers)
- ☞ Method (includes all processes used in production, harvesting, transport and packing to shipment)
- ☞ Machine (all equipment – machines, tools and packing material in contact with the product during pre- and post- harvest treatment)

In brief these are the sites, premises, resources, methods and other infrastructure used in the production, fermentation, storage and transportation of fermented and dried cocoa beans must take food safety risks into consideration in the production and export of the beans.

These requirements mainly relate to the following five factors (grouped according to the Ishikawa diagram method):

- Environment (buildings)(Milieu)
- Labour (personnel or manpower)
- Materials (raw materials)
- Machines/Resources (Equipment – machines, tools etc)
- Methods (processes used in production, harvesting etc)

2.2.1. Environment

2.1. Environment (site of production, premises for drying and buildings for storage of beans)

□ General Points

The site and premises where production, harvesting, fermentation, drying and temporary storage of the beans take place are foci of contamination if they are not properly maintained. It is therefore necessary to make provisions to control food safety risks when producing, designing and maintaining the premises.

The history or past use of land for cocoa production could lead to:

- Persistent chemicals or toxic substances which may arise from previous or present pesticide or fertilizer applications, waste disposal or mining operations in the soil causing the crop to exceed maximum residue levels.
- The absorption of heavy metal contaminants in the soil by the roots of the cocoa trees during the growth of the trees.

Produce from the farms could also exceed their maximum residue limits for plant protection products from adjacent or nearby areas due to:

- Spray drift from pesticide use
- Waste disposal
- Mining activities

All sites for fermenting and drying and warehouses for the storage of cocoa must be located, designed, constructed and maintained to facilitate hygiene operations.



What do you need to know?

The activities at the site of production (illegal mining site – “galamsey”), buildings, equipment, infrastructure and premises used in the fermentation, drying, storage and transportation of wet and dried beans can help spread sources of contamination if they are not properly maintained.

- Risk of chemical contamination (heavy metal – mercury) from the soil, water and the use of contaminated fertilizer, plant protection products for the control of pests and diseases.
- Risk of pesticide contamination in trying to control bees around the fermenting areas.
- Risk of chemical contamination when contaminated bags (old fertilizer bags) are used to transport wet fermented and also dry beans.
- Risk of contamination from vehicle fumes and fuel/oil spillage of beans dried along the road side.
- Dirty fermenting and drying areas and their surroundings are food safety risks
- Risk of drying in areas of heavy smoke (by incinerators, abattoirs, firing of wood shavings, fish smokers site, etc



What do you need to perform?

Requirement level

<ul style="list-style-type: none"> • <i>Check previous land-use activity from the land-owners or community/District Assembly; before acquisition of the farm and avoid use of mining sites for crop production</i> 	Major
<ul style="list-style-type: none"> • <i>Carry out a soil test or analysis for evidence of heavy metals residues and other metals of health significance from mining sites. Evidence of heavy metals or radioactive metals is a red-flag.</i> 	Major
<ul style="list-style-type: none"> • <i>Records of all plant protection products application indicating: crop, application location, date, product name and active ingredient, reasons for application, quantity applied, application</i> 	Major

<i>machinery used and the pre-harvest interval.</i>	
<ul style="list-style-type: none"> • <i>Conduct a risk assessment of new sites whether the site is suitable for production with regards to food safety. Factors to consider are: previous crop, mining activities, soil, drainage, water, dust, road construction, smoke, adjacent farming activities. This must be done at the Society level with the help of the LBC.</i> 	Minor
<ul style="list-style-type: none"> • <i>Observe the sanitation/hygiene practices in fermenting and drying of produce. Fermenting and drying beans must not come into contact with the soil.</i> 	Minor
<ul style="list-style-type: none"> • <i>Conduct analysis of water sources (streams) that flow through your farm if there is high activity of illegal mining upstream. .</i> 	Recommended
<ul style="list-style-type: none"> • <i>Ensure good hygienic practices on farm at all times.</i> 	Recommended
<ul style="list-style-type: none"> • <i>Site all warehouses as per the requirements of Quality Control Company</i> 	Major



What do you need to record?

- History of production site, area under cultivation, variety, age of trees, no of trees per area, total production, date of establishing farm.
- Soil type analysis.
- Written risk assessment of production site.
- Records of all plant protection products kept and applied (indicate application location, date, product trade name and active ingredient, quantity applied, pre-harvest interval).
- Water Quality analysis, parameters like pH, chlorine content, heavy metal, microbial load
- Requirements of a good warehouse.
- Records of cleaning and maintenance
- Pest control records, traps and bait sites and incidence of pest activity.



Useful Appendices

- EDES Mission 100006/CSM/NRI-UoG/010/GHA Ref: 388: Pesticide use on cocoa in Ghana; an evaluation of the strengths and weaknesses from a food safety perspective By Jerry Cooper & Anthony Cudjoe Oct 2012.
- Risk Analysis and control in production PIP Training Module 3
- QCC requirements for a warehouse.

2.2. Personnel

□ General points

Persons who come in contact with cocoa beans at all stages in the value-chain can contaminate them in several ways. Humans carry micro-organisms (some of which cause contagious diseases) which can be transmitted to other people via the food chain. This is why personal and clothing hygiene as well as the state of health of persons working with the beans are important.

Aflatoxins are known to occur in cocoa beans as a result of contamination before and after harvest if precautions are not taken in order to minimize risks.

Personal items may also find their way to physically contaminate the means.



What do you need to know?

- Cocoa beans are susceptible to fungal spoilage during and after fermentation and potentially can cause acute or chronic intoxication and damage to humans and animals after ingestion of contaminated food and feed.
- The beans have the potential to be contaminated with *Salmonella* if the harvesting, pod breaking, fermenting and drying are under unhygienic conditions.
- Staff behaviour can lead to physical contamination of cocoa beans with such items as cigarette butts, pieces of strings, pebbles, sharp-metal pieces, jewellery, rings, watches, sandals, knives, rags, pieces of wood, grass, insects, nails, bits of glass, old bandages, small pebbles, ballpoint pen cap, used rubber glove, rubber bands, buttons, piece of grafting, piece of root, placenta, cocoa pods etc are possible if they are inadvertently (or deliberately left to gain extra weight) left in the beans during drying, grading, sorting and bagging and create a risk of admixing with the beans and also contaminating them.
- Fecal remains of animals (sheep, goats), pets, birds and reptiles) resulting from lack of good hygienic facilities and practices can contaminate produce and materials with micro-organisms that can pose food safety problems to consumers.
- Working in the depot or warehouse under dirty and humid conditions lead to physical or microbial contamination.



What do you need to perform?

Requirement level

<ul style="list-style-type: none"> Take all measures to avoid contact of beans with the ground, animals, birds, reptiles during fermenting and drying of produce. Dry produce on raised platform. 	Major
<ul style="list-style-type: none"> Train all persons handling beans to be clean during drying, sorting and bagging of cocoa beans. (hygiene training) 	Major
<ul style="list-style-type: none"> Prevent cross contamination during and after fermentation or drying of beans 	Major
<ul style="list-style-type: none"> Paste instructions or posters or notices (pictograms) at the Purchasing clerk's, District Depot and Take-over centres (Warehouses) forbidding staff not to wear jewellery, watches, hair pins, or walk through the beans with dirty feet or boots. 	Minor
<ul style="list-style-type: none"> Paste instruction/pictograms on the wall on sanitary/hygienic washing of hands after visiting the wash-room. 	Minor
<ul style="list-style-type: none"> Provide sanitation/hygiene facilities (toilets) with running water and detergent, hand-washing of person at the CMC Depot and Society level 	Major
<ul style="list-style-type: none"> Monitor the health status of staff in contact with the crop and prevent anyone with health problem from contacting produce. 	



What do you need to record?

- Daily records for cleaning sanitation/hygiene facilities
- Training Records (attendance sheets of members participating in hygiene training at the society level)
- Medical records periodically of workers
- Records on quality and availability of running water for the staff needs
- Volume of beans produced per period, per activity, and the number of staff who worked and hygiene compliance.



Useful Appendices

COLEACP PIP Training Manuals Module 3: Risk analysis and control in production

2.3. Material and equipment

General points: The **International Cocoa Standards** require cocoa of merchantable quality to be fermented, thoroughly dried, free from smoky beans, free from abnormal or foreign odour and free from evidence of adulteration. It must be reasonably free from living insects, broken beans and fragments. Beans must be reasonably uniform in size. The risk posed by the presence of foreign matter is high. The lack of rules on hygiene and their observation not only lead to accidental introduction of foreign bodies or contaminations from insect or rodent droppings into bags of dried beans. Tools, handling facilities, equipment and vehicles used in the transport of wet or dried cocoa beans are also potential sources of food safety risks. The nature, lack of maintenance, the equipment, material and transport vehicles which come into contact with the pods, fermented and dried beans can affect the final quality of the product.

With regards to post harvest treatments to control pests in the warehouse, if the equipment used is not calibrated, the risks of not applying the correct dose of the plant protection products on the dried beans is high.



What do you need to know?

The main hazards linked to the equipment are.

- *There is the risk of cross-contamination if the cocoa beans are not stored in clean bags made of non-toxic materials free from mineral oil.*
- *Tools, handling facilities, materials, equipment and vehicles in contact with beans are to be clean and free from all physical, chemical and biological contamination.*
- *All contact surfaces including tools, knives, metal bowls, tables, drying platforms, equipment, scales for weighing are potential sources of cross-contamination of the cocoa beans.*
- *There is the risk of the presence of foreign matter in the form of stones, metal pieces, weeds/grasses and glass pieces, needles, sewing thread, among others and must be avoided*
- *Conveyances, containers, vehicles (taxi, tro-tro), tractors, trailers for transporting food including cocoa beans when not in an appropriate state of cleanliness, repair and best sanitary/hygienic condition are potential sources of contamination.*
- *Contamination of beans can occur if transports used for evacuating dried cocoa beans had been used in transporting different food or non-food items.*
- *Exchange and transfer of tools/equipments of trade between farmers and agents of production, etc.*

	<h2>What do you need to perform?</h2>	<h2>Requirement level</h2>
	<ul style="list-style-type: none"> • <i>Ensure that harvesting knives, baskets, sacks, drying platforms, etc used in the cocoa industry are clean and in absolutely good condition always.</i> 	Major
	<ul style="list-style-type: none"> • <i>Tools and equipment should be stored under conditions that guarantee good sanitation/hygienic and protect the cocoa beans. Such items are not to be stored in Plant Protection Products (PPP) stores or with fuel or lubricants</i> 	Major
	<ul style="list-style-type: none"> • <i>Always inspect vehicles and containers used in the transport of cocoa beans for absolute cleanliness and sources of potential contamination. Vehicles must be in a state of good repair. Tarpaulins used in covering transported beans must be clean and free from accumulation of moisture and also dirt/dust from previous transportation.</i> 	Major
	<ul style="list-style-type: none"> • <i>Design training programs and continually train all stakeholders in the best sanitation/hygiene practice in the industry</i> 	Minor
	<ul style="list-style-type: none"> • <i>Monitor the field activities of producers/operators in compliance with best sanitary/hygienic practices.</i> 	Minor
	<ul style="list-style-type: none"> • <i>Check reports on cleaning of vehicle or transport for cocoa beans to accompany vehicle for loading and evacuation.</i> 	Major



What do you need to record?

- *Record of all contact surfaces, types and numbers and each application and condition(degree of maintenance and extent of use)*
- *List of areas of non-compliance to sanitary/hygienic operations identified and corrective measures prescribed and actions taken.*
- *Cleaning record of vehicle/transport which is submitted to the supervisor at the loading bay.*
- *Record of the state of general cleanliness of vehicle using dirt, filth and*
- *Records of training programs or workshops, attendance and follow-up of impact.*
- *Client issue certificate of approval of cleanliness*



Useful Appendices

2.4. Raw materials

□ General points

The quality of the final product offered for sale, i.e. dried cocoa beans to a large extent is a function of the raw material inputs (fertilizer, plant protection products, raw matured cocoa pod etc) the degree to which prescribed and best agronomic cultural practices have been followed through in the various stages to harvesting, post-harvest handling etc.

Streams running through farms in small scale mining areas are potential sources of contamination. As much as possible all sources of potential water contamination in the farm should be identified and controlled.



What do you need to know?

- Only approved raw materials must be used and their origins must be traceable and must also meet the requirements of the importing country.
- Cocoa must be grown with minimum pesticide use in accordance with GAP and agreement between the importer and COCOBOD
- There is a potential risk of exceeding the MRL of PPP because of short PHI (Pre –harvest interval)
- The use of unapproved PPP may lead to the rejection of the entire produce.
- Beans bruised or injured when machete is used to open the pod predispose them to mycotoxin attack.
- Evidence to date suggests that Ochratoxin “A” producing organisms enter the cocoa supply chain via damaged pods.
-
- The interval between harvesting and pod opening influences fermentation. Long delays in pod breaking (> 3days after harvest) or opening leads to germination and affect subsequent processes of fermentation and quality and shelf-life;
- Quality control at the pod-opening stage is necessary to eliminate germinating, immature, diseased and damaged beans
- Risk for biological contamination with mould arising from pods kept over a long period of time.
- Risk from biological contamination from improper sorting out of rejected beans.
- Risk from physical contaminants from broken piece and rust particles from poorly maintained machete.
- Risk of biological contamination from workers handling the pod-breaking and collection
- Risk of biological contamination from cross-contamination from diseased pods to disease-free pod and beans



What do you need to perform?

Requirement level

<ul style="list-style-type: none"> • Sort out black pods, damaged pods, all germinated and diseased beans, , damaged pods, small beans (immature) and dry beans from the lot and disposed off in a sanitary/hygienic manner 	Major k
<ul style="list-style-type: none"> • Do not inflict injury to cocoa beans with a machete or any sharp object or equipment during harvesting in order to reduce Ochratoxin “A” in the cocoa supply chain 	Major
<ul style="list-style-type: none"> • Do not store injured or bruised pods of any kind for any longer than one day. 	Minor
<ul style="list-style-type: none"> • Record details of source of pods, date of harvesting, pod breaking and fermentation 	Minor
<ul style="list-style-type: none"> • Provide the right tools or equipment, preferably a wooden club and monitor operators during pod-opening activity. 	Recommended
<ul style="list-style-type: none"> • Create awareness of and maintain the best sanitary/hygienic environment and conditions for pod opening. 	Major
<ul style="list-style-type: none"> • Train workers to harvest pods at the right time for high quality beans. Sensitize operators to the need for pod opening without delay after harvesting. 	Minor



What do you need to record?

- *Record of harvesting date, pod breaking time and date of fermentation..*
- *Record of time interval between harvesting and opening of pod (3-4 days is desirable)*
- *Record of any PPP or any chemical used (source, date, rate of application, operator details, stage of pod, pre-harvest interval).*
- *Train the producers/operators in hands-on best pod opening practices*



Useful Appendices

2.6. Methods

□ General points

The main post harvest operation at risk is the fumigation or fogging of the cocoa beans throughout the value chain particularly at the central grading, sealing and take-over centers to control storage pests in conformity with international sanitary and phyto-sanitary agreement. Pre-shipment treatments with insecticide /rodenticide products should be carefully undertaken because the wrong choice of product, the concentration, the method of application and the skills of the operator could lead to residue and other food safety problems.



What do you need to know?

- Have information on the consignment of beans being treated for the sake of traceability
- Products approved for use on naked beans and their expiry date.
- The formulation, the minimum effective dosage taking into consideration the volume of cocoa to be treated
- Equipment calibration
- Regular equipment maintenance
- Maintain safe storage and conditions to ensure optimum PPP performance
- Condition for application of the selected product
- The MRLs required by importers (EU, Japan and USA)



What do you need to perform?

Requirement level

<ul style="list-style-type: none"> • Have a list of approved pesticides and their MRLs 	Major
<ul style="list-style-type: none"> • Sample and test beans for pesticide residues. 	Major
<ul style="list-style-type: none"> • Record details of plant protection products used: name, active ingredient, formulation, dosage, total applied, 	Minor
<ul style="list-style-type: none"> • Calibrate all equipment in use. 	Recommended
<ul style="list-style-type: none"> • Train the operators of the equipment for application. 	Major
<ul style="list-style-type: none"> • Keep records on repairs and replacement of equipment • 	Minor



What do you need to record?

- *All PPP or any chemical used (source, date, rate of application, operator details, stage of pod, pre-harvest interval).*
- *Training records of operators who do spraying, fumigation and fogging.*
- *Calibration records*
- *Plant protection products residue analysis results*



Useful Appendices

3.0

Risk assessment and self-assessment measures

3.1

Cocoa Production

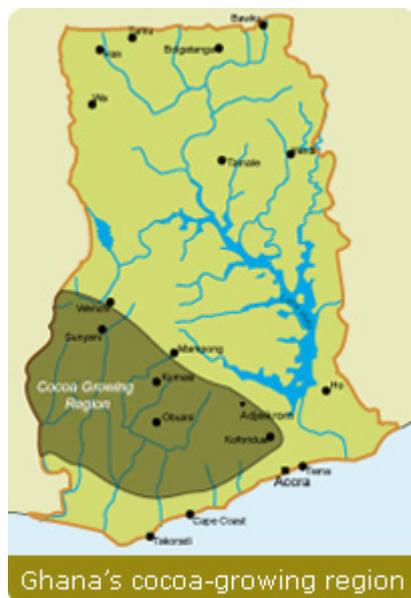


3.1.1 General Information

3.1.1.1. Major areas of production of cocoa

Cocoa (derived from the tree (*Theobroma cacao*) is strictly a tropical tree crop, of the forest undergrowth; the seeds of which provide an important raw material for the confectionery industry. . It grows under shade and in sheltered localities in Ghana, suited to small-scale farmers. The climate in these areas are characteristically of tropical type, of moderate temperature, high humidity, and heavy rainfall.

The main producing centres of cocoa in Ghana are the dark areas in the map below. The zones are located in the semi-deciduous and rain forest zones of Ghana. Currently cocoa is cultivated in six regions in Ghana; namely Ashanti, Brong Ahafo, Eastern, some parts of Volta, Central and Northern and some Southern parts of Western regions.



3.1.1.2. Features of the farms

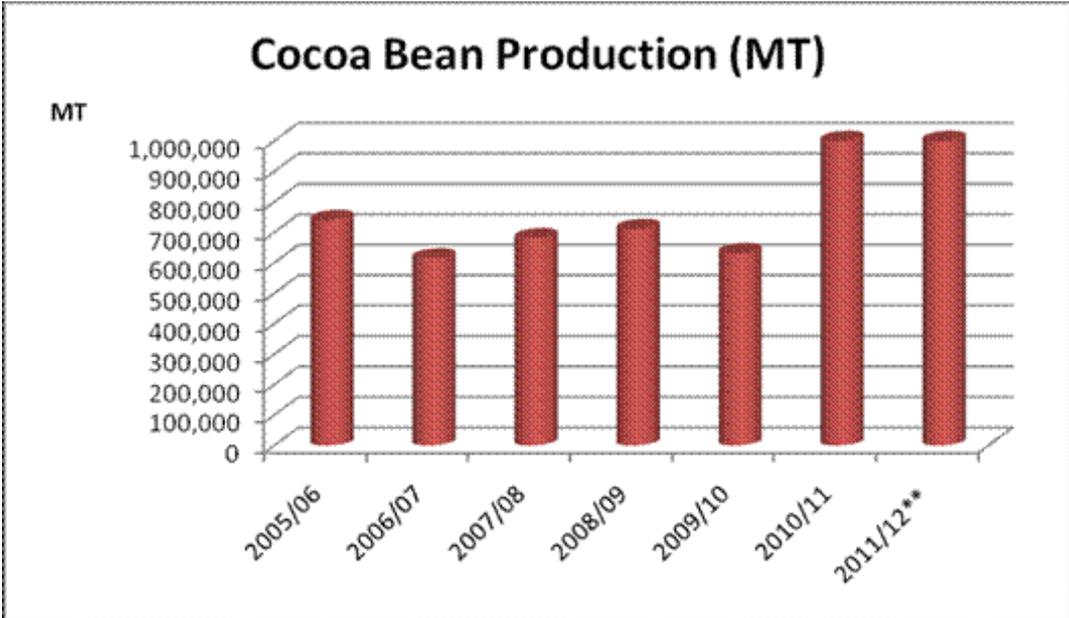
Estimates put cocoa farmers in Ghana at 800,000. The cocoa is grown on small family farms averaging two or three hectares. National yield vary and estimated between 300kg -750 kg per hectare depending on the soil, shade, climate, genetic make-up, pest/disease control, and the application of best cultural practices. Large variations in yield occur from year to year, usually due to weather conditions and pest or disease attacks. Traditional varieties start yielding about five years after planting but are gradually being replaced by hybrid varieties that start yielding after about three years after planting. Peak yields are obtained after eleven and six-seven years for traditional and the hybrid varieties respectively.

Given the right conditions, cocoa trees will maintain their high yields for 20 – 25 years, and will continue yielding between 30 – 70 years.

3.1.1.3. Production data

The Ghana cocoa bean production for the 2010/11 reached a record high of 1, 004,190 MT up from the 650,940 MT in 2009/10 according to COCOBOD sources.

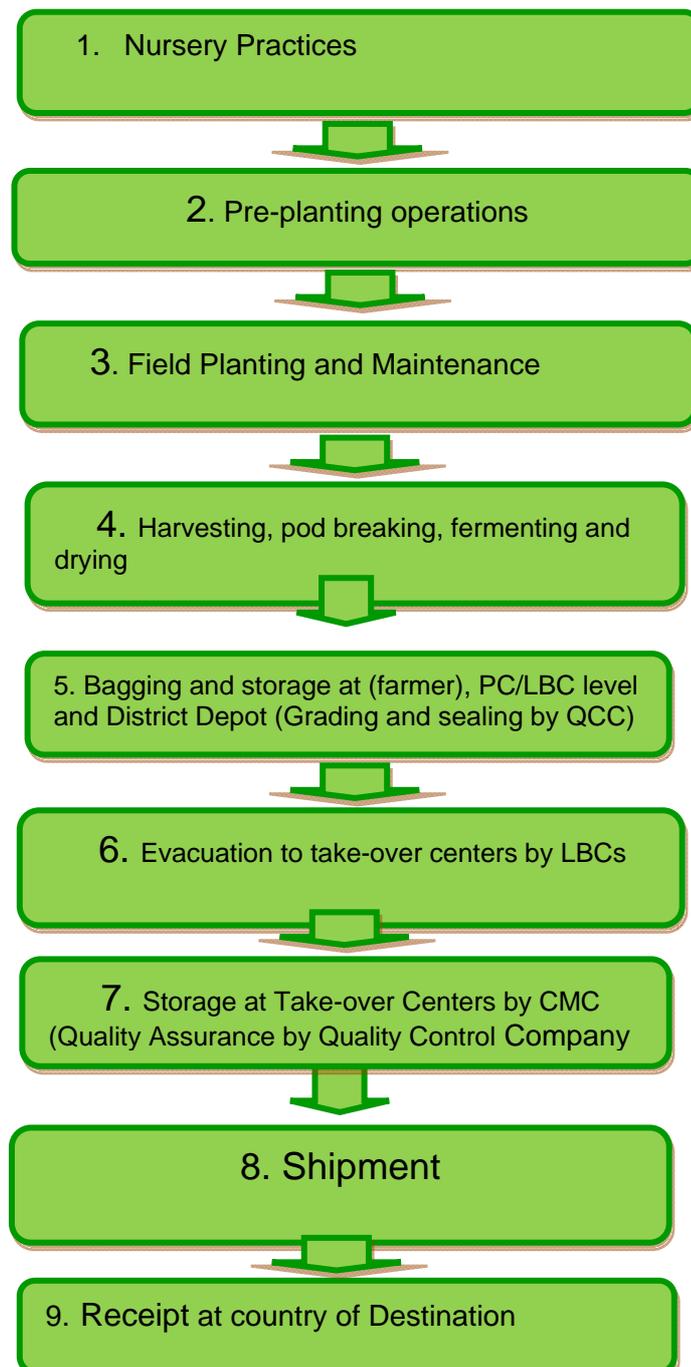
The main crop season is October-February/March while the light mid-crop cycle falls in April/May-mid September. However, more recently COCOBOD has introduced longer crop seasons for the main crop (October to May) and reduced the period for light crop season (June-September). The volumes of the light crop beans are smaller than the main crop season, and the bean sizes are smaller even though quality is the same.



3.1.1.2. Generic diagram of the process

General points

The generic diagram below shows the main stages of cocoa bean production in Ghana. Each operator must identify and take into consideration the practices that apply to him or her.



3.1.3. Description of Practices

3.1.3.1. Nursery Practices

The site selected for the nursery should be close to the proposed farm, flat, well drained and near a source of permanent water. It should not be too close to an existing cocoa farm to avoid the transmission of pests and diseases mainly Cocoa swollen shoot diseases. Seeds are sown on nursery beds or in polythene bags, maintained and transplanted about 6 months later. A good site will help you to reduce the use of pesticides and should be accessible.

3.1.3.2. Pre-plant operations

- **Site selection:**

The site selected for cocoa is limited by climatic and soil requirements. The soil must be deep and rich in nutrients with a pH of 5-8. Very wet and marshy/swampy sites/land should be avoided. Rocky areas and sites with hardpan are not suitable for cocoa cultivation.

- **Land preparation:**

- a) The land is cleared of secondary bush or forest in or around December and January. All undesirable shade that harbour cocoa pests and are also brittle are removed leaving about 15-18 medium size trees per hectare (6-9 per acre) and 2-3 very tall trees to provide permanent shade.
- b) To replant old cocoa plants, all the old cocoa trees are cut. The old forest shade is then thinned leaving 15 to 18 desirable trees per hectare, (6-9 per acre).
- c) All previous litter is not to be burnt. This dry vegetation rots to improve the soil fertility and prevent erosion.

3.1.3.3. Field Planting and Maintenance

- **Lining and pegging:**

- a) The farm is lined and pegged at the recommended spacing of 3m x 3m (10ft x 10ft) or 2m x 3m (6.5ft x 10ft) in March/April. Always plant in lines. This eases your future operations such as spraying, weeding and harvesting.
- b) Temporary shade plants such as plantain and cocoyams are established in March in between the cocoa. Alternatively, *Gliricidia sepium* may be planted at 6m intervals in April to supplement the shade.

- **Transplanting cocoa seedlings from polybags:**

- a) Planting is usually done from April to July during the rainy season. It is ideal to plant before the end of June. Planting holes are dug in advance in April.
- b) The planting holes should be 25cm deep and 25cm wide.
- c) Seedlings that are 3 to 6 months old are transplanted by removing the polybags carefully in order to leave a ball-of-earth.
- d) The seedlings are placed in the planting holes and the holes covered by firming the soil around the seedlings.

- **Transplanting cocoa seedlings from nursery beds:**
 - a) In the case the seedlings were raised on beds, they are removed with a cutlass or small hand trowel to ensure that there is a ball-of-earth around the roots.
 - b) The seedlings are placed in the dug holes and covered firmly with soil.
 - c) To ensure establishment success, seedlings should be transplanted soon after rainfall or when rainfall is anticipated within 48 hours.

- **Sowing at stake or *in situ*:**
 - a) Fresh cocoa beans may also be planted directly in the field.
 - b) Two to three beans are sown at stake with a hoe or cutlass and thinned to one when the seedlings are at 6-8 weeks after planting or at 4-leaf stage.
 - c) The beans should be sown 2.5 cm deep from the surface of the soil. The pointed end of the bean attached to placenta should point downwards during sowing.
 - d) The fresh beans can also be placed flat if there is doubt as which is the pointed end and covered with soil.

- **Maintenance practice:**
 - a) The farm should be weeded regularly at least four times in a year
 - a) All side shoots (chupons) that grow on the main stem before jourquette (fork) formation are to be removed.
 - b) The young cocoa seedlings are to be mulched with the trash from weeding or plantain pseudostems to retain soil moisture.
 - c) The mulch should be placed about 6cm away from the seedling to prevent termite attack.

- **Chemical weed control**

Weeds may be controlled over a longer period of time with chemicals than by manual weeding. Glyphosate is recommended for weed control in cocoa.

- **Young Cocoa**
 - a) Usually apply 1.5 litres to 2 litres of Glyphosate in 100 litres of water per hectare (i.e. about one and half to two milk tins of glyphosate in a 17 litre knapsack sprayer fitted with the low volume nozzle (Lurmark AN1.0) for maximum efficiency and economy.
 - b) Spray 3 times in a year. The spray must be directed against the weeds.
 - c) Avoid spray drift on cocoa seedlings and food crops by spraying early in the morning or late in the evening.

- **Mature Cocoa**
 - a) Apply 1.0 litre of Glyphosate in 100 litres of water per hectare two times per year (about 1 milk tin of glyphosate in a 17 litre sprayer full of water) using the low volume nozzle (Lurmark AN 1.0).

- **Precautions**
 - a) Avoid contaminating nearby streams.
 - b) Wear protective clothing whilst spraying.
 - c) Do not eat or smoke whilst spraying.
 - d) Do not use herbicide containers for storing, drinking water, cooking oil or food.

e) Wash down after spraying before you eat.

- **Fertilizer application**

Three types of fertilizers are recommended by COCOBOD. These are :

1. Conventional inorganic fertilizers applied once a year to the soil either by broadcasting or ringing under the cocoa trees. These are

Asase Wura (NPK 0-22-18+9CAO+7S+6MgO)

Cocofeed (NPK 0-30-20)

Mixture of Triple super phosphate (TSP 46% P₂O₄) and Muriate of potash (MOP 60% K₂O)

Ammonium sulphate (21%N)

2. Foliar/liquid fertilizers : the recommended ones are Sidalco liquid fertilizers (NPK 10:10:10, NPK 20 :2 :4) and NPK 6 :0 :20)
3. Organic Fertilizers – the recommended ones are poultry manure, cocoa pod husk ash and compost.

- **Pests and diseases Control**

The major pests are mirids (capsids), stem borers, mealy-bugs and termites while the minor ones include shield bugs, defoliators, psyllids, aphids and rodents.

The pests are to be managed by adopting integrated pest management practices by using the principles of prevention, monitoring and intervention.

Current approved insecticides for the control of both the major and minor pests are:

Imidacloprid (200SL) - Confidor 150ml/ha: Use 30ml of confidor in 11.0 liters of water for half an acre of a cocoa farm.

Bifenthrin - Akate Master 500ml/ha: Use 100ml of Akate Master in 11.0 liters of water for half an acre of a cocoa farm.

Thiomethoxam – Actara 85ml/ha: Use 17ml of Actara in 11.0 liters of water for half an acre of a cocoa farm.

Note: 11.0 Liters of water = a tank full of a motorized mist blower.

- **Time to spray against mirids**

The population of Capsids build up from August to March. It is therefore necessary to spray in August, September, October, and December.

The major disease is Phytophthora pod rot or the black pod disease caused by two species of the fungus, *Phytophthora palmivora* and *P. megakarya*

Practices such as judicious reduction of shade, regular weeding, removal of chupons and reduction of heavy canopy through pruning to admit light, draining of stagnant water in the farm, removal of mistletoes, dry pods during and between harvesting, good house-keeping coupled with improved micro-climate in the crop area reduce the incidence and severity of the disease.

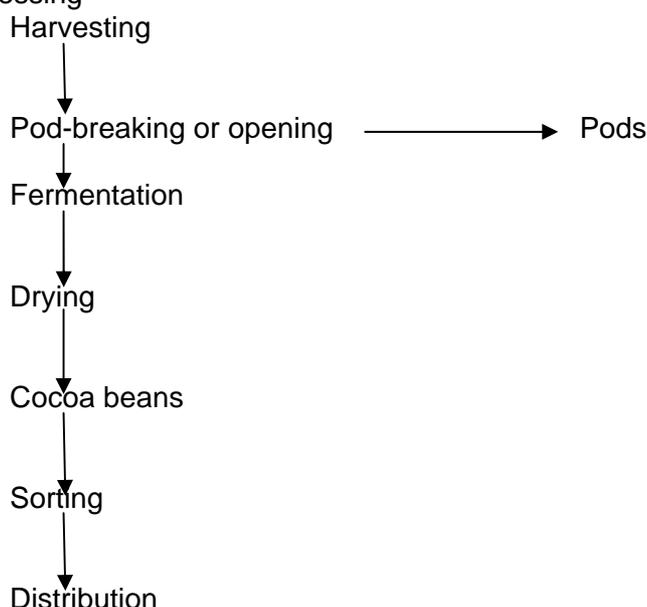
If fungicides are used, the recommended ones are the following:

Trade Name	Chemical Name	Dosage (gm/15l of water)	No. of sachets/spraying of tank	Frequency of application
Kocide 101WP	Cupric Hydroxide	100	1	3- weekly
Champion WP	Cupric Hydroxide	100	1	3- weekly
Funguran-OH WP	Cupric Hydroxide	100	1	3- weekly
Nordox-WG	Cuprous Oxide	75	1	3-4 weekly
Ridomil 66 Gold WP	Cuprous Oxide & Mefonoxam	50	1	4- weekly

3.1.3.3. Harvesting, pod breaking, fermenting and drying

Cocoa is valuable only when it is harvested and processed for sale. The production of high quality cocoa beans is the objective of primary processing operations. The principal operations are pod opening, fermentation, drying, sorting and distribution. An over view of primary cocoa beans processing is shown below in Fig. 1

Fig. 1 – Primary Cocoa processing



Harvesting and Pod Breaking

Harvesting is triggered by rainfall, and ripe pods are ready for harvesting by hand in roughly 5 months later from the flower stage. The old types of cocoa (Amelonado and Trinitario) produce their crop in two distinct peaks. It is therefore possible to separate the crops into major (October/March) and minor (April-June) seasons.

Pods are harvested as soon as they are ripe. Ripe pods for harvest are available all year round but definite peak occurs, mainly as a result of climatic factors, especially rainfall and temperature. Frequency of harvesting also influences bean quality. For the major season, cocoa should be harvested at 3 to 4 weeks (possibly 2-3 weeks interval) although some quality deterioration does occur. In the minor season cocoa

should be harvested at 4 to 6 weeks intervals. It is essential that the pods do not become over-ripe as they are more likely to become infected with diseases, and the beans inside over-ripe pods will germinate. Germinated beans in over-ripped pods tend to reduce the weight per bean. Germinated beans also become vulnerable for infestation and mould development. Evidence to date suggests that Ochratoxin "A" producing organisms enter the cocoa supply chain via damaged pods. To reduce Ochratoxin "A" in the cocoa supply chain, it is recommended that farmers do not inflict injury to the beans with a machete or any sharp object or equipment during harvesting. Injured or bruised pods of any kind should not be stored for any longer than one day.

Pods are broken by means of a blunt cutlass, club or by knocking or hitting against a stone or against another pod.

Fermentation and Drying

The fresh beans are scooped with the hands from the pods and heaped on a mat of clean banana leaves (perforated to allow drainage of sweatings) and then covered with additional leaves. The heaps are turned on the second and fourth days. At each turning and mixing the beans are placed on fresh clean leaves. For normal size heaps of about four to ten baskets, fermentation is completed in six days. It is important to avoid fermentation in very large heaps, because such heaps result in uncompleted fermentation. It is also possible to ferment in baskets and wooden boxes. Where wooden boxes are used, to facilitate drainage of the sweating, the box must have holes of about 0.5cm diameter at the bottom.

The fermented beans are dried daily in the sun on raised platform on a mat and not on the floor. Defective beans such as flat beans, germinated beans, clumps of mucilage and damaged beans are removed. Clustered beans are also separated and damaged beans are removed. Taking good care of the fermentation and drying processes will give you a good grade cocoa free from food safety issues.

3.1.3.4. Bagging/Quality control/Storage (Warehousing)

Cocoa beans are packaged in clean jute sacks which are sufficiently strong and properly sewn or sealed. The bags must be made of non-toxic materials, preferably food grade hydrocarbon-free jute bags. Once the drying, grading has been completed, the cocoa beans must be put into appropriate bags and sent to buying centers. Proper bagging and storage of the processed beans is just as important as proper fermentation and drying. Incorrect or careless bagging and storage can lead to rejection of the beans, meaning that time and efforts as well as money have been wasted. Following proper fermentation, drying and bagging, the cocoa beans are ready to be sold.

The bagged cocoa beans are placed in suitable storage sheds that are sufficiently dry, free from rain, well ventilated/aerated, free from dampness and insect pests and away from smoke and other undesirable odour/scent that would contaminate the cocoa beans. The bags must be placed on gratings kept above ground level and away from walls. The storage sheds/ depots must be kept opened for ventilation during daytime and clean at all times. and clean at all times.

. The Quality Control Company has the responsibility for inspecting storage facilities and issuing Certificates of Registration of premises (QC Form 4) to cover them. The sheds so approved are designated as scheduled centre where grading sealing and storage of cocoa takes place.. No grading and sealing or storage of produce is

allowed in any shed which has not been duly approved and/or certified. Among the criteria used for approving a warehousing facility are :

- size (capacity in metric tonnes)
- location (site)
- accessibility
- drainage of site
- ventilation of the warehouse
- space available (for bulking)
- materials used in building
- availability of tarpaulins
- scales
- ,sacks and twines.

After purchasing the cocoa from the farmer/producer, the LBCs invite the Quality Control Company to inspect, grade and seal the cocoa which is covered by a certificate of inspection (QC form 1). Staff of the Company are stationed in seventy three (73) Operational Districts within the six cocoa-growing regions, and carry out functions of inspection and sampling, grading and sealing of cocoa before evacuation (Evacuation Certificate used is QC Form 1b) to the take-over centers for subsequent shipment. Any cocoa shipped is covered by a Purity Certificate (QC Form 6) and a Fumigation Certificate are issued. Any infestation must be dealt with by proper and approved methods of spraying, fogging or fumigation. Cleaning and maintenance of the storage area and rooms are essential to ensuring produce integrity.

3.1.3.5. Primary and Secondary Evacuation to the District Depot and Take-over centers - Transportation

It is important that safety hazards must be avoided during primary evacuation to the district depot as well as the secondary evacuation from the district to the port. Hazards can occur when the beans are left in the sun without cover or left in the rain. Contamination may occur when farmers transport beans in taxis together with other food and non-food items or other merchandised items transported at the same time or from previous transport.

All vehicles used in transportation are inspected before loading and vehicles should be clean and free from any contaminants from previous haulage (cement, poultry feed, chemicals etc)

At the take-over centers at Tema port, Takoradi port and an inland port at Kaase, Kumasi, the beans are check-sampled by QCC port staff to confirm the integrity of the graded cocoa from upcountry centres. Any parcel that falls below the standard is rejected. Parcels which meet the standard are taken over by CMC.. A Purity Certificate is issued for every parcel of cocoa accepted and taken over.

3.1.3.6. Shipment

Cocoa beans should be well prepared, free from infestation and off-flavours. Cocoa is either shipped in containers or in bulk.. Another check-sampling is conducted by the Quality Control Company for all consignments prior to shipment to ensure that only good quality cocoa is exported. A Purity Certificate (Purity Certificate for cocoa taken over at the ports, QC Form 1d) is again issued for every consignment passed for shipment.

During shipment, only cocoa beans should be stored in one location of the cargo vessel. Highfire-risk materials, hazardous or poisonous chemicals, should never be stored with cocoa beans. Containers for cocoa shipment should be clean and free from residue of previous cargo. Containers should not have been used to carry chemicals or other materials giving off strong odours.

3.1.3.7. Local Marketing and export of cocoa

General information:

The busiest export season runs from November to April. Cocoa bean exports account for about 40 percent of the country's foreign exchange earnings and provide the second largest source of export revenue. Information from the Bank of Ghana indicates that export receipts of cocoa beans and products for the first quarter of 2011 amounted to \$859.4 million accounting for about 61 percent of total export earnings as compared with \$682.5 million for 2010 which was 48.8 percent.

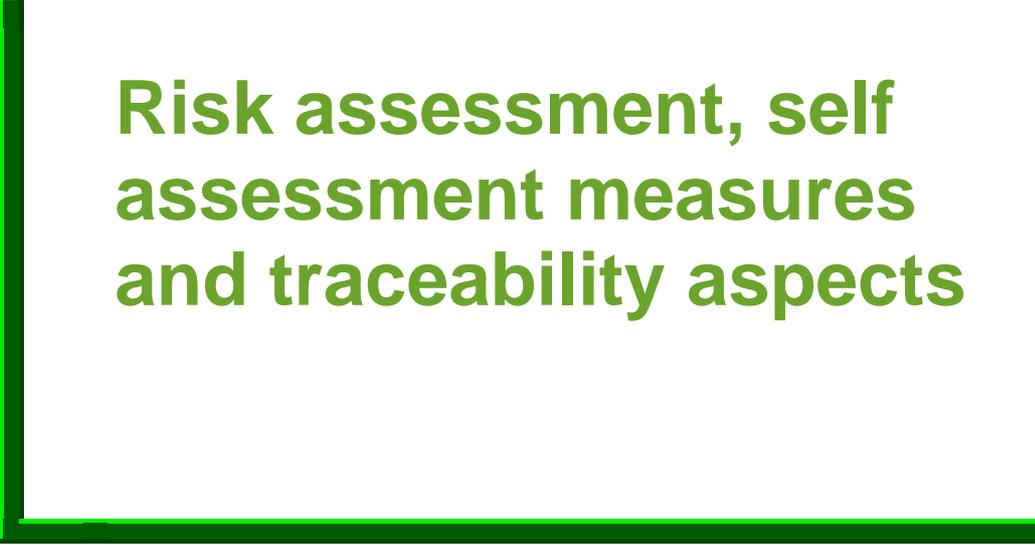
The major destinations of Ghana's cocoa beans are the EU USA, (Holland, UK, Germany, Belgium, France and Spain), Asia (Japan, , China, India etc), Brazil and US.

The bulk of the cocoa bean output in Ghana is exported either as dry bean. COCOBOD usually sells the smaller size (light crop category cocoa beans) to processing industries in the country at a discount. The main processing companies are the Cocoa Processing Company (CPC), Barry Callebaut, Afrotropics, Cargill and Archer Daniels Midland (ADM). There is primary processing into the pastes, butter and nibs and there is secondary processing into confectioneries and chocolates. The Cocoa Processing Company (CPC) operates with an expanded installed capacity producing chocolates and cocoa-based sweets and other products for exports and local consumption. The total installed capacity for processing cocoa is 343,000 metric tons. These cocoa processing companies in Ghana process the cocoa beans into primary products, such as, liquor, butter, powder and cake. About 90% of all processed cocoa is exported whilst the remaining ten percent is used in the production of confectionery products.

Locally there are about ten (10) companies that produce cocoa confectionery products, such as, chocolate, cocoa beverages, cocoa powder and other chocolate candies, ice cream, and chocolate drinks.

References:

- Cocoa Manual: A Source Book for Sustainable Cocoa Production – Tafo. Cocoa Research Institute of Ghana 2010.
- ICCO Consultative Board -Guidelines on best known practices in the cocoa value chain - CB/16/2/Rev.1 17 April 2009
- GAIN Report Number GH1202



Risk assessment, self assessment measures and traceability aspects

General points

Risk assessment is a process which involves:

- Identifying hazards (chemical, biological or physical).
- Analysing or assessing the risks related to a hazard.
- Determining the appropriate means to eliminate or control these risks.

In the context of the Guide, a hazard is defined as any biological, chemical or physical agent (presence of a foreign body) or quality defect which could lead to non-conformity with respect to commercial quality requirements, food safety requirements or traceability requirements applicable to any food or ingredient meant for human consumption considering the governing legislation.

3.1.4.1. Production stage



What do you need to know?

- There are concerns by consumers about levels of pesticide residues, mycotoxins, poly-aromatic hydrocarbons (PAHs) and heavy metal contamination in cocoa •
- MRLs for pesticide residues are in place for cocoa in importing countries and regions e.g. EU and Japan whilst for other contaminants eg heavy metals, legislation is still being debated.
- In the production stage, it is possible that your site may be located in areas where illegal mining activities (galamsey) may be very high leading to possible contamination of the soil and water with heavy metals. (Lead -Pb, Cadmium -Cd, Mercury –Hg and As)
- Pests and diseases incidence in cocoa is high in all production areas and plant protection products have been used for over 50 years or so to control them. Care however, need to be taken in the interpretation of the dosage given on the label of the pesticide container and if the operator is poorly trained there is the risk of over-application.
- For the optimum production of cocoa, farmers have been advised to apply full package of

recommended PPPs from CRIG. Pests are controlled 4 times using recommended pesticides while diseases are controlled 5-6 times a year. In addition, farmers use fertilizer to improve productivity. The source of fertilizer is a potential cadmium contamination as evidence in the fruit sector has shown that cadmium contamination has been linked to fertilizer use.

- Several PPPs are available in the open-market and there is therefore potential higher risk of unapproved chemicals being used at some stage by farmers given that there is no exclusive market or sales outlets for cocoa approved agrochemicals. There is also a further risk of the use of unapproved agrochemicals on cocoa because the approved ones are relatively expensive than the unapproved ones. The use of non-authorised PPP treatment in your farm can lead to rejection of a whole consignment of produce from Ghana at the EU
- The Ghanaian market is flooded with all types of pesticides applicators many of which have not been screened and approved for use by the Cocoa Research Institute of Ghana. This is largely because the applicators are not exclusive for cocoa alone. The unapproved spray equipment for cocoa may not be appropriately calibrated for use in cocoa increasing the risk of applying higher doses than the recommended and hence exceeding the MRLs.
- MRL can be exceeded when the label instructions in terms of dose/ha, pre-harvest interval (PHI), with the number of applications, incorrect application and anomaly in the product active ingredient and concentration are not observed carefully.
- Poor house-keeping of farm may lead to farm-over-run with pest/diseases, prompting excessive use of PPP to “kill” the scourge resulting in MRL exceedance.



What do you need to perform?

Requirement level

<ul style="list-style-type: none"> • Carry out risk assessment of any new site or the existing site where activities ('galamsey'- mining sites illegally using heavy metals to pollute the environment) pose food safety problems. The factors to consider are: Look out for Local regulations or policies on farming; key informant history, previous crop, landfill or mining sites; soil; water adjacent farming activities, contamination from water. 	Major
<ul style="list-style-type: none"> • Carry out soil, surface and ground water analysis of site if historical activities such as illegal mining of polluted streams run through the farm or pose food safety problem 	Minor
<ul style="list-style-type: none"> • Train producers to implement GAP particularly IPM – pruning, farm hygiene, weeding, removal of diseased pods etc) to mitigate the risks of over reliance on pesticide 	Major
<ul style="list-style-type: none"> • Keep an up-to-date list of all approved PPP used in cocoa production and demonstrate knowledge in their use. 	Major
<ul style="list-style-type: none"> • The growers or the contracted staff who apply pesticide must be trained and conversant with the preparation of spray solution. 	Major
<ul style="list-style-type: none"> • Calibrate all spray equipment and scales used in production. 	Major
<ul style="list-style-type: none"> • Carry out at least one pesticide analysis (per 100Ha) from a recognised laboratory.. 	Minor
<ul style="list-style-type: none"> • Records sheet detailing all PPP applied to a particular plot must be available for inspection. The list must have a history of treatment from its first application to the last together with the 	Major

observance of the pre-harvest interval. The records must be available at the farmer level and society level.



What do you need to record?

- Signed Training records indicating the nature of training, the topics covered and the resource persons used.
- Records of all fertilizer and other plant protection products applications, including the location, dates, the reason for application, type and quantity, method (foliar, or soil), and the person who applied it.
- Competency of the person handling PPPs and any training
- Records of PPP type used, date, quantity and rate of application, requisition and approval records; storage, formulation method and disposal method and location of containers
- Calibration sheets for knapsacks and mistblowers used for foliar fertilizer, herbicides, fungicides and insecticides.
- Plant population, plot identity, and variety of crop, dates
- List of approved PPPs
- Participants assessment sheet/forms of the training received
- Results of pre-training assessment test of the participants
- Results of post-training assessment test of the participants



Useful Appendices

Sample production manual for cocoa

3.1.4.2. Stage of harvesting, pod breaking, fermenting and drying

During harvesting, pod breaking and fermentation the cocoa beans may be exposed to pathogenic bacteria from the air, insects, birds, other animals and/or humans.

Assuming the beans are undamaged and whole, the bacterial contamination will remain on the surface/shell of the beans



What do you need to know?

- Raw cocoa as a commodity can be potentially contaminated with *Salmonella*, because of the condition under which they are harvested and fermented.
- The harvesting process starts with the selection of the ripe pod at the right stage of maturity to reduce the incidence of ochratoxin. Un-ripped pod should never be harvested.
- The use of the right equipment for pod breaking is crucial in the prevention of damage to beans which pre-dispose beans to attack by mycotoxins (ochratoxin A)
 - Worker and equipment hygiene is important to prevent contamination of produce at the time of harvest. Baskets, sacks, plastic and metal bowls and harvesting equipment stored where there is a risk of contamination with crop protection products, fertilizers, other toxic products stored with containers.
 - Germination and infestation problems begin to manifest when pods are left on the tree for longer periods. It is advisable to open the pods with *wooden baton instead of machete that may cut or damage the shell of the seed, allowing mould and insect infestation.*
 - *Proper hygiene of personnel is crucial to prevent the contamination of produce at time of harvest.*
 - *Bean contamination may occur if dirty or contaminated harvesting containers are used to transport or temporarily store dried beans.*
 - Workers need to have access to clean sanitary facilities.
 - Harvested produce must be fermented and dried in clean areas

Main hazards at this stage

- Risk of biological contamination from insect infected beans, black or diseased beans, from injuries and damage to pod/beans.
- Risk of biological contamination from personnel handling produce and containers.
- Risk of chemical contamination not observing PHI, heavy metals and mycotoxins from mould infestation
- Risk of physical contamination, from metals, jewellery, stones, dust/soil, extraneous foreign matter.



What do you need to perform?

Requirement level

- *Carry out Hygiene risk assessment of personnel, equipment and transport.*

Major

- *Provide regular training in hygiene for all personnel who come in contact with the beans*

Minor



What do you need to record?

- Time of spraying and time of harvest (PHI), pod breaking and time of fermentation
- Time of drying
- Employee files (If any, personal record)
- Employee hygiene training (If any, personal record)
- Regular checks, maintenance program and service files.



Useful Appendices

Useful appendices

3.1.5.1. Some traceability tools

In view of increasing consumer awareness of food safety issues, traceability has become a legal requirement for all exporters to the EU (EC 178/2002). Markets now require minimum residue levels of pesticides, mycotoxins, heavy metals etc, in cocoa beans. To be able to trace the source of contamination, the cocoa beans must be traceable from the farm to the consumer. Increasingly, countries are imposing stricter food regulations driven by consumers' demand for food that is safe for consumption worldwide. Ghana cocoa is traceable to the society level, however, some farms that are UTZ, Rain Forest Alliance or Fairtrade certified are traceable to the farm level.

Although existing traceability systems as indicated on the bags meet the EC 178/2002, there is the need to go further to the farm level to be able to identify communities of farms that persistently have their produce exceeding the MRLs. Existing general traceability has the following: National ID –Ghana Cocoa Board, Produce of Ghana Cocoa, Drop Mark: AGL/WR/012/02. AGL = LBC; WR = Region; 012 = District; 02 = Community.

The following need to be captured along the supply chain to have an effective traceability system.

3.1.5.1.1. PRODUCTION ACTIVITIES REGISTER

- Records on the site history
- Farm record (Labor, plant protection products and fertilizer used)
- Name of farmer or farm (owner of farm) and farm size.
- Farmer code:
- Location of farm, District, Region:
- Phone:
- Address:
- Name of society, members of the group, total acreage of the society, estimated production. LBCs purchasing dried produce:
- General Records (Variety, planting date or year, last season's production:
-

3.1.5.1.2. REGISTER OF PHYTOSANITARY TREATMENT

Farmer name: Farmer code:
Crop: Variety:
Acreage: Plot No:
Date of application,
Product name and active ingredient,
Reasons for application,
Total amount of product,
Dosage per vol. of water,
Pre-harvest interval,
First harvestable date,
Operator name,
Machinery used,
Authorization
ICCO Cocoa Pesticides List of banned chemicals
List of pesticides approved for use in Ghana
List of banned plant protection products in Ghana

3.1.5.1.3. REGISTER OF FERTILIZATION

Fertilizer application: plot number or the field, date, types and concentration of fertilizer (foliar or solid), quantities applied, method of application, person applying

List of solid and foliar fertilizer approved by COCOBOD

3.1.5.1.4. HARVEST REGISTER

Name of Farm
Farm code:
Location :
Cocoa District:
Plot Number:
Passbook number of the farmer
Variety
Date or Week of harvesting
Kg of dry produce
Sales ledger book (Purchasing Clerk)

**3.1.5.1.5. FORM FOR RECORDING
TRAINING/AWARENESS-RAISING**

TRAINING RECORD

[LETTERHEAD LBC] WORKER TRAINING			
DATE:	NAME OF TRAINER:	SIGNATURE:	
TRAINING TOPICS:			
No.	NAME OF WORKER	STATUS	SIGNATURE OR MARK
1.			
2.			
3.			
4.			

**3.1.5.2. Checklists for self-assessment and
inspection**

Production and harvesting of cocoa (see above)

3.2

Warehousing, evacuation and Shipment of cocoa beans



3.2.1

Risk assessment and self-assessment measures



3.2.1. Warehousing stage

□ General points

In the case of COCOBOD, warehousing starts from the shed of the Licensed Buying Companies (LBCs) till the beans are evacuated to the take-over centres at Tema, Takoradi and Kumasi. Upon reaching the take-over centres, the beans are received by warehouse managers of Cocoa Marketing Company who cross check whether the number of bags matches those on the way bill. The received beans are check – sampled for Quality conformity and when accepted are then stacked separate from other bags for easy traceability after which they are ready for shipment.

It is known that raw cocoa beans can take the odours and other airborne particles that they come into contact with. Besides this, there are also reports from buyers that 4% of cocoa beans have an insect infestation, hence the storage of cocoa beans whether at the farmer level or at the LBCs or at the take-over centres is of major concern as the risk of contamination is high. Poor warehousing or storage conditions can

- allow pest access and infestation
- create moist/damp or dusty environments from lack of proper ventilation for growth and proliferation of opportunistic micro-organisms.
- expose the bags and for that matter the beans to birds, rodents and animal faeces
- expose the dried beans to contamination with non-food items.



What do you need to know?

- Trace all bags brought to the warehouse.
- The warehouse (Purchasing Clerk Shed, District Depot and Take-over centres) must be built with sound and robust material with sufficient illumination either artificial or natural and rain proof to prevent any wetting of the beans
- Bags that are stored close to walls can allow pests to hide unnoticed in storage areas, creating ideal breeding and nesting sites.
- Storing bagged beans on the floor (i.e. instead of on gratings/pallets) increases the risk of the cocoa beans re-absorbing moisture, (cocoa beans are highly hygroscopic) damage and potential contamination by pathogens from flooding in storage areas. Cocoa bags are to be stored on gratings that are about 8cm off the ground.
- Droppings from birds, bats and pets could contaminate packaging materials if the materials are not properly stored in the warehouse.
- The integrity of the cocoa beans needs to be protected at all times from the potential risks

of contaminants including agrochemicals and smoke from kitchen fire.

- The risk of contamination of the dried beans from fertilizer is high especially if old fertilizer bags are used in storing the dried beans. Where plastic bags are used there is the risk of condensation that could cause the beans to go mouldy.
- Storing other items (food, fuel, pesticides, detergent/chemical disinfectants, etc) are potential sources of cross contamination of cocoa beans
- To prevent cross-contamination, the warehouse, storage facilities and equipment (scales, sacks, tarpaulins, gratings, walls, floors, etc.) must be cleaned or maintained according to a pre-determined cleaning schedule.
- Only chemical agents approved by COCOBOD shall be used in disinfesting of the warehouses.
- Where artificial lights are provided in a warehouse, to prevent breakage and contamination of glass, such fixtures are to be protected.
- Access of all animals including pets, reptiles, pests should be restricted to prevent possible contamination with their droppings and urine.
- Using non-food grade paints on the gratings and walls are potential source of contamination of bagged beans.
- All plant protection products used to control pests must be approved for use on cocoa beans and are officially registered by EPA and approved by COCOBOD.
- The person who applies the PPP in the warehouse must be well trained and capable of demonstrating his competence.
- Clean toilets with hand washing facilities (running water and soap) are to be provided in the vicinity of the warehouse for workers.



What do you need to perform?

Requirement level

<ul style="list-style-type: none"> • <i>Make sure that the warehouse design and construction is sound, robust and complies with the specification of Quality Control Company Ltd and GMP/GHP (code of good sanitary/hygiene practice)</i> 	Major
<ul style="list-style-type: none"> • <i>Provide concrete floors and walls, smooth without cracks, fissures which can be cleaned easily.</i> 	Minor
<ul style="list-style-type: none"> • <i>Floor, walls, gratings and other storage equipment are cleaned and disinfested before and after the cocoa season</i> 	Major
<ul style="list-style-type: none"> • <i>Check for no evidence of storage of items other than cocoa beans (food, oil, fuel, motorbikes etc)</i> 	Major
<ul style="list-style-type: none"> • <i>Maintain and clean all equipment, clean the outside environment, remove cob webs, bird's nest, etc and white wash the walls and gratings immediately after every evacuation.</i> 	Minor
<ul style="list-style-type: none"> • <i>Protect or shield of all light bulbs (in places with electricity) and other glass in the warehouse to prevent glass falling into bags case of breakage.</i> 	Major

<ul style="list-style-type: none"> • Register all incoming batches of cocoa beans with the following information: product, quantity, society/community of origin, date and signature of person who delivered it. 	Major
<ul style="list-style-type: none"> • Store beans in clean and hygienic area and on gratings made of dry wood. 	Minor
<ul style="list-style-type: none"> • Seal off or screen-off all ingresses to prevent the entry of pets and other animals, birds, rodents into the warehouse. 	Major
<ul style="list-style-type: none"> • Monitor and assess pest or animal activities (birds, insects, animals, reptiles and rodents,, bats). 	Minor
<ul style="list-style-type: none"> • Provide on request an up-to-date list of approved PPP for fumigating or fogging, spraying on stored beans. 	Minor
<ul style="list-style-type: none"> • Record all fumigants and other plant protection products used indicating the following: batch of produce treated, application dates, product trade name and active ingredients, quantity applied, reasons for application and who did the application). 	Major
<ul style="list-style-type: none"> • Do not store any PPP in the warehouse or prevent 'leakage' of chemicals from the chemical store to the warehouse. 	Major
<ul style="list-style-type: none"> • Provide clean toilets and hand washing facilities with running water for the warehouse workers 	Minor
<ul style="list-style-type: none"> • Provide changing facilities and PPEs for loaders, sorters 	Recommended
<ul style="list-style-type: none"> • Identify, signpost and show the plan of all rodent baits or traps in the warehouse 	Recommended
<ul style="list-style-type: none"> • Set up a monitoring system for pests, rodents, birds etc. 	Minor
<ul style="list-style-type: none"> • Remove all waste material and rubbish in the warehouse. 	Minor
<ul style="list-style-type: none"> • Store bales of bags an orderly manner on pallets 	Recommended



What do you need to record?

- Cleaning and maintenance of the warehouse (dates needed, cleaning procedure and aids used).
- Glass handling procedure in the warehouse.
- Procedure and Records of monitoring of pest activities and control
- Records of fumigants and other plant protection products used in the warehouse. Record the following: batch of produce treated, batch number of chemical, application dates, product trade name and active ingredients, quantity applied, reasons for application and who did the application).
- No. Of baits, types, pest no and types eliminated



Useful Appendices

CPC Sec. 515.750 Cocoa Beans – Adulteration by Mould, Insect Infestation and mammalian Excreta

3.2.1.1. Warehouse Personnel

□ General points

Proper hygiene of all employees is very crucial in food safety and compliance with all hygiene measures is necessary to reduce food safety lapses. It is the responsibility of management to ensure that all category of workers whether casual or permanent are fully aware of food safety and sanitation practices that are pertinent to their jobs. Training/coaching must be continuous.



What do you need to know?

- There is the need to perform a hazard and risk analysis which must include physical, chemical and microbial contaminants.
- Workers are to be clean, behave in a clean manner while at the warehouse. Workers are to wash their hands regularly, prior to start of work and after visiting the toilets. They are not to smoke or eat, or drink in the warehouse but can only do that in a confined or a designated area outside the warehouse.
- The company shall have a guide and spell out a code of good sanitary/hygiene and handling practices that must be implemented and maintained



What do you need to perform?

Requirement level

<ul style="list-style-type: none"> • <i>Display signs of NO SMOKING, NO EATING, NO DRINKING, NO KEEPING OF FOOD consciously</i> 	Minor
<ul style="list-style-type: none"> • <i>Dispose of all waste using containers exclusively for that, such areas must be cleaned.</i> 	Minor
<ul style="list-style-type: none"> • <i>Carry out Hygiene risk analysis covering physical, chemical and microbial contamination.</i> 	Minor
<ul style="list-style-type: none"> • <i>All workers in the warehouse are trained in warehouse management, hygiene and food safety</i> 	Major
<ul style="list-style-type: none"> • <i>Workers shall dress adequately in clean and the prescribed working gears</i> 	Recommended
<ul style="list-style-type: none"> • <i>Record and make all visitors aware of the need to follow all hygiene instructions and guide them to comply</i> 	Minor



What do you need to record?

- Inspection report of compliance of workers with prescribed behaviour and signs of no smoking, eating or chewing or drinking clearly displayed at the warehouse and workers trained in hygiene of packhouse.
- Documented risk assessment and procedure for the bagging, packing and loading of beans.
- Training records (warehousing, hygiene, food safety) to prevent physical (stones, insects, knives, watches, mobile phones), microbial and chemical contamination of the beans.
- Records of non-compliance and corrective measures put in place.
- Records of cleaning and maintaining hand-washing and toilet facilities in good sanitary/hygienic condition
- Sanitary/hygienic cleaning procedure warehouse and contact surfaces including containers and vehicle for transporting crop.



Useful Appendices

3.2.1.2. Warehouse equipment and raw materials

□ General points

Material and equipment are contact surfaces that come into direct contact with food at various points of the value-chain with the potential for contamination and cross-contamination. Maintaining these items in high sanitary/hygienic conditions at the point of contact with the food is an indispensable requirement for food safety. The essence here is that these items are safe, legal and meet your standard. Only materials from approved sources must be used and their origins should be traceable.



What do you need to know?

- Suppliers of equipment must agree with the conditions of supply listed by you. There must also be a system of material inspection and record-keeping.
- You need to have agreement on the requirements covering the quality and safety of items supplied at each stage in the supply chain.
- All equipment should be sound and kept in a good state of repair.
- The material for construction of equipment must be of high quality and capable of performing its function without flaking or chipping-off sharp metal pieces.
- The equipment must be maintained clean and in good condition so that they cannot contaminate the dried beans.
- There is the need to provide training for workers to use only clean containers to fetch produce, and also the approved bags and those containers and tools that are clean and in good condition.
- All dirt and filth are to be removed and containers (gratings, baskets, bowls, bags) and tools suspected of being in contact with fecal material, bird droppings must be washed and disinfested with the approved chemicals before it is used.
- It is essential to identify containers for waste or inedible or dangerous substances and mark them as dangerous.
- All spray, fogging or fumigation equipments are to be calibrated seasonally before being used.
- A pest control mechanism must be put in place to reduce the incidence of rodents and other vermins which may come along with the supplied items.

- Spayers Residual chemicals after spraying must be drained from the machines and the machine properly washed.



What do you need to perform?

Requirement level

<ul style="list-style-type: none"> • <i>Clean all reusable materials (vehicles, bags, baskets) used for transport of produce. They are to be used solely for cocoa and maintained to prevent cross-contamination or contact with the soil, dirt, fertilizer or plant protection products. .</i> 	Major
<ul style="list-style-type: none"> • <i>Record all cleaning agents and disinfectants used for cleaning</i> 	Major
<ul style="list-style-type: none"> • <i>Calibrate equipment (scales, foggers, sprayers etc.) used.</i> • <i>Procedure for sanitary/hygienic cleaning of contact surfaces prepared and maintained</i> 	Major
<ul style="list-style-type: none"> • <i>Stock adequate and only approved food grade detergents, sanitizers and cleaning aids</i> 	Minor



What do you need to record?

- Cleaning records
- Calibration records
- Training records
- Instruction for preparation of cleaning agents
- Results of swab test of air, contact surfaces of microbial load and profile.
-



Raw materials

□ General points

Raw materials such as bags (sacks) labelling ink, gratings, etc purchased which are critical to safety of the dried beans need to conform to defined requirements. There is the need to have procedures for approval and monitoring all raw materials. All such materials shall be assessed critically for any food safety lapses. Raw material must be supplied from credible suppliers who are pre-selected based on defined performance criteria and can supply raw material in compliance with agreed customer specification at the right price and time.



What do you need to know?

- *Specifications exist for raw materials labelling ink, bags (sack)s, wood and paint for gratings.*
- *Suppliers with certified food safety systems such as HACCP system in place are guaranteed sources for both high quality and food safety compliant.*
 - Bags made with inappropriate material (polyethylene bags) can contaminate food from residues from chemicals in the bags leaching on or into the beans.
 - Where old bags are re-used, there are potential contaminants from what it was used for. Some sacks are used in areas to carry poultry manure.
 - Cocoa beans are bagged in new and clean food grade bags made of non-toxic materials free of any mineral oils.
 - Ink for labelling should be approved by COCOBOD for use. The use of unapproved ink such as the use of charcoal and old batteries (cells) will lead to the rejection of your consignment by the importer.
 - Labelling must be done on empty bags without beans to avoid spillage or leakage on beans.
- Labelling must be unique so as to facilitate lot identification and traceability



What do you need to perform?

Requirement level

<ul style="list-style-type: none"> Check for compliance with the requirements for jute sacks labelling in, paint for gratings and other packaging materials used. 	Major
<ul style="list-style-type: none"> Keep a file on specification of raw material kept by LBCs 	Major
<ul style="list-style-type: none"> Keep a copy of raw material supply contracts for fertilizer, PPP, bags etc.(Raw material assessment) 	Minor
<ul style="list-style-type: none"> Conduct a second party audit of supplier if they are food safety compliant. 	Minor
<ul style="list-style-type: none"> Prepare and sign a supply contract with input suppliers spelling out specification and supply conditions to be met. 	Minor



What do you need to record?

Specification of all raw materials used.

Copy of signed supply contract for inputs

List of credible input suppliers, and type of inputs, profile and performance ranking

Visual assessment of bags at time of receipt, and seal integrity

Number of bags received and quality, source and description physical conditions

Details of ink used in labelling bags and source

Unique Lot identification code and description





Useful Appendices

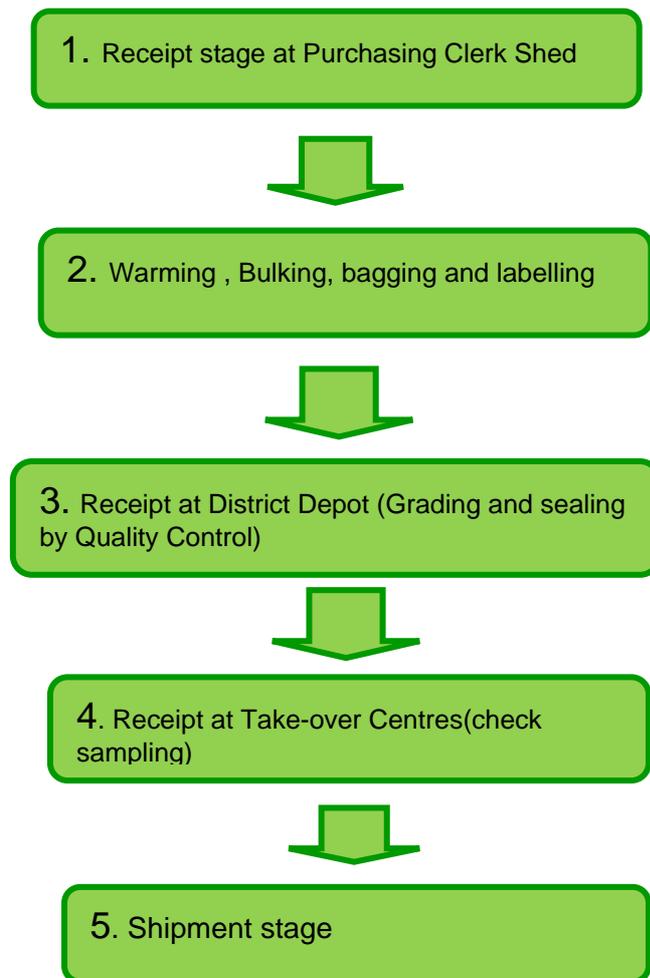
3.3

Generic diagram of the receipt process



General points

The process below includes the operations performed in order to collect, transport and deliver the dried cocoa beans to the Purchasing Clerk's shed, District Depot and Take-over centres. It starts with the dried beans being aggregated at Purchasing Clerk's Shed at the farming community level or the society shed. This is the first point of direct contact and transaction exchanges between the producer/farmer and the buyer or its representative.



3.3.1. Receipt stage: at Purchasing Clerk's shed:

The purchasing clerk works on behalf of the LBC for a commission and purchases produce from various farmers or farmer associations. The produce is checked and assessed for quality based on aesthetic or sensory attributes of (visual, texture, astringency, colour, flavour and wholesomeness) and weighed. The produce is accepted if it meets the expected criteria of COCOBOD, but may be rejected and re-dried where necessary if moisture is found to be too high, sorted, bulked, labelled and bagged. The bagged dried beans are then evacuated from the communities to 'Cocoa District' depots.

For documentation purposes there is the need to have the following information:

- Farmer data (name, code, passbook number, volume and value). The information is very important for tracking production record and estimate farm inputs requirement for a sustainable production. It also helps to build a database on participating farmers.
- Society drop marks showing details of: Company name, Region, District and Society identities.
- Vehicle Waybill (with vehicle particulars and information about the cocoa being evacuated to the district depot)

3.3.2. Receipt stage at District Depot for Grading and sealing;

The dried beans from the clerk's shed are received at the District Depot, and then arranged according to the society origin, in lots of 30 bags with all the detailed information. Staff QCC are invited by the LBCs to inspect grade and seal the cocoa into Grade I, Grade II or substandard beans. QCC uses approved chemical for disinfestation of cocoa and warehouses cocoa storage.. Graded cocoa is sealed for secondary evacuation from district depots to ports where CMC receives the beans for onward export. The major risks posed are non-compliance with good agricultural practices (GAP) and label instructions, including improper or illegal use of PPP's.

3.3.3. Receipt stage at Take-over centres (Check Sampling and , and issuance of purity certificate,; weight check)

Cocoa arrivals at the take-over centres/ports are accompanied by the detailed information captured at origin and particulars of the delivery vehicle. The bags of graded cocoa are offloaded onto stacks according to history of all arrivals. By doing it this way the traceability of beans is not lost. During offloading CMC staff physically count and verify the consistency of information on the waybill. QCC staff further samples to check the quality standard and and issue purity certificate. The produce is stored temporary and exported on FIFO a first-in-first-out inventory management principle

All rejected cocoa bags are returned to the discrepant depot of the LBC where they are reconditioned for subsequent grading and sealing.

3.4

Risk assessment and self-assessment measures

3.4.1. Receipt stage Purchasing Clerk's shed



What do you need to know?

- You need to be able to trace all produce received. Traceability will enable you recall or withdraw cocoa bags that have food safety or quality problems. Risk of contamination of stored bags with other materials
- Risk of mouldy beans arising from improper drying or re-wetting and storage conditions..
- Risk of admixing of dried beans with faecal material from birds and rodents during recondition and also storage
- Risk of contamination of beans with rodent urine.



What do you need to perform?

Requirement level

<ul style="list-style-type: none"> • <i>Properly sew and label all bags with non-toxic material. Check for traceability.</i> 	Major
<ul style="list-style-type: none"> • <i>Conduct hygiene and cleaning checks at the store/shed/warehouse</i> 	Minor
<ul style="list-style-type: none"> • <i>Check for Moisture content (mouldiness and dryness)</i> 	Major
<ul style="list-style-type: none"> • <i>Check aesthetic or sensory (visual, olfactory, touch or texture, taste/flavour, astringency) quality of dried cocoa beans relative to prescribed attributes</i> 	Major
<ul style="list-style-type: none"> • <i>Accept or reject cocoa beans based on quality assessment and separate lot</i> 	Minor
<ul style="list-style-type: none"> • <i>Distribute adequate new jute sacks for bagging/re-bagging of the dried beans bought</i> 	Minor
<ul style="list-style-type: none"> • <i>Prepare goods receipt invoice covering quantity and value</i> 	Recommended
<ul style="list-style-type: none"> • <i>Prepare payment vouchers to be signed by payee</i> 	Recommended



What do you need to record?

- Cleaning and disinfestation schedule for floors, walls, containers etc
- Cleaning records showing when/frequency, place and procedure, concentration, temperature and condition for cleaning
- Moisture content of beans
- Hygiene procedure and implementation schedule
- Training records on hygiene
- Payment vouchers signed by payees
- Quantity and value of beans purchased and details of source
- Results of quality checks on prescribed parameter or attributes
- Record environmental and storage conditions(humidity, temperature, illumination)) at the point of business transaction



Useful Appendices

3.4.2. Receipt stage at District Depot Sorting and Grading stage



What do you need to know?

- You need to be able to trace all produce received. Traceability will enable you recall or withdraw cocoa bags that have food safety or quality problems Produce is to be graded and sealed by the Quality Control Company Ltd.
- Risk of contamination of stored beans from storage with other materials (chemicals)
- Risk of mouldy beans
- Risk of admixing of dried beans with fecal material from birds and rodents
- Contamination from, rodenticides, fumigants or other pesticides used in controlling pests at the Depot
- Failure to observe and comply with label instructions of PPP's, application of non-registered PPP, application of illegal PPPs or use of formulation from non-authentic sources, wrong application or use of equipment, wrong calibration may lead to the exceedance of MRLs.
- Physical risk from contamination with glass, metal (splinters, blades, broken needles, pieces of worn tools), plastics, stones (from improperly maintained warehouse), wood (splinters from pallets).
- Disinfestation of depot for storage of dried beans must be done by QCC with approved PPP
- Storage of cocoa beans must comply with the FIFO rule; i.e. first-in-first-out rule
- Depot for storage of dried cocoa beans must be approved and certified by QCC
- The timing of the fumigation of the depot, the correct preparation of PPP is key to its effectiveness.



What do you need to perform?

Requirement level

• <i>Produce must be traceable back to and trackable from the registered farm (one step up, one step down)</i>	Major
• <i>Check for evidence of cleaning and good hygiene in the store/shed/warehouse</i>	Minor
• <i>Provide an up-to date list of pesticides allowed for treating stored produce</i>	Minor
• <i>QCC grades and seals cocoa</i>	Minor
• <i>Fumigation or fogging of warehouse by QCC staff</i>	Minor
• <i>The Technically responsible person for application is able to demonstrate competence in the use of pesticides</i>	Major
• <i>Record all PPPs used in the storage area to control pests (date; warehouse/depot number, type of treatment (fogging, fumigation, spraying etc), trade name and active ingredient of chemical, product quantity, reasons for application and the person who</i>	Major

<i>applied it or gave the instruction)</i>	
<ul style="list-style-type: none"> • <i>Inspect beans to ensure that they do not contain contaminants from drying that were not detected</i> 	Major
<ul style="list-style-type: none"> • <i>Organize staff training sessions that cover warehouse management and hygiene.</i> 	Minor



What do you need to record?

- Cleaning and disinfection schedule for floors, walls, containers etc
- Cleaning records
- Hygiene procedure
- Training records on hygiene
- PPPs used and record of fumigation/fogging
- Records of movement of beans in and out of the depot
- Record of grading and sealing issued by QCC
- Residence time of cocoa beans for evacuation
- Goods receipt invoice and transfer or despatch invoice and waybills
- Equipment calibration and maintenance records



Useful Appendices

3.4.3. Receipt stage at Take-over centres



What do you need to know?

- Contamination of bagged beans as a result of improper use, storage, labelling of poisonous or toxic materials
- Lack of personal hygiene and non-compliance with best hygiene behaviour
- Risk of beans becoming mouldy from leaking roof or damp warehouses
- Risk of admixing of dried beans with faecal material from birds and rodents and also contamination with urine of rodents
- Weights are checked and grading and purity certificates are issued by the QCC staff.
- Incorrect choice and application of PPPs, poorly maintained equipment may lead to high residues from PPP (fumigants or other pesticides) used in controlling pests at the Depot can contaminate produce or lead to higher MRLs.
- Cocoa beans must be packed off the ground on pallets and away from the walls prevent possible contamination of produce
- Mechanism of control of pest access to warehouse using baits and screening of points of outlet/inlet must be in place.



What do you need to perform?

Requirement level

<ul style="list-style-type: none"> • <i>Produce must be traceable back to and trackable from the registered farm (one step up, one step down)</i> 	Major
<ul style="list-style-type: none"> • <i>Check for evidence of cleaning and hygiene at the store/shed/warehouse</i> 	Minor
<ul style="list-style-type: none"> • <i>Provide an up-to date list of PPP allowed for treating stored produce</i> 	Minor
<ul style="list-style-type: none"> • <i>Technically responsible person of QCC apply or fumigate bags</i> 	Minor
<ul style="list-style-type: none"> • <i>Technically responsible person of QCC is able to demonstrate competence in the use of pesticides</i> 	Major
<ul style="list-style-type: none"> • <i>Record all pesticides used in the storage area to control pests(date; warehouse/depot number, type of treatment (fogging,</i> 	Major

<i>fumigation, spraying etc), trade name and active ingredient of chemical, product quantity, reasons for application and the person who applied it or gave the instruction)</i>	
<ul style="list-style-type: none"> • Carry out a residue test of sample of produce stored 	Major
<ul style="list-style-type: none"> • Provide Quality control inspection records (grading, weight and purity certificate) 	Recommended



What do you need to record?

- Traceability records
- Cleaning and disinfection schedule for floors, walls, containers etc
- Cleaning records
- Hygiene procedure
- Training records on hygiene
- Pesticides used
- Residue test



Useful Appendices

3.1.5. Evacuation (transportation) stage



What do you need to know?

- Pathogens or chemicals from previous loads could contaminate the cocoa bags during transport by:
 - ✓ Being circulated in the air
 - ✓ Condensation dripping onto the bags
 - ✓ Dirt or debris containing pathogens or chemical residues
 - ✓ Manure accumulation from previous poultry manure or livestock and poultry transportation.
 - ✓ Excess debris in the bucket of the vehicle creates a higher risk that foreign material could embed itself into the bags.
- Vehicles in bad state of repair create the risk of foreign material such as wood splinters, broken metal parts or glass from windows or lights penetrating bags during transport.
- There is the need to avoid safety hazards during transportation of all kinds whether by the use of commercial vehicles or hired vehicles for the purpose. Hazards can occur when dried beans are left in the rain or left along a dusty road uncovered.
- Contamination can also occur as a result of the previous use of the vehicle for the transport of hygienically hazardous substances and other merchandise such as cement, fertilizer, agro-chemical etc.
- There must be a written contract covering the state of hygiene of the vehicle, the ability to protect the beans, a guarantee that the beans will not be contaminated by other products transported at the same time or previously and that access is restricted.



What do you need to perform?

Requirement level

• <i>Have a written contract with transporter with provision for relevant procedures on food safety and hygiene.</i>	Major
• <i>Check that vehicles used for transport of bagged beans are not used for other purposes besides transport of cocoa and that they are clean, dry, odour free and maintained to prevent contamination from soil, cement, dirt, organic fertilizer, etc.)</i>	Major
• <i>Label all bags with traceability records or Drop Marks</i>	Major
• <i>Provide evidence that the vehicle used in the transport of beans have been cleaned.</i>	Minor
• <i>Protect bagged beans being loaded or transported from getting wet.</i>	Major
• <i>Guarantee that the vehicle used for the transport of beans are free from all pests</i>	Minor

- *Train or instruct all drivers and loaders on the need of hygiene and cleanliness.*

Minor



What do you need to record?

- Cleaning schedule and records
- Contracts indicating the obligations of the contractor and that of COCOBOD
- Proof of cleaning of vehicles (washing bay receipts, cleaning records etc)
- Training records
- Details of haulier (name, address, time of dispatch, time of arrival, time of loading, date of previous vehicle cleaning, place of vehicle cleaning, vehicle registration number, time and places of rest stops,



Useful Appendices

3.4.6. Shipment stage



What do you need to know?

- At the port, a batch of cocoa bags being loaded for shipment must have a history showing details of society, arrival date, offloaded date and shipment date and place, consignment/quantity and vessel



What do you need to perform?

Requirement level

<ul style="list-style-type: none"> • <i>Record the Batch being shipped with all necessary traceability records.</i> 	Minor
<ul style="list-style-type: none"> • <i>Pre-trip inspection of containers (PTI) if containers are to be used</i> 	Minor
<ul style="list-style-type: none"> • <i>EUR Certificate or certificate of origin, phytosanitary certificate</i> 	Minor
<ul style="list-style-type: none"> • <i>Inspect ship hold and ensure effective fumigation/fogging with approved PPP and trained and competent spraying gang</i> 	Major
<ul style="list-style-type: none"> • <i>Ensure ship-hold containing dried beans does not contain any other merchandize or cargo that will taint cocoa beans</i> 	Major
<ul style="list-style-type: none"> • <i>Investigate and ensure that monitoring equipment for control of critical parameters, like humidity and temperature, ventilation are functional</i> 	Major
<ul style="list-style-type: none"> • <i>Carry out pre-shipment analysis of physical, chemical, pesticide residue level (MRL), absence of insect, micro-biological and heavy metals and mycotoxins (ochratoxin) and issues release or reject results</i> 	Major



What do you need to record?

- Details of society, drop mark, arrival date, off-loading, loading and shipment date.
- Storage period and pre-shipment period or interval
- Inspection of ship and report of the inspection
- Cargo history of ship and cleaning program and verification of cleanliness
- Details on fumigation of ship-hold, date, and PPP applied and approval status.
- No of hold or space available, quantity loaded per hold and total load bags x unit weight
- Certificate of purity or release from QCC prior to loading ship
- Records of analytical results on the consignment shipped
- Storage conditions in the ship-hold loaded with the dried beans
- Bill of lading, EUR certificate, phytosanitary certificate and other relevant document of origin.



Useful Appendices

3.5

Useful appendices

3.5.1. Some traceability tools

BAGGING ACTIVITIES REGISTER

Existing general traceability has the following:

National ID – Ghana Cocoa Board, Produce of Ghana, Cocoa, Drop Mark: AGL/WR/012/02. AGL = LBC; WR = Region; 012 = District; 02 = Community. (The need to trace back to the farm level is necessary to be able to identify where problems of non-compliance come from.) to be discussed

RECEIPT REGISTER

At this stage, the produce from the various communities/PC's are received and counted. It is then entered in to the register, with dates of arrival, name of communities/PC involved and the number of bags each community/PC supplied. The register also contains the list of all communities with their drop marks.

STORAGE REGISTER

This document is also known as stack register. It records the number of cocoa bags in the warehouse at a point in time and the remaining jute sacks in the stack room.

TRANSPORT REGISTER

This also records the various vehicles that transport cocoa bags from the various communities as well as to the depot. It comes with a way bill that indicates the drivers name, driver's license number, vehicles reg. no, number of bags transported, etc.

Log Book

Haulier Section: Name of hauler, address, Timer of dispatch, time of arrival, time of loading, date of previous cleaning, place of previous cleaning, vehicle registration number, times and places of rest stops, difficulties encountered, signature and name.

CONSIGNMENT NOTE

Invoices, way bills, Trucks

FORM FOR RECORDING FOOD SAFETY TRAINING/AWARENESS-RAISING

TRAINING RECORD

[LETTERHEAD / NAME OF SOCIETY]		
WORKER TRAINING ATTENDANCE SHEET		
DATE:	NAME OF TRAINER:	SIGNATURE (STAMP):
TRAINING TOPICS:		
LOCATION OF TRAINING :		
NR.	NAME OF WORKER	SIGNATURE
5.		
6.		
7.		
8.		
9.		

3.5.2. Checklists for self-assessment and inspection(to be attached)

BAGGING AND SHIPMENT OF COCOA BEANS



Source of picture: ADAMU NBABUINE, KABIRU: Evaluating the Supply Chain of Ghana Cocoa from a Company Point of View

PART 4

Checks and sampling plan

General points

In the context of the SAG, the **concept of 'check' must be understood in the widest sense of the term**. It covers voluntary and regular verification that the SAG requirements are met (application of general hygiene principles, control measures, corrective action, traceability), in accordance with the provisions established and the sampling plan presented in the SAG Guide.

In a narrower sense, check = inspection; in other words any form of official check performed by the competent authority (or an ICB certified by this authority) to check that food safety and plant health legislation relating to the products is adhered to.

Each operator must, depending on the specific features of the organisation's system for production, harvesting, collection, packaging and shipment, perform their own **Risk Assessment**, define which checks need to be performed and establish a 'sampling plan'.

In order to avoid difficulties which may occur due to differing legal, administrative and technical approaches, and to ensure the same level of checking across all exporters, it is useful to define, at national level, the types and nature of the checks to be performed by all operators, the sampling plans to be performed and the criteria for interpreting the results.

4.1. TYPES OF CHECKS

Three types of controls are recommended in the Self-Assessment System Guide:

- ☞ A check at the LBC level
- ☞ A check at the warehouse (Take-over-centres)
- ☞ A check before shipment or loading (ship)

4.2. PERFORMING CHECKS

The different checks carried out, the data on sampling and the results of checks must be recorded and archived. Parameters and attributes checked must be operator-specific and methods used must be simple, cost-effective and timely results to be useful and facilitate decision-making at the particular operator level.

4.2.1. Check and sampling at the LBC level

Before determining what checks and samples to be made, there is the need to carry out a risk assessment. Previous reported incidences of exceeding MRLs at the Districts shall be used as a basis. The risk assessment will therefore give an indication of the number and size of samples that need to be taken, where it should be taken, and when it should be done. The sampling program needs to be pro-active and be done by the competent authority. Checks should be made whether only authorized PPP are used and records are kept by the farmers. The number of samples taken will depend on the size of production (tonnage), size of producer groups, producer historical data i.e. whether the producer has previous history of exceeding the MRLs. The bigger the number of producers in a group, the bigger the food safety risk. The agriculture system remains highly fragmented, with small-holder operators, thus poses potential and serious food safety risk which must be managed.

❑ **Documentary check**

Each operator must check the documentation that identifies and traces all products received at the station. The documentary will cover key SOPS (standard operating procedures) which will check and address fundamental issues of 5Ws; i.e. WHO, WHAT, WHEN, WHY and WHERE may be exemplified below:

The check should cover:

- ☞ The date harvested when?
- ☞ The origin of the produce, where?
- ☞ PPP used in production what, why?
- ☞ The time elapsed between harvesting and delivery at the station when/frequency?
- ☞ Identification of the farmer or Society who?

❑ **Quality control and sampling**

Each LBC/operator must perform a visual check of the basic quality of the products entering the packaging station.

- ☞ The purchasing clerk inspects the beans for the presence of foreign matter and the bean quality whether it meets the basic international and local quality criteria (product aspects: dryness).
- ☞ The check must be performed on the total quantities of produce.
- ☞ The results of the checks must be recorded and archived for at least six months.

4.2.2. Check and sampling at the District Depot Level

At the District Depot, the beans are checked by the Quality Control Officials of QCC Ltd based on established international quality criteria. Each Quality Control Official must perform the following three types of checks:

- ▶ Checking the **commercial quality of the bagged beans**
- ▶ Request for checking the **level of pesticides content of about 5% of produce???? received**
- ▶ **?????? the 3rd check is missing please insert**

Choice of analysis laboratory

The analysis of the level of pesticides, and mycotoxins and heavy metals as requested by the buyer must be performed by a laboratory registered with the competent national authority preferably the Lab of the Ghana Standards Authority for residue and heavy metal tests. It is important to select a Lab that is ISO 17025 certified. The Food Research Institute has excellent facilities and strong human resource to carry out a range of mycotoxin analysis that may be requested. It is also accredited with ISO 17025 certification ????????

Recommended choice of analysis method?????????

Wherever possible, only **methods whose reliability** (accuracy, replicability, inter and intra laboratory variations) **has been established by statistics** (validation), in **internal studies and/or by ring tests**, must be used.

PART 5

Crisis management and mandatory notification procedure

5.1. DEFINITION OF A 'CRISIS'

There is a 'crisis' when **you observe that a standard has been exceeded** or that a **regulatory specification** has not been followed, by examining the results:

- ☞ of one of your **internal checks** (visual examinations, documentary examinations, results of your measurements etc.);
- ☞ of **analyses** performed on the products by the laboratories you have contracted.

Specific examples:

Pesticide level greater than the limits set before loading at the port or upon arrival in Europe or a banned pesticide has been used.

It is your responsibility to give notification as soon as one of the set action limits has been exceeded.

5.2. MANDATORY NOTIFICATION

You are obliged to **inform the relevant authority immediately (= notify)**.

As soon as you notice the problem, you must contact the designated Control Unit by telephone, fax and/or e-mail:

Contact:.....

Address:

Tel:.....Fax:.....

E-mail:

Always confirm in writing (e-mail or fax) by sending all the basic information about your observations by sending the notification form specifically provided for this purpose, which can be found in the appendices.

5.3. WHICH ACTIONS SHOULD BE TAKEN?

CASE No 1: if the produce has not yet left your company: **block** the produce, search for them and, if necessary, withdraw and destroy them.

CASE No 2: if the produce **has been delivered to the port and is not yet loaded**

CASE No 3: if the produce has already arrived in Europe

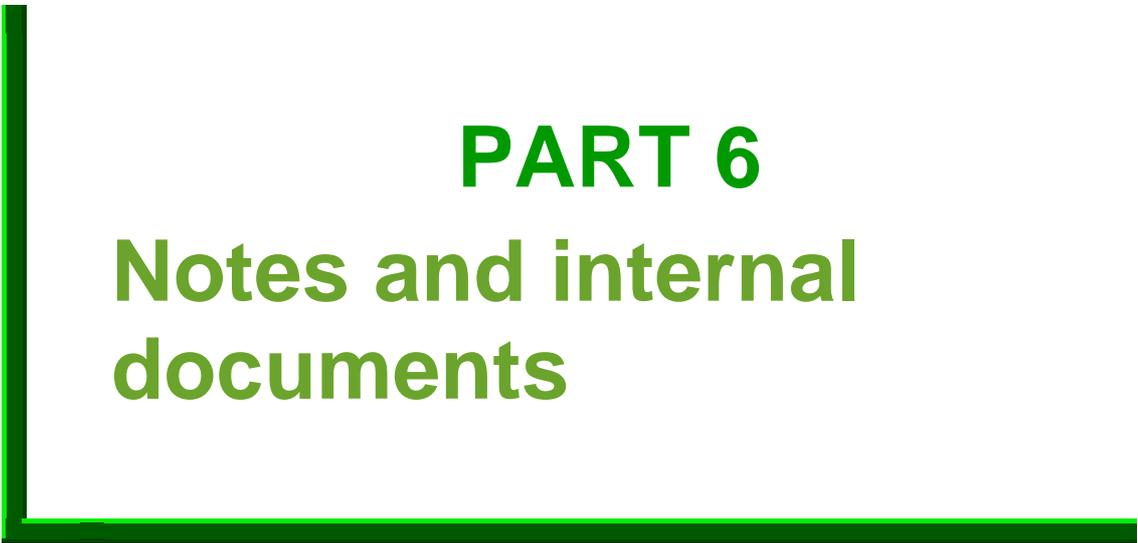
Blocking the affected batches means:

- ▶ Noting the affected batches as 'blocked' in the register.
- ▶ Clearly and recognisably identify and physically separate the blocked products from the other products.
- ▶ Affix a form for each logistics unit (for example, each container, or bulk) with the reason for the block.

Product Recall or Withdrawal information sheet

Date:	Time	Responsibility
Consignment Number: Quantity of Produce:	Batch Number:	
A short description of the incident or problem Nature of contaminant: What happened? How the contaminant gained entry?		
Describe the method of analysis undertaken to investigate the incident: Sensory: Chemical: Microbiological :		
Are reports of the analysis available?	If Yes where are they located?	If No when will they be available?
Current Status of The product	Y N	
	Product Quarantined?	<input type="checkbox"/> <input type="checkbox"/>
	Product Rejected?	<input type="checkbox"/> <input type="checkbox"/>
	Product Destroyed	<input type="checkbox"/> <input type="checkbox"/>
	Product re-worked?	<input type="checkbox"/> <input type="checkbox"/>

	Recalled from the customer? <input type="checkbox"/> <input type="checkbox"/>
Action taken by the Recall Team	
Quality manager (Name)	Signature: Date Time:



PART 6

Notes and internal documents