



**CAPACITY BUILDING PROGRAMME ON PESTICIDE RESIDUES AND
OTHER HARMFUL SUBSTANCES IN COCOA IN AFRICA**

Project Preparation Grant Report

**Prepared by Roy Bateman Ph.D
ICCO Consultant
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CAPACITY BUILDING PROGRAMME ON PESTICIDE RESIDUES AND OTHER HARMFUL SUBSTANCES IN COCOA IN AFRICA

Abstract

The regulations of cocoa consuming countries on Sanitary and Phytosanitary Standards (SPS), and the inadequate and inefficient capacity of cocoa producing countries to meet such SPS, have the potential to harm the welfare of cocoa farmers and affect the poverty alleviation programmes in a number of cocoa producing countries in Africa.

The following gaps have been identified to be addressed immediately to enhance the capacity of cocoa producing countries to meet international SPS. They are: (i) quantification of the levels of risk from contaminants affecting the cocoa supply chain; (ii) provision of specific information on pesticide science, at all levels in producer countries and (iii) infrastructure to monitor and enforce SPS standards. It is proposed that an investment of \$5,458,709 would be required to address many of these issues, by strengthening national capacity in five participating countries and developing regional co-operation in SPS. By collaborating with existing in-country and international initiatives for extension and pesticide stewardship, a substantial level of local and counterpart contribution has been identified.

The proposed project places emphasis on issues relating to Good Agricultural and Warehouse Practices and aims to put in place a sound infrastructure to monitor and prevent the occurrence of potentially harmful pesticide residues and other substances. Specifically, this will initially focus on realistic interventions for: (i) selection, trade, availability, use and residue monitoring of pesticides and (ii) drying methods and storage of cocoa beans.

1. Introduction

In September 2008, a European Union Legislation on Maximum Residue Levels (MRLs) on Pesticides (Regulation 149/2008/EEC) came into effect. The Regulation set maximum levels on the amount of pesticides permitted on imported foods including cocoa beans. Consequently, all cocoa beans imported into the EU from September 2008 must conform to the new Regulation. In the U.S.A, the Environmental Protection Agency (EPA) established the Food Quality Protection Act of 1996 which regulates the amount of pesticide residues permitted on food for consumption. The EPA also requires that all approved pesticides are clearly labelled with instructions for proper use, handling, storage and disposal. In Japan, the Ministry of Health, Labour and Welfare (MHLW) established a new legislation that came into effect from May 2006, setting new MRLs for food products.

Cocoa is of vital importance to the economies of the producing countries in Africa namely, Cameroon, Côte d'Ivoire, Ghana, Nigeria and Togo. In 2008, these countries exported about 1.3 million tonnes of cocoa beans to the EU and about 0.3 million tonnes to the USA, representing about 50% and 9% of total world exports respectively. The crop contributes major proportions of national foreign exchange earnings and regionally, providing employment to millions of people in Africa. But cocoa is still produced predominantly by a large number of resource-poor smallholder farmers. Therefore, the SPS regulations of cocoa consuming countries have the potential of constituting a trade barrier, as most cocoa producing countries may not have

the capacity to adequately meet these SPS regulations. This will disrupt cocoa trade, limit market access and have a significant economic impact on cocoa producing countries.

In light of the above, the ICCO Secretariat requested a Project Preparation Grant (PPG) from the Standard and Trade Development Facility (STDF) to engage a consultant to conduct a study to assess the ability of cocoa producing countries to meet existing international SPS standards.

The objective of this study was to review the existing SPS practices along the cocoa supply chain and to establish the capacity of cocoa producing countries in Africa to meet the food safety regulations of cocoa consuming countries. In doing this, areas of weaknesses would be identified for improvement and a project proposal will be developed to help the countries concerned to comply with the food safety requirements of importing countries, thus ensuring a continued market access for cocoa export. The methodology used for the study was the administration of structured questionnaires (see **Appendix 2**) to establish the current situation regarding SPS in the countries, followed by the visit of the consultant to the countries to discuss with the various stakeholders on the measures for improving SPS practices in the countries.

Finally, a workshop was organized in Douala, Cameroon, attended by participants from Cameroon, Côte d'Ivoire, Ghana, Nigeria and Togo to discuss and finalize the proposed project on building capacity for effective and efficient SPS practices in the countries.

The final draft project proposal on “SPS Capacity Building in Africa to Mitigate the Harmful Effects of Pesticide Residues in Cocoa and to Maintain Market Access” was reviewed and approved by the Executive Committee of the International Cocoa Organization at its meeting in March 2010 in Yaoundé, Cameroon.

2. Description of PPG Activities

2.1. Review of existing SPS standards that relate to cocoa production and export

This study focused on the three major existing regulations that affect cocoa production and trade (see **Appendix 1**). They are: (i) Regulation 149/2008/EEC of the European Union Legislation on Maximum Residue Levels (MRLs) in Pesticides; (ii) Food Quality Protection Act of 1996 by the Environmental Protection Agency (EPA) of the United States of America; and (iii) Food Sanitation Law by the Japanese Ministry of Health, Labour and Welfare (MHLW).

The Regulation 149/2008/EEC of the EU brings together and harmonizes the different levels of MRLs that apply in individual Member States of the European Union and sets maximum levels on the amount of pesticides permitted on imported foods including cocoa beans. For active substances with no set MRLs, a default MRLs of 0.01 mg/kg will apply. The Regulation came into force in September 2008 (see appendix 1). The Food Quality Protection Act of 1996 by the Environmental Protection Agency (EPA) of the United States of America came into force in August 1996 and it sets tolerances or maximum legal limits for pesticide residues in food including cocoa beans.

Only limited regulations, where they exist, are currently effective in cocoa producing countries (see Appendix 3 item 12). They require considerable strengthening (and enforcement), in order to avoid the legislation described above effectively becoming barriers to trade. The current focus is predominantly on pesticide residues (see Appendix 3B), with *codex* limits and standards for mycotoxins (for example

ochratoxin-A) still awaited by the food quality laboratories. PAH residues are seen as one area where intervention in rural areas may be required: especially in the wetter eastern areas (e.g. Cameroon) where artificial drying is more commonplace. FFA is seen as a quality (i.e. marketing) rather than a safety issue, with analyses taking place, when required in food chemistry laboratories.

2.2. Assess the institutional capacity of cocoa producing countries to meet existing SPS standards

The use of pesticides remains the most effective means of controlling cocoa pests, diseases and weeds. The residues of the pesticides could be potentially dangerous to health if they are above certain safe limits. Therefore, preventative measures are needed such that harmful substances from the use of pesticides and other contaminants from post-harvest handling of cocoa are as low as permissible. This can be achieved through improved SPS practices, within a framework of Good Agricultural Practices (GAP). The stated SPS practices in the five countries involved in the study are indicated below.

Cameroon: Cocoa remains the most important agricultural product, representing about 25% of the total value of non-oil revenues (although crude oil and petroleum products are the main export sector). The crop is grown in 8 out of 10 regions in an area estimated to average 450,000 hectares. The cocoa sector has around 600,000 cocoa producers, and involves “a total population of 5 million people living directly or indirectly on the cocoa economy”. A national objective for Cameroon is to increase production of quality cocoa to 300,000 tonnes by the year 2015. As with all participating countries, cocoa in Cameroon suffers heavy attacks of black pod and insects (especially mirids) and the “uncontrolled use of fungicides and insecticides is a matter of great concern to the government”. A national priority is therefore to ensure that the country complies with the European Union Regulation 149/2008/EEC on MRLs for pesticides in cocoa beans, in order to minimise the risk of rejection of cocoa that does not meet these limits. Furthermore, Good Agricultural Practices (GAP) and Good Warehousing Practices (GWP) are seen as important for marketing of quality cocoa, under the label "Cocoa Made in Cameroon". Among the major constraints in the cocoa sector in Cameroon to achieve this objective, one can mention illiteracy that prevents the farmers to read the labels attached to pesticide packages and the poor understanding by small retailers of critical information about active ingredients. This, in the past, has caused serious problems including, in some instances, human poisoning.

Côte d'Ivoire: Cocoa is the most important export and represents 35-40% of the national earnings for the world's largest producer. The crop employs approximately one million farmers, and more than six million people rely directly and indirectly on it for a living. Phytosanitary issues are seen as one of the most serious threats to the sustainability of cocoa production and of the national economy. Disease and insect problems compel producers to use many type of pesticides, but there is a general lack of knowledge and information about them. Experts agree that producers must be encouraged to use good agricultural practices in order to minimize the risk of pesticide residues, or other contaminants (OTA, PAH, etc.) in cocoa beans. In order to minimise threats to cocoa exports on the international market, the Government has resolved to strengthen compliance with international SPS standards, and develop strategies for producing quality cocoa. To this end, a number of governmental and non governmental initiatives promote quality cocoa production. There is strong support for a project as it fits in with these initiatives and supports the national policy for the production of quality cocoa for better access to the international market.

Ghana: Cocoa employs approximately 800,000 farm families, spread over six of the ten regions of Ghana. The crop generates about 1 billion US dollars in foreign exchange annually and is a major contributor to government revenue and GDP (26 %). Cocoa products like chocolate and cocoa powder feature prominently on the menu in many homes, restaurants and hotels. The processing of cocoa into various products also creates jobs for thousands of Ghanaians and there is a growing belief in the health benefits of cocoa. The Ghana government has therefore embarked on a vigorous campaign in various forms to ensure a healthy workforce by promoting the consumption of cocoa and its derivative products, thereby creating ancillary jobs. As in neighbouring countries, Ghanaian cocoa is attacked with Black Pod, mirids and other pests. In response, the Ghanaian government, through the Ghana Cocoa Board, regularly organized a centrally-co-ordinated nationwide spraying programme (CODAPEC), thus enabling recommendations for improvement to be implemented rapidly on a large scale. Maintaining its reputation for high quality cocoa is of paramount importance to the Ghana Cocoa Board and the Quality Control Company Ltd (QCCL) has been designated to implement SPS-related projects.

Nigeria: Cocoa contributes significantly to the economy of Nigeria and it is currently the largest non oil foreign exchange earner for the country and contributes substantially to the rural economy. In terms of employment, over five million people derive their income from cocoa as farmers, Licensed Buying Agents, Warehouse agents, processors and exporters. 95% of cocoa is grown in 21 out of the 36 States by small scale farmers working on farms of 1-3 hectares, providing low yields and facing high incidence of pests and diseases. The authorities are concerned about the “irrational use of pesticides and its associated risks for the environmental and potential damage on the health of cocoa farmers, consumers of cocoa and its by-products and others along the supply chain. In addition, Nigeria has a specific concern related to the widespread use of copper sulphate, from various sources, for black pod control and the risk of heavy metals contaminating produce. In terms of SPS standards in general, Nigeria attaches great importance to pesticide residues and strongly supports the full implementation of a SPS project.

Togo: This relatively small economy is heavily dependent on both commercial and subsistence agriculture which provides employment for more than 60% of the labour force. The major crops are: cocoa, coffee and cotton (the most important), which together generate about 30% of export earnings. Cocoa provides a direct livelihood to some 11,000 households, with additional benefits to a substantial chain of collectors, transporters, traders and various exporters. At the time of independence, yields were low (150-200 kg/ha), but after a significant replanting programme with hybrids during the 1970s, yields improved to about 400kg/ha. The major concerns are decreasing areas and decline in production, with ageing tree stock and the resurgence of pest problems such as Black Pod, Swollen Shoot and mirids. Enthusiasm to participate in A SPS project is driven by the need for compliance with EU directives and concerns that this may not be possible if the cocoa farmers and other stakeholders in the sector are not adequately informed and appropriately trained.

It was important to identify the organisational responsibilities and initiatives for cocoa quality by country and these are given in **Appendix 3**. The two largest producers, Côte d'Ivoire and Ghana, have functional laboratories assessing residues in cocoa beans (see below); in others such facilities need to be strengthened. All countries have a clearly defined authority with overall responsibility for food safety and separate authorities responsible for registration and use of pesticides and establishing MRLs in cocoa. Apart from Togo, participating countries also have (a) extension activities co-ordinated by the international Sustainable Tree Crops Programme (STCP: funded mostly by USAID and linked to IITA) and (b) national associations of

CropLife International, which act as the authorised representatives of the research-based agro-chemical industry.

2.3. Review of the existing SPS practices along the cocoa supply chain

In general, pesticide (and specifically insecticide) residues raise the greatest levels of concern, with exports to the EU identified as the key market. However, there were significant country variations in emphasis. For example Ghana focuses on Japanese standards for pesticides, despite the relatively small proportion (4%) of its export market, since they represent the most stringent specifications. During the survey, the Quality Control Company Limited (QCCL) representatives indicated that if they can conform to Japanese requirements (which currently include residue analysis with the husk still on the cocoa beans), then meeting the requirements of others countries would be relatively straightforward. In all markets Good Manufacturing Practices (GMP), that includes optimised husk removal, can substantially alleviate the risk of harmful residues as analysis is made with de-husked samples.

Common concerns observed in the five countries reviewed included the following:

- Officials in all countries are unsure about the scale of the problem and request the means to assess levels of potentially harmful residues in their growing regions, warehouses and trading points.
- To a certain extent, many were taken by surprise by the EU legislation (which became Regulation 149/2008/EEC) and there are concerns about further amendments leading to a loss of more active substances (*e.g.* certain pyrethroids and neonicotinoids in current use against mirids). There remains a specific request for lists of active substances, which are likely to remain suitable for use by growers and warehousemen, to be made easily available in the public domain. These are referred to as “strategic cocoa pesticides” and the rationale for their selection is described in the ICCO Manual *Pesticide Use in Cocoa: A Guide for Training Administrative and Research Staff*.
- An extension of this issue is advice on the “next generations” of pesticides: *e.g.* what to include in efficacy tests and field trials against key cocoa pests. There is a growing realization about the need for more in-country expertise about pesticide science.
- Farmer training remains an enormous task, with a need to (a) raise awareness and requirements for improved SPS standards and (b) transfer the relevant Good Agricultural Practice (GAP) knowledge and skills needed. Although training materials on GAP have been prepared by Government organizations, the STCP and others, these need strengthened sections on SPS standards and specific recommendations for mitigation of residues.
- The high cost of substitute active substances, in comparison with the obsolete pesticides that they are intended to replace, is a common concern.
- Training of trainers (ToT) on timely and efficient application methods was also identified as a specific need.

- Cross border (and in-country) traffic in pesticide products that could result in inappropriate active substances being made available and applied by cocoa farmers.

2.4. Develop the proposed measures into a project proposal

The measures proposed to enhance the capacity of cocoa producing countries in Africa to meet international SPS standards have been developed into a project proposal on “SPS Capacity Building in Africa to Mitigate the Harmful Effects of Pesticide Residues in Cocoa and to Maintain Market Access”.

The proposal focuses on measures that can be implemented in the short-medium term to reduce contamination of cocoa beans: primarily by pesticide residues but PAH and heavy metals. In the light of the concerns described in 2.3, the following measures are being proposed to be implemented as a project in participating countries.

- Creating awareness among cocoa farmers and other stakeholders along the cocoa supply chain on the Sanitary and Phyto-Sanitary (SPS) standards via dissemination of information on pesticide use.**
 - A web-based network “Cocoa SPS” will be created, coordinated by the International Cocoa Organization in London but very much “owned” by participating countries. This will help cross the language barrier (mostly between English-speaking and French-speaking countries) in Africa and facilitate exchange of ideas and SPS techniques.
 - A series of workshops is described in the activities section (Project Document Appendix 6)
 - Other publications, including updates to ICCO literature
- Enhancing the capacity of relevant stakeholders to adequately apply the component on Good Agricultural Practices (GAP) and Good Warehouse Practices (GWP) during the production and post-harvest processing of cocoa in order to meet international SPS standards.** GAP and GWP are universally seen as the best approach and details are described in the ICCO Manual (see 2.5 below), which is updated regularly. Works such as this should be adapted for country needs and it is important to create/strengthen an institutional framework for extension, research and other technical personnel, conversant with modern pesticides and their application. Besides research & development, these people will be involved in Training of Trainers (ToT) Programmes, *etc.* in order to obtain feed-back from stakeholders in the supply chain.
- Enhancing institutional capacity in-country to monitor and enforce adherence to SPS standards in cocoa.** This includes strengthening regional and domestic regulatory & legislative provisions on SPS standards and setting-up and/or enhancing the capacity of national residue laboratories to carry out product and residue analyses. Currently, only the two largest producers, Côte d'Ivoire and Ghana, have laboratories that are actively monitoring residues on cocoa samples. Cameroon and Nigeria are currently planning to invest in analytical capacity for residues on cocoa, but need more technical support.

In Côte d'Ivoire, the *Laboratoire Central d'AgroEcotoxicologie du Laboratoire d'Appui au Développement Agricole* (LCAE/LANADA) is the main national laboratory responsible for food safety

and for monitoring the quality of agricultural products. Its activities include: research, training and analyses in many aspects of food safety and as such, it checks residues on approximately 1200 cocoa samples per year. Analytical work is frequently carried out for commodity trading companies, with a current list of 6 active pesticide substances being checked. Intermittent analysis for mycotoxins is also carried out on cocoa. Established in 2004, it is now well established in its new premises on the outskirts of Abidjan, which are presently undergoing accreditation procedures. It is well equipped with clean-up facilities, HPLC, GLC (3 detectors), etc., but space is limited and output could be improved (doubling the number of samples) by provision of a mass spectrometer and more laboratory space. LANADA is currently able to process approximately 1,200 cocoa samples per year, often screening primarily approximately 6 compounds (including a rodenticide) on behalf of a major international commodity trading company.

In **Ghana**, the Quality Control Company Limited (QCCL), a limited liability company wholly owned by the Ghana Cocoa Board, has a mandate to initiate, introduce and maintain quality standards in the operations of its mother company and to ensure compliance with international standards. To carry out this mandate, QCCL inspects, grades and seals cocoa, coffee, shea-nut and other agricultural products. Added to this, the company also disinfects all produce, storage warehouses, domestic and other premises. QCCL has a laboratory, equipment and trained personnel to provide back up support for its field operations. QCCL is gearing up to receive ISOIEC/17020 and ISOIEC/17025 accreditation: to enable it carry out inspection and all types of analysis on soft commodities for food safety and security. Typically 200 cocoa samples are analysed every month and QCCL has acquired the necessary equipment to enable it carry out pesticide residue analysis. Routine testing is of approximately 7 active substances (mostly insecticides), analysed to Japanese standards. QCCL has a workforce of 1200 comprising highly qualified management personnel, skilled and motivated research, technical, accounting and administrative personnel who are poised to take up the challenge of this project. The company is governed by a Board of Directors, which is chaired by the Chief Executive of Ghana Cocoa Board. The day to day affairs of the company is run by a six member management team headed by a Managing Director.

The two laboratories above have specified items of analytical equipment (see Project Document Appendix 10) to increase capacity for measuring samples. In Nigeria and Cameroon, it would be most appropriate to quantify the problem at existing laboratories: probably in Ibadan, Lagos, Douala and Yaounde. We propose to supply cost-effective and versatile high performance liquid chromatography (sometimes high pressure ~: HPLC) instruments to help train staff in techniques and to carry out preliminary appraisals. In Togo, laboratory analysis is contracted out when needed, and more emphasis has been placed on raising awareness and GAP extension.

- d. Developing regional collaboration** to aid institutional capacity in individual countries to SPS standards in cocoa. For example, it is important to address the issue of unofficial cross-border trade in pesticides - prohibition of importation of pesticides that might be used on the cocoa crop (either directly or indirectly). We would hope that the management and monitoring structures developed by the project would be sustained beyond the duration of the project.
- e. Project management, supervision and evaluation** would be carried out by ICCO, which has over 15 years of experience in project development and successfully completed projects including: cocoa germplasm conservation, cocoa quality and productivity improvement, cocoa marketing, generic

promotion of consumption, control of cocoa pests and pathogens. Most importantly, ICCO provides a forum for the adoption of common measures by its members as would be required in this project. Regionally, the project would be co-ordinated by the *Fonds Interprofessionnel pour la Recherche et le Conseil Agricole (FIRCA)* in Côte d'Ivoire in its capacity as Project Executing Agency (PEA), with regional and national workshops, mid-term and final evaluations.

The proposed project should therefore attempt to focus on the areas where institutional capacity building can have an impact on known risky procedures along both (i) the cocoa supply chain and (ii) the supply of inputs such as pesticides. Emphasis will initially be placed on issues related to: (a) pesticide availability (in stores, cross-border movement, abatement of illegal products, *etc.*), quality, user-selection and application (b) drying methods for cocoa beans. By generally raising awareness at various levels of SPS and cocoa quality, together with support of sustainable laboratory services (with equipment, training, accreditation, *etc.*), a sound infrastructure will be put in place to monitor and prevent the occurrence of potentially harmful pesticide residues and other substances.

2.5. Overview of ongoing and other related initiatives in the area of SPS standards in cocoa producing countries.

This proposed project would fit into the broader programme of initiatives and past efforts by the International Cocoa Organization (ICCO) and its member countries to achieve a sustainable world cocoa economy. Such efforts include the work on the use of food graded jute bags for storing and transporting cocoa beans. In this respect, the International Cocoa Council Resolution on International Jute Bag Standard has been in place and its implementation has been monitored with funding provided by the ICCO and the cocoa industry: in collaboration with the Association of the Chocolate, Biscuit, and Confectionery Industries of the EU (CAOBISCO), and by the European Cocoa Association (ECA). Considerable work has been done on the safe use of pesticides and guidelines on best known practices in cocoa production. In this context, a document on *Guidelines on Best Known Practices in the Cocoa Value Chain* and a manual: *Pesticide Use in Cocoa: A Guide for Training Administrative and Research Staff* have been produced by the ICCO Secretariat and are available on its website for public use. The Manual is to be revised and updated at frequent intervals over the coming years. The funding for the Manual and its subsequent revisions is provided the Federation of Cocoa Commerce (FCC), CAOBISCO and the ECA.

In the same way, in the formulation of the project, ongoing initiatives such as the US\$23 million Gates/WCF *Cocoa for Livelihoods Programme* (CLP) on cocoa in Africa provides substantial resources to “reach” the enormous numbers of cocoa farmers in Africa. Other relevant initiatives pertaining to sustainability such as the Rainforest Alliance, Fairtrade, UTZ certified (a Dutch organisation working with Coopagro in Cote d'Ivoire and Cocoa Abrabopa Association in Ghana), IITA-STCP, *etc.*, will be engaged-with (underway in the case of STCP), to avoid any duplication of efforts. These initiatives, which are likewise supported by the chocolate and confectionery industries, provide traceability of produce and thus complement the educational, regulatory and infrastructural support provided by this project. STCP have proved to be an especially effective training network in its member countries, which nearly coincide with those of the proposed project (includes Liberia but excludes Togo). The project would be especially useful for strengthening the links between with national and International agencies by providing technical back-stopping for the ‘next generation farmer field schools’ as well as enhancing in-country capacity to monitor and enforce adherence to SPS standards in cocoa.

Projects involving pesticides are unlikely to be effective without engagement with the industry itself: most impartially, via the association of agro-chemical manufacturers/distributors, *Croplife International*. *Croplife* representatives have been enthusiastic about active collaboration with the project, via its international, regional and national agents. Mutually beneficial activities include: (i) development of IPM/GAP training materials (ii) ToT development - *Croplife* has a trainer presently stationed in Ghana - and (iii) implementing technologies to thwart counterfeit products.

3. Itinerary and Financial Report

COTE D'IVOIRE: 18-21 January 2010

Meetings and visit to LANADA Laboratory

GHANA: 21-24 January 2010

Meetings and visits to the Ghana Standards Board Laboratories and STCP HQ

NIGERIA: 24-27 January 2010

Meetings

CAMEROON: 27 January – 5 February 2010

Meetings, then project preparation workshop 1-5 February

Consultant's costs

	Airfares	£1,594	\$2,391
	Travel expenses (including visas & taxes)	£2,062	\$3,093
22	days work @ £440	£9,680	\$14,520
	19 days traveling		
	3 days pre-visit preparation, report writing, ICCO visits		
	Total		\$20,004

4. Funding Possibilities

The estimated total cost of the proposed project is US\$5,458,709. Out of this amount, US\$598,500 will be sourced from STDF as grant and US\$2,533,319 from other donors as cash external co-financing. The participating countries will provide a cash counterpart contribution of US\$1,725,239 and an in-kind contribution of US\$601,650. The proposed project is based on the need and a realistic assessment of local co-financing and counterpart contributions. A detailed budget has been prepared with detailed costs by country, category and activities (see Project Document Appendix 4).

The International cocoa Organization has made contact with and requested the following donors to provide external co-financing for the project. They are Agricultural Commodity Programme (ACP) of the African,

Caribbean and Pacific Group of States (ACP Group); and Agro-chemical companies via *CropLife* International. One objective of the Agricultural Commodity Programme (ACP) of the African, Caribbean and Pacific Group of States (ACP Group) is to Strengthening Food Safety Systems for export products “in line with regional, international and EU SPS standards.” *CropLife* International, which represents the research-based agro-chemical companies, can draw from a €1 M budget for promotion of GAP and has expressed interest in collaborating with the project proposed here. The ICCO is in the process of securing firm commitments, in view of the interests and assurances that have been indicated by the above donors.

5. Conclusions and Recommendations

The project proposal “SPS Capacity Building in Africa to Mitigate the Harmful Effects of Pesticide Residues in Cocoa and to Maintain Market Access” has been prepared with the active input of experts and other representatives of participating countries. It focuses on measures that can be implemented in the short-medium term with interventions to reduce contamination of cocoa beans: primarily by pesticide residues but also PAH and heavy metals.

The proposed regional project would assist cocoa-producing countries in Africa to establish and strengthen GAP (*i.e.*, to grow and trade cocoa in a sustainable way) and GWP. As a starting point, the ICCO Manual *Pesticide Use in Cocoa: A Guide for Training Administrative and Research Staff* provides guidance on what might be done in practice, but the author emphasises that (a) current regulation is a “moving target” and (b) specific recommendations need to be adapted to local situations. At the national levels, the project fits well into the strategy developed and adopted by the International Cocoa Council which seeks to implement measures at improving the physical and ethical qualities of cocoa to meet the demands of the international markets. It will improve the compliance level of countries with respect to SPS standards and requirements.

Specifically, the project activities will contribute to:

- Quantification of the levels of risk from contaminants affecting the cocoa supply chain and complement other projects designed to increase cocoa production by reducing the incidence of pests and diseases. This will raise awareness about SPS issues and contribute to making cocoa a sustainable crop by growing and trading it in accordance with economic, social and environmental recommendations.
- Strengthening infrastructure to monitor and enforce SPS standards, specifically by providing technical and financial support to analysis laboratories, research stations.
- Providing specific information on pesticides and other SPS issues, to farmers, researchers and policy makers in cocoa producing countries, using websites, workshops, manuals and other training tools.
- Successful implementation of the project will be important to sustain cocoa exports from Africa and thus help to alleviate poverty. By increasing confidence that SPS standards are adhered-to and collaborating with relevant certifying bodies, local and international organisations.
- More broadly, emphasis will always be placed on the opportunities, specifically the higher prices that may be gained by developing a reputation for quality cocoa, which the market increasingly commands.

Appendix 1

Overview of Quality Standards

Consumers of cocoa and cocoa products all over the world are becoming increasingly aware of food safety concerns as related to the use of chemicals in the production and processing of cocoa and as related to other issues and procedures that may be detrimental to their health. As a result, some countries have enacted legislative and regulatory measures and established sanitary and phytosanitary standards that have to be met by imported food or food substances, in order to continue to have access to their markets. The food safety concerns that affect cocoa are pesticides residues, Ochratoxin “A” (OTA), Polycyclic Aromatic Hydrocarbons (PAH), Free Fatty Acid (FFA), heavy metals such as lead, cadmium and others substances.

Ochratoxin “A” (OTA) is a toxin which is produced by a fungus and has been related to kidney damage. It is also currently viewed as a potential carcinogenic substance. Studies have shown that OTA development in cocoa happens during the early post-harvest handling of cocoa beans, with damaged cocoa pods being most implicated. Polycyclic Aromatic Hydrocarbons (PAH) are a group of chemicals produced during the incomplete combustion of organic substances such as coal, oil, gas and wood. It is reported that the consumption of products that have been contaminated with PAH or have been in direct contact for a long period with PAH may cause lung or skin cancer. Cocoa is contaminated with PAH during drying, especially when artificial drying is used. Free Fatty Acid (FFA) results from the degradation of fat. FFA in cocoa is caused by poor preparation of cocoa beans, mould and prolonged periods of storage before export. FFA is essentially a quality issue that affects the price of beans, although they have been associated with several cardiovascular risk factors. Studies on pesticide residues and other heavy metals such as lead and cadmium have shown that they can directly influence human behaviour by impairing mental and neurological functions and alter numerous metabolic body processes.

In the EU, measures have been taken for the following contaminants: mycotoxins (aflatoxins, ochratoxin A, fusarium-toxins, patulin), ‘heavy’ metals (cadmium, lead, mercury ,inorganic tin), dioxins and PCBs, polycyclic aromatic hydrocarbons (PAH), 3-MCPD and nitrates). Further information can be found on: http://ec.europa.eu/food/food/chemicalsafety/contaminants/index_en.htm.

Pesticide residues

In the EU and USA, samples of cocoa beans are first de-husked before residue analysis takes place, whereas at the time of writing, whole beans are analysed in Japan (“beans without pods”), which is more likely to result in residue violations.

In Europe Commission Regulation 396/2005/EC of the European Parliament and of the Council proposed maximum residue levels of pesticides for food products applied from 1st Sept 2008. This was amended by regulation EC 149/2008 by establishing Annexes II, III and IV setting maximum residue levels for products previously covered by Annex I: at:

<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2008:058:0001:0398:EN:PDF>. Annex III includes MRLs for cocoa and is split into two parts as follows:

- Part IIIA: Temporary MRLs for substances being in the approval circle for use in EU or substances that are no longer approved for use in EU.

- Part IIIB: Temporary MRLs for all active substances for new commodities (including cocoa) introduced under 396/2005/EC. These MRLs are based on national MRLs, where a risk assessment has been performed by the European Food Safety Authority (EFSA).
- Annex IV contains plant protection products already evaluated at EC level for which it is not necessary to set MRLs.

This 398 page document is arcane and difficult to read, but easier access (with a download facility), under “cocoa (fermented beans)” and “tea, coffee, herbal infusions and cocoa”, is available at: http://ec.europa.eu/food/plant/protection/pesticides/database_pesticide_en.htm

One of the major aspects of the proposed project is to strengthen institutional capacity in cocoa growing countries to “stay ahead of the game” in technical know-how concerning pesticide science, residue analysis, *etc.*: thus preventing the disruption caused by new regulations such as EC 396/2005, which itself continues to undergo amendment (*i.e.* to its Annexes). The original 91/414/EEC regulation, which concerns pesticide use in the EU, was seen by many as just the start of a review process and in July 2008 EU agriculture ministers proposed even stricter controls, with a shift in emphasis from risk to hazard-based assessment of pesticides^{§1}. Regulation 91/414/EEC will be repealed on the 14 June 2011 and replaced by EC 1107/2009, which has now been adopted. The details of the proposed legislation may take several years to be agreed, but research institutes in cocoa producing countries should now be considering how best to manage key pest species, if substances possibly ‘under threat’ (*e.g.* certain pyrethroids and neonocotinoids) were to be deemed unsuitable for use with food crops. Further details and discussion is given in: *Pesticide Use in Cocoa - A Guide for Training Administrative and Research Staff* (Bateman, 2009).

In the **USA**, the **Environmental Protection Agency (EPA)** established the Food Quality Protection Act (FQPA) of 1996 and was 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 labelled with instructions for proper use, handling, storage and disposal. The EPA produces fact sheets, prepared as part of EPA Registration and Re-registration programmes. Where a Fact Sheet has been issued for a “New” active ingredient (one registered since 1997), this is noted. In addition, the **Food and Drug Administration (FDA)** provides guidance (2005) on trade policy (<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>.

In **Japan**, the Ministry of Health, Labour and Welfare (MHLW) established new legislation, the Food Sanitation Law, was modified on 29 May 2006, with analysis of cocoa included on a “positive list” published by the Ministry of Health, Labour and Welfare. The MRL list was updated on February 5, 2007 and is on: <http://www.mhlw.go.jp/english/topics/foodsafety/positivelist060228/dl/index-1a.pdf>. Some samples were found to have excessive residue levels and shipments were rejected (although the method of analysis used was different to that proposed elsewhere).

**Appendix 2 Questionnaire:
Management of Pesticide Residues and other Harmful Substances in Cocoa**

1. About yourself	
Name:	
Position	
Organisation (full address, telephone, email)	
2. Please provide the following information:	
(a) Which organisation has overall responsibility for food safety:	(a)
(b) What is the main authority responsible for registration and use of pesticides	(b)
(c) What is the main authority responsible for establishing Maximum residue levels (MRLs)	(c)
(d) What is the main national (federal) laboratory responsible for food control	(d)
(e) Are there other important (regional) laboratories responsible for food control?	(e)
(f) What is the main laboratory responsible for development of analytical methods for residues	(f)
(g) What is the main organisation responsible for applied research regarding pesticides for cocoa pests	(g)
(h) What is the main organisation responsible for providing information on quality standards to cocoa producers	(h)
(i) Which institution is the <i>Codex</i> contact point	(i)
(j) Which institution is the SPS contact point (if different)	(j)
(k) Is there a National association of pesticide manufacturers/distributors? In the event, please provide their full address	(k)
(l) Responsibility for Hazard Analysis Critical Control Point (HACCP) analysis of the cocoa supply chain	(l)

3. What are the main problems encountered in the use of agro chemicals in your country?	<ul style="list-style-type: none"> ▪ ▪ ▪ 																																																																																																
4. Using a rating score, how concerned are you about the following for cocoa:	<i>not a problem moderate very concerned</i>																																																																																																
a) Insecticide residues b) Fungicide residues c) Herbicide residues d) Ochratoxin and other mycotoxins e) Polycyclic Aromatic Hydrocarbons (PAH) f) Free Fatty Acid (FFA) g) Heavy metals h) Other (please state) i) Contamination by allergens, e.g. ground nuts or tree nuts j) Mineral oil contamination from jute bags k) Non-dioxin like Poly Chlorinated Biphenyls (PCBs)	<table border="0" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 5%;"></td> <td style="width: 5%;"></td> <td style="width: 5%;"></td> <td style="width: 5%;"></td> <td style="width: 5%;"></td> <td style="width: 5%;"></td> <td style="width: 5%;"></td> <td style="width: 5%;"></td> </tr> <tr> <td>(a)</td> <td>0</td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> <td></td> </tr> <tr> <td>(b)</td> <td>0</td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> <td></td> </tr> <tr> <td>(c)</td> <td>0</td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> <td></td> </tr> <tr> <td>(d)</td> <td>0</td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> <td></td> </tr> <tr> <td>(e)</td> <td>0</td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> <td></td> </tr> <tr> <td>(f)</td> <td>0</td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> <td></td> </tr> <tr> <td>(g)</td> <td>0</td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> <td></td> </tr> <tr> <td>(h)</td> <td>0</td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> <td></td> </tr> <tr> <td>(i)</td> <td>0</td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> <td></td> </tr> <tr> <td>(j)</td> <td>0</td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> <td></td> </tr> <tr> <td>(k)</td> <td>0</td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> <td></td> </tr> </table>									(a)	0	1	2	3	4	5		(b)	0	1	2	3	4	5		(c)	0	1	2	3	4	5		(d)	0	1	2	3	4	5		(e)	0	1	2	3	4	5		(f)	0	1	2	3	4	5		(g)	0	1	2	3	4	5		(h)	0	1	2	3	4	5		(i)	0	1	2	3	4	5		(j)	0	1	2	3	4	5		(k)	0	1	2	3	4	5	
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5. Which among the following standards affect your country most?	<i>not important moderate major issue</i>																																																																																																
a) European Union Legislation on Maximum Residue Levels (MRLs) in Pesticides (Regulation 149/2008/EEC) b) U.S.A Environmental Protection Agency (EPA) Food Quality Protection Act 1996: (this regulates the amount of pesticide residues permitted on food for consumption). c) The EPA requirement that all approved pesticides used are clearly labelled with instructions for proper use, handling, storage and disposal. d) Japanese Ministry of Health, Labour and Welfare (MHLW) legislation (May 2006) setting new MRLs for food products.	<table border="0" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 5%;"></td> <td style="width: 5%;"></td> <td style="width: 5%;"></td> <td style="width: 5%;"></td> <td style="width: 5%;"></td> <td style="width: 5%;"></td> <td style="width: 5%;"></td> <td style="width: 5%;"></td> </tr> <tr> <td>(a)</td> <td>0</td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> <td></td> </tr> <tr> <td>(b)</td> <td>0</td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> <td></td> </tr> <tr> <td>(c)</td> <td>0</td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> <td></td> </tr> <tr> <td>(d)</td> <td>0</td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> <td></td> </tr> </table>									(a)	0	1	2	3	4	5		(b)	0	1	2	3	4	5		(c)	0	1	2	3	4	5		(d)	0	1	2	3	4	5																																																									
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<p>6. Do you have an ongoing programme for monitoring residues (or planned within the next year)? If so:</p> <p>a: Which laboratory</p> <p>b Is it fully and appropriately equipped?</p> <p>c What accreditation process has taken place (in-country/international)?</p> <p>d. Please attach the standard operating procedures (SOP) for handling failed samples</p>	<p>yes / no</p> <p>a)</p> <p>b)</p> <p>c)</p> <p>d) available? yes / no</p>
<p>7. Implementation of Good Agricultural Practices (GAP) for cocoa in your country:</p> <ul style="list-style-type: none"> • Please indicate who you think can most effectively provide GAP information to farmers • In addition to those mentioned in (2h) above, are there any other key extension services ? 	<ul style="list-style-type: none"> ▪ ▪
<p>8. About the organisation responsible for pesticide evaluation (2g above):</p> <p>(a) What are the key pests on which it carries out assays and trials</p> <p>(b) Are there published, standard test methods?</p> <p>(c) Where are the results of these tests published?</p>	<p>(a)</p> <p>(b)</p> <p>(c)</p>
<p>9. Which organisations do you consider most important for supporting and providing information relevant in the area of SPS work?</p> <p>a) local</p> <p>b) national</p> <p>c) international</p>	<p>none minor major support</p> <p>(a)</p> <p>(b)</p> <p>(c)</p>

10. Which Organisation(s) is responsible for implementation of good storage/ warehousing practices for cocoa in your country?			
11. If you identified any major quality issues in Q3 (ochratoxins, other mycotoxins, PAH, FFA, heavy metals), briefly describe:			
a) your strategy for overcoming them	(a)		
b) which Organisation(s) are responsible at local level?	(b)		
c) b) which Organisation(s) are responsible at national level?	(c)		
12. What other quality control issues (if any) concern you for cocoa in your country?			
▪ What, if any, other concrete actions are currently being implemented in your country to address the issues of SPS and pesticide residues?	▪		
▪ Are these actions sufficient in your view or would you like to see more done? If so, what additional actions would you recommend?	▪		
▪ What level of assistance, in terms of capacity building, does your country require to better tackle this issue?	▪		
13. Have you heard-of / do you use the following ICCO literature:			
a) <i>Guidelines on Best Known Practices in the Cocoa Value Chain</i>	yes	vaguely	no
b) <i>Manual on the Safe Use of Pesticides</i>	yes	vaguely	no
14. If you have answered “yes” to the above, what improvements would you like to see for:			
a) <i>Guidelines on Best Known Practices in the Cocoa Value Chain</i>	(a)		
b) <i>Manual on the Safe Use of Pesticides</i>	(b)		

15. Early in 2010, an ICCO consultant will briefly visit to follow-up on your responses to this questionnaire
Who should he meet?

What issues do you especially wish to raise?

What, if any, legal and regulatory documents exist in your country concerning SPS and pesticide use? In the event, please collect the said documents for him.

16. **Further comments, and additional information relating any of to these questions.**

(Continue on another page if necessary)

Appendix 3

A. Organisational responsibilities and initiatives for cocoa quality by country

	Cameroon	Côte d'Ivoire	Ghana	Nigeria	Togo
1. Overall responsibility for food safety	Ministry of Industry, Mines and Technological Development (MINMIDT), Department of Standardization and Quality (DSQ)	Direction de la Protection des Végétaux, du Contrôle et de la Qualité (DPVCQ/MINAGRI§)	Food & Drugs Board (FDB)	National Agency for Food and Drug Administration & Control (NAFDAC)	Laboratoire de l'Institut Togolais de Recherche Agronomique (ITRA)
2. Authority responsible for registration and use of pesticides	MINADER§ Department of Regulation and Quality Control of Inputs and Agricultural Products	DPVCQ/MINAGRI	Environmental Protection Agency (EPA)	NAFDAC: HQ: Abuja; cocoa practice: Lagos	Direction de l'Agriculture
3. Authority responsible for establishing maximum residue levels (MRLs)	MINADER (as above), Ministry of Scientific Research and Innovation; IRAD; Ministry of Trade (MINCOMMERCE)	DPVCQ/MINAGRI	Ghana Standards Board (GSB) (<i>Codex</i> Committee)	NAFDAC	ITRA
4. Main national/federal laboratory responsible for food control	Centre Pasteur du Cameroun	Laboratoire Central d'AgroEcotoxicologie du Laboratoire d'Appui au Développement Agricole (LCAE/LANADA)	FDB and GSB	NAFDAC	ITRA
5. Other important laboratories responsible for food control	none	-	Food Research Institute (FRI), CSIR, Accra (ISO 17025 accredited)	none	Eurofine, Toulouse, France
6. Main laboratory responsible for development of analytical methods for residues	Ministry of Scientific Research and National Institute of Agricultural Research & Development (IRAD)	LCAE/LANADA	GSB	NAFDAC	Laboratoire de l'ITRA
7. Main organisation responsible for applied research regarding pesticides for cocoa pests	IRAD and MINADER: Department of Regulation and Quality Control of Inputs and Agricultural Products	Centre National de Recherche Agronomique (CNRA)	Cocoa Research Institute of Ghana (CRIG)	Cocoa Research Institute of Nigeria (CRIN)	ITRA/CRA-F & Institut de Conseil & d'Appui Technique (ICAT) Kpalimé

	Cameroon	Côte d'Ivoire	Ghana	Nigeria	Togo
8. Institution acting as <i>Codex</i> contact point	Ministry of Industry, Mines and Technological Development (Department of standardization and Quality) –MINMIDT)	Direction des Productions Alimentaires et de la Diversification § (DPAD/MINAGRI§)	GSB	Standards Organisation of Nigeria (SON)	Laboratoire, Direction de la Protection des Végétaux, Direction de l'Élevage et ITRA
9. Institution acting as SPS contact point (if different)	Ministry of Trade (MINCOMMERCE) MINADER	DPVCQ/MINAGRI	Plant Protection and Regulatory Services Directorate (PPRS) of MOFA§	ditto	assume ditto
10. National association of pesticide manufacturers/distributors	CropLife Cameroun, Douala	1. CropLife Côte d'Ivoire 2. AMEPHCI (Association des Petites et moyennes entreprises de C d'Ivoire)	CropLifeGhana	CropLife Nigeria	(not CropLife member)
11. Responsibility for Hazard Analysis Critical Control Point (HACCP) analysis of the cocoa supply chain	n/a	DPVCQ/MINAGRI	CRIG, FRI and GSB	NAFDAC	n/a
12. Legal and regulatory documents concerning SPS	Law on phytosanitary protection. Regulations on pesticide registration procedures, management and plant quarantine; Schedule of pesticides forbidden for cocoa	- Décret n°99-272 (6/4/1999) fixant les modalités du conditionnement du cacao à l'exportation; - Décret n°89-02 sur l'homologation et l'utilisation des pesticides *	Act 528, Pesticides Control & Management Act (1996)	TBD	n/a
13. Organisations primarily responsible for implementing Good Agricultural Practices (GAP) in cocoa	Emergency Programme for the Reduction of Pesticide Residues on Cameroonian Cocoa & Coffee (EPRPRCC§); IRAD, NCCB; Cocoa Development Society (SODECAO); various cooperatives of producers	DPVCQ/MINAGRI et ANADER (Agence Nationale d'Appui au Développement Rural) ANADER, CGFCC; Autorite de Regulation du Cafe et du Cacao (A RCC) controls and administers regulation of the trade of coffee and cocoa.	CRIG, CODAPEC CSSVD/CU of Cocobod ; Quality Control Company Ltd. (QCCL: with 3 laboratories)	CRIN: Farmers Field Schools (FFS): especially via STCP; also formal extension service	ITRA/CRAF; ICAT/UTCC (Unité Technique Café et Cacao) Federation of Unions of Cocoa and Coffee producers (FUPROCAT)

	Cameroon	Côte d'Ivoire	Ghana	Nigeria	Togo
14.Organisation(s) is responsible for implementation of good storage/ warehousing practices for cocoa	National Cocoa and Coffee Board (NCCB); SODECAO and producers organisations (cooperatives); MINADER - EPRPRCC; Cocoa and Coffee Orchards Protective Program (PPVC)	MINAGRI, CGFCC, ANADER	QCCL P. O. Box M 55, Accra, Tel. +233212269/ 23321664630/ 23321603218/ Fax. +23321663193 Email:qcd@ghana.com	Federal Produce Inspection Service (FPIS)	Institut de Conseil et d'Appui Technique (ICAT)
15.Main organisation responsible for providing information on quality standards to cocoa producers	MINMIDT - DSQ National Cocoa and Coffee Board (NCCB)	DPVCQ/MINAGRI, Comité de Gestion de la Filière Café et du Cacao (CGFCC)	QCCL	CRIN	Assume ITRA
16.Organisations advising on mitigation of mycotoxins, PAH, FFA, heavy metals, etc.	MINADER: Farmer field schools with ICPM approach with the help of resource persons (scientists and researchers)	MINAGRI, CGFCC, ANADER	CRIG/FRI, GSB and FDB under codex. (National surveys being undertaken to determine extent of problems)	Not yet designated	Not yet designated
17.NGOs and other relevant initiatives working on cocoa quality	STCP	STCP	STCP (HQ in Accra)	STCP	(STCP not active)

§ Ministère de l'Agriculture, Ministry of Agriculture ; Ministry of Agriculture and Rural Development (Cameroon); Ministry of Food & Agriculture (Ghana)

* Also : (1) Arrêté interdisant l'utilisation de certaines matières actives en agriculture (2) Note circulaire suspendant l'utilisation de certaines matières actives en cacao-culture

Appendix 3B. Concerns Raised by Survey Respondents

The food safety concerns that affect cocoa are pesticides residues, mycotoxins such as ochratoxin A (OTA), Polycyclic Aromatic Hydrocarbons (PAH), Free Fatty Acid (FFA), heavy metals (*e.g.* lead, cadmium) and others substances. In the STDF sponsored survey of experts from key cocoa producing countries, an International Cocoa Organisation (ICCO) consultant recorded the following ratings (scale of 0-5, with 5 representing “most concerned”):

	Cameroon	Côte d'Ivoire	Ghana	Nigeria	Togo
Rating of concerns					
Insecticide residues	4	5	5	5	4
Fungicide residues	4	5	2	5	2
Herbicide residues	2	5	1	4	1
Ochratoxin A and other mycotoxins	3	5	1	3	2
Polycyclic Aromatic Hydrocarbons	3	5	1	1	1
Free Fatty Acid (FFA)	1	1	0	0	1
Heavy metals	0	3	0	3	1
Contamination by allergens	4	1	1	1	0
Mineral oil contamination from jute bags	1	0	0	3	1
Non-dioxin like Poly Chlorinated Biphenyls	0	0	5	0	0
Other contaminants	0	0	0	0	0
Importance rating for pesticide standards					
EU MRLs for Pesticides (Regulation 149/2008/EEC)	5	5	5	5	5
US EPA Food Quality Protection Act 1996	2	4	5	1	0
EPA requirements for pesticide labelling	4	1	4	0	0
Japanese MHLW legislation (2006)	1	3	5	0	0

In general, pesticide (and specifically insecticide) residues raise the greatest levels of concern, with exports to the EU identified as the key market. However, there were significant country variations in emphasis. For example Ghana focuses on Japanese standards for pesticides, despite the relatively small proportion (4%) of its export market, since they represent the most stringent specifications. During the survey, QCCL representatives indicated that if they can conform to Japanese requirements (which currently include residue analysis with the husk still on the cocoa beans), then meeting the requirements of others countries would be relatively straightforward. In all markets Good Manufacturing Practices (GMP), that includes optimised husk removal, can substantially alleviate the risk of harmful residues as analysis is made with de-husked samples.