Assessing and addressing pesticide practice in cocoa producing countries to meet regulatory standards

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Outline of presentation:

- Approaches to pest and disease management and IPM
- Nature and role of pesticides in cocoa
- Why improve on pesticide practice?
- Promoting better practice - communication channels, factors to consider
- West Africa project – overview, key findings, highlight communication approaches*
- Concluding points
Approaches to pest and disease management and IPM
● Crops, including cocoa, can suffer considerable damage due to pests and diseases if not effectively controlled

● Numerous approaches to management may be possible – involving host resistance, cultural, biological, chemical measures

● Include:
  - Planting material – clean, resistance to primary problems
  - Nutrition – fertiliser, manure, mulch, water supply
    \((\text{plant health, resistance/tolerance})\)
  - Crop/farm hygiene – pruning/removal of old/diseased/infested pods
    \((\text{pod rot, Witches’ Broom, Frosty Pod Rot})\)
- Tree management – spacing, height, opening canopy, shade plants (*mirids, pod rot*)

- Pod covering – biodegradable bags/sleeves (*pod borer - Indonesia*)

- Biological control – natural/introduced enemies – parasites, predators (*Witches’ Broom, Frosty Pod Rot, mirids*)

*Witches’ Broom disease*

*Frosty Pod Rot*
- Chemical pesticides
  – copper, metalaxyl (*pod rots, other fungi*)
  – imidaclorpid, phosphines (*mirids, pod borer, storage pests*)
  – potassium phosphonate – trunk injection, stimulates resistance (*pod rots, canker - PNG*)
- Management options employed vary depending on availability, ease of use, cost etc.

- Preferable to employ variety of (complementary) measures as part of integrated management approach (IPM).

- Advantages of IPM:
  - utilise natural resources
  - maximise other resources (e.g. labour)
  - reduce risk of pest and disease resistance (pesticides)
  - reduce reliance on chemical pesticides and associated risks,
  - reduced reliance on single measure - avoid major pest problem and crop damage

- Ideally – reduce pesticide use through alternative, non-chemical measures and more rational selection and use of pesticides products.
However – in many instances pesticides are essential pest management tool - and important component of IPM - on which growers are reliant

Why? Numerous direct and indirect benefits, including:

- easy to use
- fast acting
- effect on pest and crop improvement very obvious
- improve appearance/cosmetic appeal – important for consumers, market value
- extend shelf life of stored produce,
- reduce drudgery and damaging effects of other measures
  (e.g. hand, mechanical weeding)
- increase crop yield and improve quality
- increase available food and disposable income,
- improve nutrition, health, education and social standards
Full **benefit** of pesticides only attained and risks of use minimised when used appropriately

Herein lies fundamental **problem**:

Many pesticide suppliers and users lack/cannot access information and equipment needed to select, store, apply and dispose of pesticide products in a recommended and safe manner

Raises questions:

Who should have responsibility for supply and use?
How best can this be controlled/regulated?
Under what circumstances/to what extent should supply and use be limited/prohibited?

* e.g. should users (especially farmers) be required to undertake training/aptitude test to obtain products?
Nature and role of pesticides in cocoa
Cocoa supply chain – application of chemicals and possible contamination of beans

On-farm, during:
1. Cultivation of crop
2. Post-harvest fermentation, drying and storage of beans

During drying, grading and bulk storage (warehouses) by large traders/exporters

During collection, transport and storage by:
1. Farmer co-operatives/associations
2. Intermediate buyers/traders (LBCs)

During export (shipping)

Local use

During drying, grading and bulk storage (warehouses) by large traders/exporters

Local bean processing
• Many pesticides/other chemicals may be used within supply chain

• Applied directly to crop - primarily for pest & disease control

• Include:
  - Insecticides *
  - Fungicides
  - Herbicides
  - Nematicides
  - Rodenticides *
  - Acaricides

* some exhibit high human & animal toxicity – avoid if possible
- Applied indirectly - general sanitation
  - disinfectants, fumigants (storage areas)
  - some of major concern – high toxicity, manner of dispersal, high risk of accidental exposure

- Potential for bean contamination due to pesticide application:
  - to other crops
  - on neighbouring farms
  - in other areas (industrial sites, roadsides etc)

  - critical (and unexpected) sources of contamination - residues on cocoa and end product?
Why improve on pesticide practice?
Ensure health & safety of:
- pesticide users - cocoa farmers, buyers/intermediate traders, transporters
- other crop handlers - traders, processors, transporters
- pesticide suppliers - manufacturers, importers, local retailers
- local community (incl. farming family, farm workers)
- consumers of end products

Meet safety and quality requirements:
- national authorities (Agricultural Ministries)
- importing countries/regions
  - adherence critical to international trade
  - reviewed, amended
  - include legislation on permitted residue levels
● Prevent contamination of, damage to:
  - cocoa crop
  - other crops (food, feed)
  - other plants (cooking, medicinal)

● Protect local environment:
  - animals, insects (e.g. pollinators)
  - soil organisms (e.g. earthworms, microbes, natural enemies)
  - waterways (drinking, washing, drainage)

● Reduce costs
  - pesticides and related equipment = relatively high management cost

Any improvement in pesticide practice will have positive impact on above requirements!
Promoting better practice - communication channels, factors to consider
● Numerous ‘pathways’ available to communicate and implement better pesticide practice

● Include.............
Communication channels/approaches - some examples:

**Agricultural Extension Services (Govt.)**

**Training fora:**
- Workshops/courses
- Farmer Field Schools, Demonstration plots (experiential/participatory learning)
- Training of trainers (TOTs) (increase training coverage)

**Discussion fora:**
- Stakeholder workshops
- Conferences/meetings

**Knowledge and advice centres:**
- Telecentres (internet resources)
- Plant health clinics
- NGO

**Communication via mass media:**
- Newspapers
- Radio
- TV

**Agricultural publications:**
- Advisory
- Technical
- Scientific

**Others:**
- Video productions
- Live drama
- Teaching in schools
- Mobile phone
- Vary markedly in resources required, extent of outreach, level of impact

- Before selecting approach, need to carefully consider........................
1. **Nature** of problem (inappropriate ‘practice’)

   - one or many chemicals (substances or products)?

   - related to provision of chemicals or method of use?

   - who is providing and using the chemicals?

   - how are they being provided/accessed?

   - how are they being prepared, applied, stored and disposed off,

   - is there a need to withdraw/replace chemicals or address unauthorised supplies?
2. **Scale** of problem

   - local or widespread?

   - related to specific points in production/supply chain?

   - related to specific stakeholder groups?
     
     *e.g. farmers or traders*
Possessing such information:

- Allows recognition of underlying cause(s)
- Enables key points of intervention to be defined
- Allows counter measures to be designed and implemented:
  - to achieve sufficient impact on scale required
  - via appropriate communication channels and
  - using available resources:
    - finance, specialist expertise, labour, transport
    - partner organisations (vested interest, self-financing)
Given global nature of cocoa trade........

Africa        →         Europe/US/Japan
S. America/Asia →         US/Europe

......... ideally, global perspective of pesticide trade and use in major producing countries required

In West Africa, first step taken towards this goal............
West Africa project – overview, key findings, communication approaches
2006-2008: Research conducted in West Africa to:

1. Investigate agrochemical practice in countries supplying cocoa to EU
2. Begin to raise awareness of, and address, areas of inappropriate practice

Deemed necessary due to intended introduction of new EU pesticide legislation
Possible implications of legislation for cocoa trade

- In-country research undertaken by NRI in Cameroon, Ghana, Ivory Coast, Nigeria
- CABI as Lead Technical Institute (LTI)
- Administered by ECA/CAOBISCO
- Funded by Dutch Ministry of Agriculture, Nature and Food Quality
EU legislation

Regulation EC 1107/2009 - defines chemical active substances permitted for marketing and use in EU

Regulation EC 396/2005 - defines maximum levels of chemical residues (MRLs)* permitted in food and feedstuffs in EU

* MRL = maximum content of a residue of an active chemical substance legally permitted and remains in a crop after chemical treatment according to good agricultural practice (GAP)
Implications for cocoa - Regulation 396/2005:

- MRLs harmonised across EU
  *(previously different EU Member States could set own MRLs)*

- MRLs now also apply to commodities/raw materials *imported* to EU

- For first time – MRLs exist for cocoa beans in all EU Member States

- Cocoa consignments entering EU routinely checked at the port of entry for chemical residues

- If prohibited substances detected or found at levels >MRL – considered illegal possible rejection of consignment
EU legislation

- Major impact on:
  - supply of cocoa for EU industry
  - export of cocoa by origin countries (lost foreign revenue, impact on livelihoods)

- Implications for use of agrochemicals for cocoa in origin countries

- Intention - to help safeguard human/animal health and prevent environmental contamination within EU

- Other benefits – helping safeguard welfare of those exposed to agrochemicals in origin countries and protect local environment
- West Africa produces 65% of world’s cocoa
- Supplies 85% of cocoa required by European cocoa industry
- Major producers: Cameroon, Ghana, Ivory Coast, Nigeria
Majority produced by smallholder farmers:

- Farm size <5 ha
- Rely on cocoa as main source of income
- Many illiterate and geographically isolated
- Confronted by range of constraints (e.g. pests and diseases)
- Limited resources for crop production
- Chemical pesticides form important management measure

Chemical products also used along commodity chain, primarily for pest/disease control, general sanitation (e.g. fumigants)
Investigating in-country pesticide practice

Objective;
Gather information on supply/use of agrochemicals along cocoa supply chain

Approach;
- surveys across major producing areas
- one to one consultations with;
  - farmers, farmer groups, intermediate traders, exporters (users)
  - chemical retailers, manufacturers, importers (suppliers)

What, Who, Where, Why, How.........?
Extensive information obtained - key findings:

Farmers (3000+ consulted):
- High level of chemical usage amongst farmers (76% to 97%)
- 100+ chemical products identified as used across 4 countries
- Contain 30+ different active substances
- As few as 46% ever received any information on proper use
- 10 - 31% ever received any formal training on use

Farmers using chemicals:
- As few as 57% used products as recommended (instructions)
- As few as 55% used any form of protective clothing or equipment

Farmers not using chemicals:
- Excessive cost main reason for not using
  (as opposed to unnecessary, not available or too dangerous)
Cocoa traders – similar situation:

- Although extent of chemical use varied: 20-87% across countries
- Extent of information and training received: As low as 29% and 11% respectively.
- Additional 15 products identified as used
- Contain additional 6 active substances *(not used by farmers)*

Of trade organisations using chemicals:

- All using some form of protective clothing or equipment
- Again - use of chemicals as recommended as low as 53%

Of all organisations consulted:

- Only 29-55% aware of introduction of new EU legislation
Of chemical substances identified:

- 50% not approved for use in EU
  - MRL for many - set at level of detection or at default level of 0.01 mg/kg
  
  Recommendation to origin countries – avoid using or use with caution and consideration of MRLs

- Several other substances are approved in EU and have MRLs set
  
  Recommendation - may use but with strict adherence to instructions/GAP

- Some products/substances already prohibited for use in origin country by national authorities
  
  Use must cease
Newly acquired information - greatly improved understanding of:

- Cocoa supply chain
- Chemical supply chain
- Pesticide practices employed by different stakeholder groups

- Identified specific products/substances of concern
  - not authorised
  - use may lead to residue problems (trade restrictions)

- How supplied and used, by whom and for what purpose
  (geographically/within supply chain)
Surveys also revealed:

- Areas where information and other resources to support good pesticide practice are absent or limited
- Where available – method(s) by which they are provided and who supplies
- Important for future efforts to improve practice – use same knowledge providers

Based on survey findings:

Range of activities initiated to promote and implement better practice within countries and across various stakeholder groups..........................
Process initiated through in-country multi-stakeholder workshops

- National/local
- Promote/discuss findings
- Prioritise and plan activities
- Identify communication channels and partnerships

Key needs/actions identified, including:
- Review/modify government policy
  (*re. chemical import and recommendations for use*)
- Improve monitoring of agrochemical use
- Withdrawal/buy-back of products containing problematic substances
  (*some already in wide circulation*)
- Implement training
  (*farmers, traders; quality control services, chemical retailers etc*)
- Establish/improve capacity for analysing pesticide residues
  (*enable detection of points of contamination in supply chain prior to export*)
Range of follow-up activities..............

Main focus:

● Raise awareness of EU regulations and their implications for cocoa trade

● Highlight pesticides deemed to be of concern and why

● Promote supply and use of more appropriate approved and recommended substances and related products

Included..............
• Direct engagement and discussion with key organisations..........

  - Agriculture ministries
  - Plant protection and regulatory services
  - Environmental protection agencies

Responsibility for:

  - chemical importation & registration
  - approval for specific purposes
  - monitoring of chemical use
  - enforcement of regulations

*Discussing problems and needs with policymakers*
Cocoa buyers/traders also consulted..............to raise awareness of, and discuss:

- EU regulations
- Use of appropriate products in correct manner,
- Need to avoid accidental contamination of beans in storage

*Traders important to farmers – source of advice and monetary assistance*
● Educational rallies and workshops..............

Organised for farmers in towns and villages across production areas to:

- highlight products and substances that should be avoided
- recommend approved products and substances,
- generally promote good agrochemical practice
Radio and television broadcasts..............

*Radio - important medium for communicating with rural populations in developing countries (many farmers own or have access to a radio)*

Involved:

- interviews with knowledgeable persons (govt. reps, scientific team members)
- discussion panels,
- phone-ins (very popular with farmers)

*Organising a broadcast with a representative of a leading radio station in Ghana*
● Drama/dance presentations
Organised in remote cocoa farming community in Nigeria (CRIN, 2009) to educate farmers in:

- chemical control during cocoa production
- changes in Nigerian pesticide regulations as a consequence of new EU legislation
- economic implications of not adhering to national regulations

Three men representing a cocoa tree (middle) tormented by black pod disease and mirids

Two farmers, one using banned and one using approved chemicals
Benefits to approach:

- direct engagement within local (village) community
- suitable for the many illiterate farmers among the audience
- enjoyable but informative – key messages are remembered

*Men representing approved chemicals dance to celebrate their victory over mirids and black pod*

*Cocoa farmers in attendance*
Benefits to approach:

- attracts a variety of observers – ‘spreads the message’

Village children attracted by performance

Dignitaries in attendance
• **Wide range of communication materials produced**
  
  - prepared to complement other awareness raising activities
  - distributed to many stakeholder groups, some on a large scale

  Include..............
- describe major pests and diseases of cocoa
- depict approved products
- describe best agrochemical practice for control
- prominently displayed in agrochemical stores - to help farmers select the right product for their needs (and also guide retailers!)
advisory information conveyed in the *Ghana Cocoa Farmers Newspaper*........

- jointly produced by CABI, Cocoa Research Institute of Ghana and Cadbury

- prepared in simple (non-technical) language

- 50,000 additional copies of an 3rd edition reproduced and distributed (dedicated to pest and disease control & use of recommended pesticides)
in several editions of *GroCocoa* newsletter

- produced by CABI
- financial support from USDA
- published biannually
- >500 copies distributed in 46 countries
International Pest Control

Training/advisory manual
(published by ICCO)
Various articles published in national & local newspapers & websites

- describe the project research and activities
- list approved and prohibited pesticides
- reported proceedings of workshops etc
- highlight relevant sources for further information and advice
Concluding points
Concluding points

- Potential for new EU pesticide legislation to impact negatively on cocoa trade
- Legislation of other importing countries (Japan, USA) could have similar effect
- Industry and origin countries must work together to identify and address inappropriate practice and ensure adherence to legislation
- Research in W Africa already provided important baseline data for region where measures for improvement being promoted and implemented
- Provided tools to allow continued monitoring and review of pesticide practice in the region
- Tools equally applicable to better understand and improve on pesticide use in other origin countries, to which other regulations may apply (e.g. Indonesia)
Concluding points

● Information obtained in W Africa can be of use to other importing regions

● However - where changes in practice required – important to carefully consider:
  - differing approaches available
  - ease of introduction
  - implications for ‘end users’ e.g. practicality/timeframe of implementation, costs involved

● Industry to keep origin countries informed/updated on status of legislation

● Provide advice and support as necessary (financial, information, training) – to allow countries to act accordingly and swiftly

● Reduce or remove reliance on/use of pesticides through rational selection/application and promotion/adoption of alternative/complementary non-chemical measures
Thank-you

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CAB International (CABI):
Not for profit intergovernmental organization specialises in scientific publishing, research and communication worldwide to solve problems in agriculture and the environment. Mission and direction influenced by 40+ member countries.

European Cocoa Association (ECA):
Trade association representing the European cocoa sector and regrouping the major companies involved in cocoa bean trade, processing, warehousing and related logistical activities

Association of Chocolate, Biscuit and Confectionery Industries of the European Union (CAOBISCO):
Association representing, protecting and promoting interests of >1800 companies manufacturing chocolate, biscuits and confectionery in Europe

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