

**PROCEEDINGS OF THE WORKSHOP ON POST-REGISTRATION AND
SUSTAINABILITY OF PESTICIDE MANAGEMENT**

ORGANIZED BY

MINISTR OF AGRICUTURE

**ANIMAL AND PLANT HEALTH REGULATORY DIROCTORATE AND
PESTICIDE RISK REDUCTION PROGRAM-ETHIOPIA**



A GROUP PHOTO

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ADDIS ABABA, ETHIOPIA

ETHIOPIAN INSTTIUTE OF AGRICULTURAL RESEARCH, HIRUY HALL

Compiled by Alemayehu Woldeamanuel and Professor Paul Van den Brink

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1. Workshop programme

Workshop on the development of strengthening of post registration capacities and current activities of sustainability of pesticide management system in Ethiopia.

Date: 21 June 2012, Addis Ababa, Ethiopia

Venue: Ethiopian Institute of Agricultural Research, Hiruy Hall

Time	Topic	Resource Person & Affiliation
Session 1: Registration and opening speech		
08:30-09:00	Registration	Facilitator Ato Alemayehu Woldeamnuel
09:00-09:15	Opening speech	Ato Fikre Marksos Deputy Director Animal and Plant Health Regulatory Directorate/ Ministry of Agriculture
09:15-09:30	Participants Introduction	Facilitator Ato Alemayehu Woldeamnuel
Session 2: Overview of the Pesticide Reduction Programme Ethiopia, specific activities in connection to sustainability of pesticide management and the TCP –FAO project- Enforcement of post registration capacities for better pesticide management in Ethiopia Chairperson: Dr Belay Simane, Addis Ababa University Rapporteur: Dr Merkuza Abera, Bahirdar University		
09:30-09:45	Introduction to the Pesticide Risk Reduction Programme- Ethiopia	Ato Alemayehu Woldeamnuel, Coordinator, Pesticide Risk Reduction programme – Ethiopia, APHRD, MoA
09:45-10:00	Activity plan in connection to sustainability of pesticide management (WP D of PRRP-Ethiopia)	Professor Paul van den Brink, Alterra, Wageningen UR, The Netherlands
10:00- 10:20	Introduction to TCP FAO Project-Enforcement of post registration capacities for better pesticide management in Ethiopia	Ms Francesca Mancini, FAO, Rome
10:20-10:40	Discussion	Chairperson
10:40-10:45	Group photograph	Expert from public Relation Directorate
10:45-11:10	<i>Coffee break</i>	-
Session 3: FAO national experts to propose strategies to improve pesticide management from import to disposal Chairperson: Dr Belay Simane, Addis Ababa university Rapporteur: Dr Merkuza Abera Bahirdar University		
11:10-11:25	Improvement of pesticides registration based on the results of PSMS template	Ato Gizachew Assefa
11:25-11:40	Recommendations to prevent pesticide residues in crops	Ato Eshetayehu Tefera
11:40 -12:00	Discussion	Chairperson
12:00-12:15	National pesticide container management strategy	Ato Shimelis Hassen
12:15-12:30	Proposed monitoring system for risk reduction of pesticides on public health	Ato Tadesse Amara
12:30-13:00	Discussion	Chairperson
13:00-14:10	Lunch Break	-
Session 4: Baseline study plan on pesticide use by farmers and capacity building of health professionals and three PHD proposals related to health, environment and governance towards sustainability of pesticide management Chairperson: Dr Dereje Gorfu Rapporteur: Ato Gizachew Assefa		
14:10-14:30	Baseline study plan on pesticide use by farmers and capacity building of professionals (Work Package E of PRRP –Ethiopia)	Ato Bekele Dinku, APHRD
14:30-14:50	Aquatic Ecological risk assessment of pesticide in Ethiopia	Ato Berehan Melese, PhD student
14:50-15:10	Discussion	Chairperson
15:10-15:30	Human health effects of chemical pesticides in Ethiopia	Dr Beyene Negatu, PhD student
15:30-15:50	Sustainable pesticide governance in Ethiopia	Ato Belay Tizazu Mengistie, PhD student
15:50-16:15	Coffee Break	
16:15-16:40	Discussion	Chairperson
16:40-17:00	Recommendations, next steps	Chairperson and workshop participants
17:00	End of the workshop	Facilitator, Ato Alemayehu Woldeamnuel

2. Preface

Currently, pesticide management issue has got much attention by Ethiopian government in order to attain high quality agriculture produce for local consumption and export trade, protect the health of citizens and the environment in general.

In view of this, the Animal and Plant Health Regulatory Directorate (APHRD) of the Ministry of Agriculture(MoA), Alterra of Wageningen-UR and Food and Agriculture Organization of the United Nations (FAO) have been implementing a joint programme, Pesticide Risk Reduction Programme –Ethiopia (PRRP-Ethiopia) since late 2010.

Among the work packages elaborated in the programme, the work package D deals “with sustainability of developed systems” in which capacity building towards development of technical and scientific platform is undertaken and the work package C included under TCP of FAO covers strengthening of post registration capacities for better pesticide management in Ethiopia.

In connection to these major project components, the APHRD of MoA in collaboration with PRRP-Ethiopia and FAO has organized a one day workshop at Ethiopian Institute of Agricultural Research, Hiruy Hall, Addis Ababa on June 21/2012 starting 8:30 A.M to aware stakeholders, universities and Agricultural Research Institutes regarding:

- Development of technical and scientific platform, specifically 3 PHD research study proposals related to health, environment and governance towards sustainability of pesticide management
- Existing capacity and gaps in the areas of pesticide data inventory, inspection and control of pesticide quality, management of pesticide containers, pesticide use in agriculture and health issues related to pesticides

3. Session 1: Opening speech

The opening speech was given by Ato Bekele Dinku, on behalf of Ato Fikere Markos, Deputy Director, Animal and Plant health Regulatory Directorate of the Ministry of Agriculture as follows.

Dear honourable guests

Workshop participants

Ladies and gentlemen

It is my great pleasure to be here among you distinguished guests and stakeholders at this workshop on Development of strengthening of post registration capacities and current activities of sustainability of pesticide management system in Ethiopia. On behalf of the Animal and plant health Regulatory Directorate of the Ministry of Agriculture, I welcome all of you wholeheartedly to this workshop. Special welcome is for our guests who have travelled from Netherlands and Italy, specifically coming from Alterra of Wageningen University Research centre and Headquarter of Food and Agriculture Organization of the United Nations (FAO) to provide technical backstopping and share their experience with us. I also wish to thank personnel from Alterra and FAO and Ethiopian experts of the Pesticide Risk Reduction Programme who have been involved in planning and providing logistic support to make this event possible in a very conducive environment.

Dear Workshop participants

Ladies and gentlemen

Over the last 12 years the issue of sustainable pesticide management has received much attention by the country and in collaboration with the Food and Agricultural organization of the United Nations(FAO) and several international donors the Ethiopian Government has made considerable efforts to address one of the biggest environmental problems, that is the disposal of huge accumulation of obsolete pesticides through series of three projects since the year 2000. Under these projects, significant national capacities have been built in areas of obsolete pesticide management including prevention of further accumulation of obsolete pesticides. As part of prevention strategy, Integrated Pest management Farmer Field School on cotton crop has been demonstrated. Moreover the pesticide legislation reviewed and several training courses and awareness creation sessions in connection to obsolete pesticides and pesticide risk reduction measures have been conducted.

As a follow- up to these remarkable achievements, the Animal and plant Health Regulatory Directorate of the Ministry of agriculture (MoA), Alterra of Wageningen University Research centre and Food and Agriculture of the United Nations (FAO) have been implementing a joint programme, Pesticide Risk reduction Programme – Ethiopia(PRRP-Ethiopia) since late 2010.

Among the work activities elaborated in the programme, the work package D deals with “ sustainability of developed systems” in which capacity building towards development of scientific platform is undertaken. Moreover the work package C included under TCP of FAO links to “ Strengthening of post registration capacities for better pesticide management in Ethiopia”

In this connection during this one day workshop the following topics will be presented

- Overview of the Pesticide Risk Reduction Programme Ethiopia, specific activities in connection to sustainability of pesticide management and introduction to the TCP –FAO project- Enforcement of post registration capacities for better pesticide management in Ethiopia
- Highlights of findings and proposed relevant strategies with regard to strengthening of pesticide management throughout the whole pesticide cycle from import to disposal will be presented by 4 FAO national consultants

- Development of technical and scientific platform, specifically 3 PHD research study proposals related to health, environment and governance towards sustainability of pesticide management will be presented

Dear Workshop participants

Ladies and gentlemen

It sounds symbolic that we are holding this workshop today to bring the issues of post registration and sustainable pesticide management to the attention of researchers, universities and several stakeholders and strengthen awareness on the same.

I also believe that the activities included in to the agenda of the workshop programme: presentations, information as well discussion outputs will make significant contribution for solving various pesticide management problems at the national level

Finally, wishing you a successful deliberation I declare the workshop opened.

Thank you for your kind attention

4. Session 2: Introduction to Pesticide Risk reduction Programme –Ethiopia

4.1 Introduction to the Pesticide Risk Reduction Programme-Ethiopia

Presenter: Alemayehu W/Amanuel, Pesticide Risk reduction programme Ethiopia, Coordinator.

The rationale behind to start the Pesticide Risk reduction Programme-Ethiopia (PRRP-Ethiopia) and the efforts made by APHRD, Alterra and FAO to elaborate a full-fledged project document was explained. The overall goal of the programme is to contribute to a well-functioning legal system for pesticide use in Ethiopia in order to regulate pesticide use by farmers, taking into account the environment, health of the growers and surrounding community, and stimulating the economic performance of the Ethiopian agricultural sector.

PRRP-Ethiopia partners are Ministry of Agriculture, Alterra and FAO and funding is obtained from Government of Ethiopia(in kind), Government of Netherlands-Ministry of foreign affairs (€ 195000 (4 years), FAO-Technical cooperation programme (US\$465000 (2 years). SAICM-Quick Start Programme will also provide in the order of USD 190 540 (2 years) in the near future.

Objectives of the programme are:

- To develop a legal framework for the registration and post registration of pesticides.
- To develop a proper pesticide registration system for Ethiopia and train local staff on dossier evaluation.
- To develop a post registration system (including pesticide quality control, monitoring, inspection, storage of pesticides, capacity building and training).
- To develop approaches and mechanisms that will ensure the sustainability of a effective Ethiopian pesticide management system in the long term.
- To execute an impact assessment of the new (post) registration system.

The above mentioned objectives are realized through the implementation of 6 work packages: Management, legal frame work, pesticide registration, post registration, sustainability and impact assessment.

Project achievements for the period covering from February 2010 to May 2012 per work package was presented as follows.

Work package O. Management

- As a visibility and communication strategy work 9 types of posters,3 newsletters are produced and the newsletters was distributed to more than 50 stakeholders and personnel. Moreover a website is realized for the project and Summary/information about the processes and results in connection to each workshop, training and meeting held from October2011-May2012 has been released in the Project website.
- The project in collaboration with APHRD abled to solicit USD 190540 from UNEP-SAICM for developing bio-pesticide regulation and evaluation.

Work package A. legal frame work

- Important elements obtained from stakeholders meeting have been incorporated in the draft pesticide registration and control regulation.
- However the same document will be further amended with the assistance of FAO Legal personnel in the near future

Work package B1 Strengthening of pesticide registration administration system

- APHRD staff were trained on the administration of pesticide registration
- Study tour was made by AHRD staff to Netherlands to get experience on pesticide registration procedure

- A pesticide Registration System(PREMAS) software has been developed

B.2.1 Development of Scientific evaluation system for registration of chemical pesticides

- 15 crop protection researcher/ experts trained on efficacy testing of pesticides
- 16 crop protection researcher/experts trained on trial execution, statistical analysis, reporting and evaluation
- 18 Crop protection researchers trained on developed pesticide efficacy testing protocols

B2.1 Environment, public health (operator and consumer health) risk assessment

- 15 participants representing different stakeholders and APHRD are trained on environmental risk assessment and protection goals
- 11 participants representing different stakeholders and APHRD trained on human health risk assessment
- 14 participants are trained on MRL and consumer health risk assessment
- 10 participants trained on environmental risk criteria for pesticide registration
- Development of evaluation manual for registration of chemical pesticides in connection to environment, human health (occupational and consumer health) is in progress

Work Package C. Development of a post-registration system for pesticides (TCP-FAO component)

- Capacity development of pesticide management in Ethiopia - Review and planning workshop was held
- Update the list of equipment
- Laboratory equipment for quality control of pesticide were purchased and some of them are in use currently.
- Two chemists trained on quality control at Belgium
- Five consultancy studies on strengthening post registration capacity has been conducted.

Work package D. Sustainability

- Three PHD grants to support research projects contributing to sound management of pesticides
- Annual meeting with the private sector to ensure information exchange
- Annual meeting with farmers and agricultural commodity organizations to ensure information exchange

Work package E Impact assessment

- Baseline study start-up meeting
- Baseline study on registered pesticides, less toxic and safer alternatives
- Recruitment process for hiring two consultants 1) on farm survey and pesticide users and 2) on health professionals is under progress

Questions /comments

Question/comment by Ato Hassen Ali- FAO Ethiopia

The pesticide management program has performed well and obtained good results. Has the outcome of the programme linked with other initiatives like AGP?

Comment by Dr Tarekegne Berehanu

In addition to MoA projects like AGP, there should be more synergy/ collaboration /integration between the Pesticide Residue laboratory of APHRD supported by JICA and TCP –FAO giving support to APHRD with regard to strengthening pesticide quality control laboratory.

Comment by Ato Tadesse Amara

Project activities should be integrated with programs of government and non-government institutions, universities and research organizations

4.2 Activity plan in connection to sustainability of pesticide management (WP D of PRRP-Ethiopia)

Presenter- Professor Paul van den Brink, Alterra, Wageningen UR, The Netherlands

WP D: Sustainability of the developed systems

Aims

- To develop approaches and mechanisms that will ensure the financial and scientific sustainability of the Ethiopian pesticide management system in the long term.
- How?
- Economic feasibility study
- Development of a permanent information exchange platform
- PhD grants

Who?

- Lead: APHRD & Alterra
- Addis Ababa University, WU & University of Utrecht, Ministry of Finance and Economic Development (MoFED), Private Sector

Activity 1: Development of an institutionally, legally and financially sustainable pesticide registration and post-registration system

- Feasibility study for a sustainable pesticide(post-)registration system (institutional, legal and financial aspects).
- Workshops on the feasibility study, resulting in a recommended national approach.
- Amendment of regulations and/or government policies or strategies

Activity 2: Development of a permanent information exchange platform with the regulated community

- Annual meetings with the private sector and farmers to ensure information exchange and coordination of activities regarding pesticide management
- National workshop on options to implicate relevant national research organizations and relevant other government structures in a formal consultation platform that will support APHRD with advice on issues related to the registration of pesticides.
- Development of a curriculum on sound pesticide management, for medium and higher education
- PhD grants to support to research projects contributing to the sound management of pesticides
- Long-term collaborative agreement for technical and scientific backstopping with a European pesticide registration authority and/or relevant European research institution(s).
- National workshop on a formal consultation platform that will support APHRD
- Inventory will be made on the expertise available on the registration of pesticides
- Topics include: efficacy and quality, agronomy, residues, environmental side effects, human health related effects, pesticide governance and management, monitoring of impact
- More?
- The platform will be supported by the three PhD students

Questions for discussion

- Do we need expertise on more topics?
- How can we organise the platform?
- How formal should the platform be?
- Regular meetings or irregular ones?
- Meetings with whole group or bilateral meetings?
- How to update membership?
- Financial support needed?

- Etc.

Questions/comments

Comment by Nigusie Alemayehu

Having three or more projects working more or less in isolation, it is difficult to clearly see the roadmap down the line. First have aligned and coherent program with a common goal. Then would it be possible to work out the modality (platforms for example), who (stakeholders) should do what and think about sustainability before anything else.

Question/comment by Dr Abduraheman Abdulahi

There are a number of platforms available; recently we have established Pesticide Stewardship Association of Ethiopia. Why do not we use the available platforms, instead of establishing a new one.

Comment by Nigusie Alemayehu

With regard to organizing “a platform” we need to understand the platform as technical working group feeding the Pesticide advisory Board with technical matters. Thus let the need be brought to the attention of the board and with their consent one or more platform formed.

Comment by Ato Hassen Ali

The participants of the workshop need to further discuss how the results of the programme could be sustainably supported.

4.3 Introduction to TCP FAO Project-Enforcement of post registration capacities for better pesticide management in Ethiopia

Presenter- Francesca Mancini, Pesticide Risk Reduction Group, FAO, Rome

The FAO Technical Cooperation Project –PRRP work package C is signed by MoA and FAO to be implemented between January 2010- Dec 2011 and extended to Dec 2012. The budget allocated for the project is in the order of USD 465,000.

Objective of the project: To strengthen pesticide management capacities for safe use of pesticides in agriculture.

The project has 4 outputs namely:

Output 1- National network for the management of the pesticide lifecycle in Ethiopia

Output 2- Pesticide inspection and quality control system

Output 3- system for risk reduction of pesticide residues in agricultural products developed

Output 4 Laboratory for the analysis of pesticides for quality control upgraded

Achievements

Achievements in connection to each output is outlined below.

Output 1- Pesticide post-registration, stock management

- Data base of registered pesticides: Pesticide Stock Management System (PSMS) deployed
- PSMS for pesticide management is being upgraded

Output 2- Pesticide inspection and quality control system Inventories have been completed in connection to the following

- Identification of institution and stakeholders involved in storage and distribution
- Pesticides importers, main distributors, retailers and sellers
- Pesticide import quantities by distributor
- Pesticide storage and estimate of usable and obsolete stock

Output 3- Residue risk reduction

- By conducting 2 field studies on pesticide use, covering about 1000 farmers, most used pesticide active ingredients, most treated crops and hotspot areas have been identified
- Container management assessment
 - Weight of empty containers by sector (migratory pests, horticulture, floriculture cotton, coffee and malaria prevention) has been estimated
 - The current national capacities for collection, cleaning & crushing of empty containers and potential recycling options have been evaluated

Output 4- Upgrading of laboratory for pesticide quality control

Laboratory capacity and training need assessment were conducted by international FAO consultant. Moreover, FAO has supported the training of 2 national pesticide analysts at WALoon Agricultural Centre (CRAW-W),Belgium on quality testing of technical and formulated pesticides. Existing laboratories have been upgraded with high performance liquid chromatography, gas chromatography and consumables. Some of the equipment are being used to develop protocols for pesticide residue analysis under a collaboration with the national JICA-funded project.

Planned activities

1. Assigning 1-2 pesticide registration experts for using PSMS and 1-2 personnel for registration data entry.
2. Add information on pesticide use and pests
3. Provide training for APHRD staff on PSMS so that PSMS become fully operational for registration.
4. Conduct revision of registered pesticides so that
 - Highly hazardous pesticides (HHPS) would be identified using the recent field survey information and the elaborated baseline data on registered pesticides and data of further field assessments.
 - De-registration or other mitigation measures of HHPS would be effected.
 - Registration of bio-pesticides would be started
5. Establish a network by
 - Uploading of inventory in connection to pesticide inspection and control in PSMS
 - Effecting pesticide stock and distribution management by tracking pesticides from import to disposal by sector and use on crops
 - Conducting training for inspectors, customers, distributors and dealers on pesticide inspection, application and stock management.
6. Conduct additional field survey for risk assessment of pesticide residues in selected crops which enable to investigate the exact dose applied, application date etc. This survey most likely would be conducted in September and would contribute to the identification of pesticide-crop combinations among crops for local consumption and export.

Questions and answers

Question by Ato Hassen Ali –FAO Ethiopia

In the presentation we have heard about the National Network (TCP) establishment of Platform (Alterra). Now we need to get the similarity and now we need to get the similarity and difference of these issues and how it can be harmonized.

Answer by Francesca Mancini

The network is related to the development of national network for inspection, quality control of pesticides and management of empty pesticide container. On the other hand according to work package D, Activity 3 Platform meant, development of a technical and scientific support platform which will provide long-term inputs into the national pesticide registration and post-registration system

Question by Dr Belay Semane

Why you have restricted PSMS to certain users only

Answer by Francesca Mancini

Confidentiality of the data is the of the country and different levels of authorization are granted for different personnel, data entry, viewer, validation and administrator.

5. Session 3: Strategies to improve pesticide management from import to disposal

5.1 Improvement of pesticides registration based on the results of PSMS template

Presenter: Ato Gizachew Assefa

Scope of the consultancy work

In order to monitor the distribution and use of imported pesticides the regulatory body needs to have a system to keep track of records. The most important tool to facilitate this task is a data base system. Therefore in order to get access to FAO Pesticide Stalk Management System (PSMS), the necessary information had to be loaded to the data base. Therefore, the objective of this consultancy is to upload the necessary information to the data base system using the provided template for a further use in the PSMS.

Contents of the data base

The data base spread sheet has three pages. The first page is dedicated to Pesticide registration information, the second page lists the active ingredients of the product and the third page contains information on the use of the product.

Registration information

- product registration number
- product name
- manufacturer of the product
- formulation type
- registrant
- date registration will be effective
- date registration will be expired

Active ingredient information

- list of the active ingredient(s)
- concentration of the active ingredient and
- the corresponding units are included.

Usage information

- the target pest
- the target host (crop)
- Pre-harvest interval (PHI)
- dosage
- maximum residue limit (MRL)
- application conditions

Source of information

The primary source for the above mentioned information is the pesticide registration dossier submitted by the registrant. When the required information is missing in the dossier the registrant will be consulted to avail the data. Because MRL values were not presented with most of the dossiers these values were obtained from the codex alimentarius or EU- MRL database.

A list for banned and severely restricted use pesticides is not drawn up in Ethiopia. Therefore, the information were compiled and the template was completed based on the registered pesticides.

The Ministry of Agriculture has recently moved to a new building and offices are not yet properly organized. Pesticide dossiers are simply piled up in a room in a disorganized manner. As a result during the course of the consultancy work quite a long time was required to locate and extract information from the dossiers.

Presentation of results

As it has been mentioned above the main source of information was the dossiers and an effort has been made to go through all available dossiers in search of the information. Registration information is usually available in the application forms in the dossier and active ingredients are given in the composition part. When this information are lacking contacts with registrants were necessary. Similarly, information on usage were not always available and extra efforts were made to further obtain the missing data. Where the information were not available after all those efforts, the column with the missing information was left blank. This was a common encounter especially with the PHI values and to some extent the dosage rates. Except in few recently submitted dossiers, PHI values were not available in the old dossiers. In most of the cases it is given as “ not relevant” for herbicides and flowers.

To regulate pesticides the registration process was commenced in 1996 where about 42 products were registered in that same year. This was the record year where the highest number of pesticides were registered followed by year 2009. In the year 2008 no pesticide was registered (Table.2). This coincides with the year when the ministry was on a reform process. The increase in the number of pesticides registered in 2009 may be accounted for the increased demand for a variety of pesticides in the flower farms and the slowdown of the registration process in the previous year.

Table. Number of registered pesticide products in 1996-2011

Year	Insec-ticide	Herbi-cide	Fungi-cide	Acari-cide	Nemati-cide	Rodenti-cide	Avicide	Aerosol	Others	Total
1996	32	6	4	-	-	-	-	-	-	42
1997	14	15	2	-	-	1	1	2	-	35
1998	3	4	5	-	-	1	-	-	-	13
1999	5	2	1	-	-	-	-	-	1	9
2000	11	-	-	-	-	-	-	-	-	11
2001	-	4	1	2	-	2	-	1	1	11
2002	3	2	3	-	-	-	-	3	-	11
2003	1	2	-	-	-	-	-	1	-	4
2004	3	3	2	-	-	-	-	-	-	8
2005	10	3	3	-	-	-	-	1	-	17
2006	4	3	1	-	-	-	-	-	-	8
2007	2	2	9	4	1	-	-	-	-	18
2008	-	-	-	-	-	-	-	-	-	-
2009	16	2	18	3	-	1	-	-	-	40
2010	11	9	13	-	-	-	-	-	1	34
2011	3	4	5	1	-	-	-	-	-	13
Total	118	61	67	10	1	5	1	8	3	274

Recommendations

- In order to reduce the impact pesticides cause to human health and the environment we need to reduce unnecessary use of pesticides and sensitive populations need to be protected. Therefore pesticide distribution and their use should be monitored and a system to trace them all along their life cycle should be developed.
- Pesticide registration dossiers are important information sources and contain confidential documents. If they are left as they are handled now they will have further damage through time. Therefore, the ministry should look for an appropriate and secured place where the dossiers can be properly shelved and be easily located when they are required.
- Some of the dossiers especially the old ones do not contain the information to complete the data base. Therefore in order to update the available information and complete the missing data registrants should be required to provide all the necessary information in line with this data base especially when they renew their registration.
- Although Ethiopia is a signatory to the Rotterdam convention on the Prior Informed consent (PIC) Procedure for hazardous chemicals and pesticides in international trade, which controls trade in banned and severely restricted pesticides, there are concerns that there is limited information regarding these pesticides. It is therefore necessary to draw up the list of banned and restricted use pesticides in Ethiopia.

Out of the total registered pesticides insecticides constitute 43.07 % followed by fungicides (24.45 %) and herbicides (22.27 %). The remaining 6 types of pesticides have a total share of 10.21 percent (Table 3)

A total of 141 active ingredients were registered throughout the registration process. The proportion follows the same pattern as in the formulated products, the highest being insecticides (34.74%) followed by fungicides (28.36 %) and herbicides (20.56 %)

Questions and answers

Question by Ato Gulelat Teshome – Ethiopian Standards Agency

What was the reason for the downfall fall of registration of pesticides in 2008 as compared to other times?

Answer by Gizachew: Registration of pesticides in 2008 was low because the Ministry was on a reform process and most of the submitted applications were not processed. the following year the highest number of products were registered and this might have resulted from the backing effect of the previous year.

Question by Dr Bernard Mtonga – FAO/SFE consultant group, Production and Protection

Why the list of banned pesticides not done for Ethiopia?

Answer by Gizachew: List of banned pesticides is not drawn up and that is why it was mentioned in the recommendation.

Question comment by Franscessa Mancini

Reviewing the list of pesticides may help as a mechanism to implement de-registration / restricting the use of highly toxic pesticides.

5.2 Recommendations to prevent pesticide residues in crops

Presenter: Ato Eshetayehu Tefera

A pesticide management study was conducted as part of the Technical Cooperation Project (TCP) entitled “Enforcement of post-registration capacities for better pesticide management in Ethiopia” under FAO/TCP/ETH/3301. The study was implemented by the Ethiopian Ministry of Agriculture and the Food and Agricultural Organization (FAO).

The general objective of this study was to document the overall pesticide practices and the risks associated with the local conditions of use to human health and the environment. Coffee, vegetables and fruit crops in their order of importance were considered for the survey. Two major methods, via ‘desk reviewing’ and ‘field surveying and observations’ were deployed to collect information. Desk reviewing refereed about 23 collated in-country documents and relevant global literatures. The on-farms survey was carried out under sampled farmers and stakeholders in six districts of four zonal administrative localities in Oromia and South Nations, Nationalities and Peoples (SNNP) regional states of the country.

During the last two decades, Ethiopia has undertaken important steps in strengthening the national pesticide policy legislation. Moreover, the country has adopted the Stockholm and Rotterdam Conventions on pesticides policy frameworks.

Importation of total pesticides for agricultural purposes noticeably increased from an annual average volume of 1350 tons over the period 1988-1992 to 1800 tons over the period 1994-2002. In 2010, imported pesticide totaled to 4146 tons. A shift from higher proportion of total import of insecticides (69.8%) in the 1988-1992 to herbicides (76.2%) in the 2010 was also recorded. Although the prime focus of this study was on coffee, vegetable and fruit crops; this survey exercise also touched the case of cereals. Accordingly, the usage of pesticides by the surveyed smallholding farmers on their cereal crops showed a higher users’ proportion for herbicides (47%) than insecticides (11%) and fungicides (8%).

In the 2010/11 production season; coffee, vegetables and fruit crops, at country level, were cultivated on about 3.76%, 0.95% and 0.41% of the total cultivated land respectively, whereas grain crops on about 89.1%. Ethiopian smallholding farmers of the surveyed four coffee belt districts never applied any form of pesticides on their coffee (*Coffea arabica* L.) crop implying that they either efficiently used non-chemical control methods or tolerated certain levels of yield reduction due to pests. The advice of organic coffee certifiers and government interveners urging the non-use of pesticides was an important precaution in this practice. Ethiopian state coffee farms also exclude use of all pesticides except herbicides.

In Dugda and Ada districts as well as in the major central rift valley régime of the country, some ten types of vegetable crops mainly tomato (*Lycopersicon esculentum*), onion (*Allium cepa*), head cabbage (*Brassica oleracea*) and others were produced under irrigation with high spray frequencies of pesticides. The production system by both the smallholding farmers and mechanized commercial vegetable farms pursued sequential cropping schedules almost without any season breaks in each year. In these two districts, the use of pesticides on irrigated vegetable farms was a dominant farming practice that cause possible risks to the environment and human health in several forms.

Among pesticides, fungicides followed by insecticides and their mixes were mainly used by both the smallholding and commercial vegetable farmers in the two districts (Dugda and Ada) out of the six districts under the survey. Among some 32 types of pesticides listed during the survey in Dugda and Ada districts, the three prime pesticides were known to be mancozeb 80% WP, kocide 101 and ridomil gold MZ 68% WP from fungicides and thionex 25% EC, helerat 5% EC and malathion 50% EC from insecticides. Most used products were nationally registered pesticides. Doses of usage per spray by both smallholding and commercial vegetable farmers more or less adhered to the labelling of most pesticides while the frequency of spray by the small scale vegetable growers observed to be high. The latter was aggravated by various forms of

pesticide misuses and improper disposal practices of empty containers (bags, bottles, etc) within the vegetables farms themselves.

On contrary, all fruit farmers in the surveyed six districts didn't use pesticides except on papaya (*Carica papaya*) crop by very few farmers in Dugda district. Some other important fruit crops of the study areas such as avocado (*Persea americana*), banana (*Musa domestica* or *M. acuminata*), mango (*Mangifera indica* L.) and all others were produced purely without pesticides especially under the four coffee belt districts.

In order to reduce risks associated with the use of pesticides, the following measures are recommended: pesticide policy monitoring, awareness and training on pesticide technologies, filling research gaps on pesticides, re-initiating integrated pest management (IPM) focusing on natural/biological pest control methods and prompting the guiding principles of no/low external inputs (LEI), further development and use of improved varieties, etc. Focus on vegetables and fruit farmers of the rift valley areas through harmonizing the frequent spray of pesticides and the induced environmental and health hazards of pesticides should be instrumental. Freeing Dugda and Ada farmers from depending on external (sometimes unknown) vegetable seed sources also needs to be complemented.

Questions and answers

Question By Dr Bernard Mtonga – (FAO/SFE consultant –Crop production and protection)

Why is there low knowledge /skills in pesticide management by farmers and why is extension service of Ministry of Agriculture not emphasizing pesticide management but only crop production/husbandry

Comment by Dr Abdurahman Abdulahi

I have not heard from the presentation the status of pesticide residue problem in the country because the title of presentation was pesticide residue s in crops.

Answer by Ato Eshetayehu

The negative impacts of pesticide use at farm level are too much. However he level of pesticide residue need to be tested through laboratory. Each crop e.g. tomato, cabbage, etc. need to be tested for residue like that of coffee in the national Laboratory of Ministry of Agriculture. Developing MRL for these crops in connection to the pesticides used on them is beyond the scope of my study.

Question/comment by Muhiye Endri

Do you use stakeholders' facilities to control pesticide quality (not the registered part) e.g. Lab and Inspection?

As a national body where are we now, in terms of skilled manpower and facilities in relation to pesticide quality analysis

5.3 National pesticide container management strategy

Presenter: Ato Shimelis Hassen

Empty pesticide containers are highly valued in both rural and urban communities and are commonly used for a variety of domestic uses such as storing food items, holding water, transporting a variety of consumable items and brewing local drinks all of which create serious health risks. Empty pesticide containers abandoned in the environment can also lead to pesticide contamination of soil, surface and ground water and this situation in turn would result in poisoning of various terrestrial organisms and aquatic life. In connection to empty pesticide containers, the following factors contribute to human health and environmental risks;

- In most cases (except in flower farms and some commercial farms) empty containers are not triple rinsed or not properly decontaminated after use,
- Disposed in unacceptable ways example, burn in open air or in 200 litre drum incinerators, buried, simply thrown away anywhere, etc.
- As described above used for other purposes including for storing food and water
- Sold in markets as general commodities

The negative impact of empty pesticide containers to human health and the environment and the challenges constraining their management in the country have been one of the motivations behind the TCP FAO project on “Enforcement of post registration capacities for pesticide management” in Ethiopia.

With this view, under this project, the present consultancy “Development of national network for the management of empty containers” has been conducted in order to contribute to system development for risk reduction of pesticide residue in agricultural crops.

The overall objectives of the consultancy assignment are:

- Develop a national strategy for the management of empty pesticide containers in Ethiopia(including agricultural and public health sectors) for Ethiopia
- Provide a detailed proposal for the management of empty pesticides containers including technical itinerary (collection points, frequency, transport, main collection centre, cleaning/crushing and recycling, required logistics and responsibilities and estimated costs in coffee production areas of Ethiopia.

Present and discuss the proposed national strategy and the pilot projects for the management of empty pesticide containers in coffee production areas (later changed to high pesticide use areas in Central Rift Valley and Flower Farms) at a national workshop.

In order to fulfil the above mentioned objectives, pesticide use and associated empty pesticide containers including the status of accumulation the same containers were assessed. Moreover the efforts made by FAO in connection to donation of a drum crusher and renovation of metal store to house the drum crusher and the training of 6 Moa staff for operating the machine is discussed.

In Ethiopia about 287 tonnes of empty pesticide containers (primary packaging materials) have been accumulated each year. The most frequently discarded form of packaging and the largest in total weight and volume (172 tonnes, 60%), is the various forms of rigid plastics. The one litre high density poly-ethylene (HDPE) container is a very common size for liquids. And lesser size (500ml) is also common. These are undoubtedly the result of both the combination of cost and small scale farming prevalent in the country. These packages are white or natural in colour and appear to be pure or nearly pure fractional melt HDPE with possibly a thin layer or liner of another form of plastic in some cases. These packages have a high value as a recyclable.

The 2nd frequent (46 tonnes, 16%) type of package is flexible polyethylene, which is intended to pack solid pesticides. The average annual accumulation of such type of primary container is about 46 tonnes (of this 41 tonnes is used for packaging of malaria vector control pesticides). However, recycling of such plastic is not common worldwide.

The composition of pesticide containers is thought to depend less and less on metals for a packaging material worldwide, yet the 3rd (42 tonnes, 14%) and 4th (15 tonnes, 5%) most frequent packaging material for pesticides in Ethiopia is recorded as steel drum and “can”. Presumably this is a coated steel can. The steel drums are mainly used for the packaging of pesticides destined for the control of trans-boundary and cotton pests. Cans/ tins have been used for the packaging of aluminium phosphide. Aluminium (probably a metalized plastic) is also a player in the packaging of solid formulations mainly fungicides.

The 3rd (42 tonnes, 15%) and 4th (16 tonnes, 6%) most frequent packaging material for pesticides in Ethiopia is recorded as steel drum and “can” respectively. Presumably this is a coated steel can. The steel drums are

mainly used for the packaging of pesticides destined for the control of trans-boundary and cotton pests. Cans/ tins have been used for the packaging of aluminium phosphide. Aluminium (probably a metalized plastic) is also a player in the packaging of solid formulations mainly fungicides. When contemplating any recycling programme, the products that were contained in the original packaging are a factor in planning. Analysis of the 2008-10 pesticide consumption of the country confirms that 64.5% of pesticides utilized were herbicides, dominantly 2,4-D and glyphosate. Since herbicides are usually less toxic to humans, this means that the aggregate disposal of pesticide packaging is currently less toxic than some other places in the world and the toxicity of plastic recovered in Ethiopia container collection programme must also be assumed to be less toxic than the aggregate materials recovered. However, the third most frequent utilized pesticide is endosulfan whose containers may not be allowed for recycling (Potential POP Pesticide). The following table shows average annual accumulation (2008-10) of empty pesticide containers in different sectors.

Container Material	Agriculture					Agriculture total kg	Pub. H kg	G. Total kg
	Flower kg	Cotton kg	Coffee kg	Mig. Pest kg	Others kg			
Aluminium	376	-	-	-	7,666	8,042	-	8,042
Can / Tin	-	-	-	-	15,377	15,377	-	15,377
Fibre drum	-	-	-	-	2,015	2,015	-	2,015
Rigd PI (HDPE, Co-EX)	4,649	31,267	3,496	-	132,958	172,370	-	172,370
Paper/ lined	781	-	-	-	1,267	2,048	-	2,048
Plastic (flex)	593	-	-	-	4,166	4,759	41,300	46,059
Steel drum	-	7,461	-	4,670	29,780	41,911	-	41,911
G. Total	6,398	38,728	3,496	4,670	193,230	246,522	41,300	287,822

Although there are some plastic factories, which collect and recycle plastic shoes, HDPE scraps (mainly vegetable oil containers) and PET bottle of water in Ethiopia, no facility exists today that could, on short notice, safely collect, redistribute or recycle recovered materials into products that would pose little or no risk for human beings and the environment. Therefore further capacity development of these plastic factories in terms of treatment facilities for wastewater generated while washing (even if the containers are triple rinsed), training and use of strong monitoring system (not to mix with row material to be used for food). Moreover market for recycled products should be ensured and licensing mechanisms for such business should be established. The operator to be trained should have also the necessary facilities and experience in relation to the recycling of the same plastic products. A plastic company, Inova Group of Companies, has showed interest to receive and recycle properly cleaned (triple rinsed) HDPE pesticide containers. However, this potential needs further development to recycle empty pesticide containers because of technical limitations.

In similar to plastic containers, recycling of metal containers that is smelting of metal scraps is common in the country and hence this potential can be used to recycle metal containers but if and only if the containers are properly triple rinsed.

The pesticide management strategy to be implemented in Ethiopia is based on two components namely:

- Strategies for safe collection, decontamination and recycling /disposal of legacy empty containers
- Strategy for sustainable empty container management (on farm decontamination, collection and recycling of contemporary empty pesticide containers)

The first component comprises two options: Option 1. In country recycling of steel and old ridged plastic containers and option 2. Crush/shred steel drums and rinsed plastic containers for overseas disposal.

This consultancy studies gave much emphasis on the second component and strategic goals and objectives have been elaborated for sustainable empty container management strategy and seven guiding principles and approaches have been described for the same strategy. The public private partnership is one of the guiding principles/approaches and discussed the following strategy topics.

- Active involvement of all stakeholders through a comprehensive consultative and participatory approach and establishing national EPCs focal point and steering committee involving several stakeholders
- Raising public awareness through information and education
- Institutional, systemic and human resource capacities in connection to sustainable container management
- Strategy for container cleaning and rinsing
- Collection strategy/networking of collection centres for collection of containers from small holders (mainly 1 L HDPE), commercial farms(including flower farms)
- Promote and implement waste management hierarchy that includes: Avoid/reduce, reuse, recycling, recover, destruction and, sequestration and disposal.
- Short term and long term strategy for financing/funding requirements and mechanisms
- Legislation and enforcement – enforcement capacity building and issuance of regulation on directives based on the proclamation
- Conducting risk management measures
- Develop scale up strategy: Design pilot project for the management of empty pesticide containers in hot spot areas then scale up to other areas phase by phase

The consultancy document also elaborated the container stewardship conclusions and also outlined the major tasks to be conducted in short to medium term period. Moreover, a pilot project is proposed.

Recommendations

General

It was difficult to trace the where about of each pesticide and/ or the containers after import. Even the importers/ distributors didn't register information on the type and size of packages other than registering the quantity of pesticide sold and related information for tax purposes. At the Animal and Plant Health Directorate (APHRD) of MoA, import data have been registered but no information is recorded on size and type of packaging except mentioned in dossiers submitted for registration purpose. The following are recommended to alleviate these problems

- Develop post registration monitoring system so that it would be possible to follow up pesticides throughout their life cycle
- Pesticide importers/ distributors to keep detail record on the pesticide they have sold (including the containers)
- Establish a standard data base like FAO-PSMS so that full information would be recorded
- Enforce so that each pesticide would be utilized for the purpose it is registered

Recommendations related to EPCs Management

1. In order to deploy fully fledged container management capacity in connection to containers generated from migratory pest control operation, besides to drum crusher donated by FAO the following are recommended.

- Purchasing and installation of mobile plastic shredder including training of staff on the operation of the same equipment
 - Purchasing of washing machine for shredded plastic material and appropriate detergent
 - Refresher training for those who took a training on the operation of the drum crusher and additional training to staff on operation of the same equipment
 - Installation of Tanks for washed water effluents and oil water separator, drums with activated carbon in connection to plastic container management.
2. Regarding to management of old containers, which have been left behind without rinsing, overseas disposal by high temperature incineration is recommended as there is no safe option is available locally. However, feasible option would be assessed in detail by a container management technologist as ASP Ethiopia has planned to conduct a full-fledged container management technology assessment study.
 3. The United States President's Malaria Initiative has been supporting Ministry of Health to undertake a pilot project on malaria control in Oromia Region. Among the various tasks the pilot project supplies insecticides (for Indoor Residual Spray) packaged in biaxially oriented polyethylene terephthalate (boPET) film sachets that contained water dissolvable polyvinyl alcohol covering over the actual pesticide. This type of packaging needs scaling up both in Public Health and Agriculture sectors as it is safer to applicators and minimizes burdens to the environment.
 4. Though Inova has showed interest and has potential (capacity) to receive and recycle properly cleaned or triple rinsed HDPE pesticide containers, however, the following are recommended:
 - Conduct an Environment and Social Impact Assessment including health impact assessment and operate as per the output of the assessment
 - Provision of training to workers on safety issues
 - Strong commitment to separately process pesticide containers from other scrap plastic and to use the recycled raw material only for authorized purpose
 - The company must be committed to apply high standards of safety to workers (e.g. using appropriate PPE, periodic medical check-up) and also not to pollute the surrounding environment
 - No regulation or mechanism to decide on what to manufacture from the recycled raw materials (the use of end product) hence special permission is required
 - Needs strong monitoring (not to mix with raw materials to be used for food)
 5. Detailed market assessment regarding to recycled end products. The establishment of a pesticide container stewardship programme (a voluntary scheme) administered by public private partnership is recommended as a viable possibility in the short and medium term. The timing for implementing an effort of this type should be now, since Ministry of Agriculture is drafting Pesticide Registration and Control Regulation. The following are the major tasks to be conducted in short to medium term period.
 - Establish national focal point and/or a steering committee composed of key institutions, NGOs/ CSOs, private sector (Public Private Partnership),
 - Secure donor funding, levies from importers,
 - Implement awareness raising campaign mainly on triple rinsing (on farm cleaning of containers) and teaching the general public on public health and environmental risks is a top priority task to be undertaken,
 - Build human resource capacity (study tours, trainings) local recycling capacity of recycling plastic containers,
 - Start as pilot project at sites of intensive pesticide use (rift valley, flower and other commercial farms to be scaled-up to a fully-fledged container management programme
 - Promote innovative packaging (water soluble packs, recyclable packaging, etc.)
 - Initiate, mandate and operationalize an incentive scheme aimed at attracting and encouraging triple rinsing and returning of empty containers
 6. In the long run establishing a legally mandated privately owned scheme that ensures all groups contribute to the scheme (financial, by an obligation to return properly rinsed containers to a collection

point, etc.) is recommended. The following are the major tasks to be conducted in short to medium term period.

- Fully fledged scheme (funded by levies collected, resource recovery, etc.) and administered by the private sector (creating a stewardship community).
- Development of partnerships between governments and recycling companies or individuals in countries where the recycling waste industry is more advanced. These partnerships should be able to facilitate the smooth transportation or trans-boundary movement of the recyclable materials from collection points in-country to the recycling companies overseas if required.
- Active involvement of all stakeholders through a comprehensive consultative and participatory approach
- Raising Public Awareness through Information and Education
- Promote innovative packaging (water soluble packs, recyclable packaging, etc.)
- Develop regulations (to classify triple rinsed containers as non-hazardous waste and to regulate the final use of recycled products)

Questions and answers

Question by Francesca Mancini

Some countries considered levy system to implement container management scheme. Would levy system be feasible in Ethiopia?

Answer by Shimelis Hassen

As the volume of pesticides imported or use of pesticides in Ethiopia is very low in Ethiopia, collected levy from the pesticide business men may not be sufficient to cover all costs in connection to container management scheme. However levy system is recommended for long term strategy

Questions and comment by Glenn

When can container collection scheme would start (Triple Rinse + Puncture) in Ethiopia?

Answer by Francesca Mancini: TCP of FAO has developed a strategy. Funding has to be initiated by certain body to implement the strategy.

Questions by Glenn

Can Triple rinsed and punctured plastic containers be recycled in Ethiopia?

Answer by Shimelis

No dedicated recycling company is existing in the country. But one company showed interest to collect and recycle Ethiopian pesticide containers to produce sewerage pipes etc.

Comment by Glenn

One of the problems in connection to PPE utilization is associated to high tax of PPE. PPE is taxed 125% in Ethiopia.

Stakeholders should restrict access to household pesticides and should be advised to separate clothing (not to mix with other clothing) and wash their body and spray clothing after use and separately washed in household laundry.

5.4 Proposed monitoring system for risk reduction of pesticides on public health

Presenter: Ato Tadesse Amera

General objective

To develop the capacities in reporting; which can assist the establishment of monitoring and reporting health incidents caused by severely hazardous pesticide formulation in Ethiopia by taking Dugda District of Oromiya Region and Dale District of Southern Nations, Nationalities and Peoples Region as pilot areas of intervention.

Specific objectives

- To raise awareness of major stakeholders on health effects due to SHPF
- To assess human health exposure to SHPF and their effects
- To create link to local authorities of the pilot areas for monitoring and reporting health incidents caused by SHPF

Main results

Pesticide spraying and the use of Personal Protective Equipments (PPEs)

Pesticide spraying in both districts was handled by either members of the family mainly fathers, mothers and sons and they also use hired labour. During the survey, we could interview 53.8% in Dale and 53.3% in Dugda who themselves were pesticide sprayers. Sprayer fathers accounted for 74.8% and 18.6%; sprayer mothers accounted for 3.5% and 0.2%; and sprayer sons were 6.9% and 9.9% for Dale and Dugda respectively.

The minimum pesticide application frequency in both districts was once per cropping season and the maximum was 30 and 41 with average frequency of 6.5 and 9.6 for Dale and Dugda respectively.

When we discussed with the local agriculture offices if they did a follow-up of the frequency of pesticide application for different pesticides used in the districts, both offices informed us that they have data for insecticides, herbicides and fungicides that the farmers apply for vegetable production.

The average land holding of farmers was 0.2 hectares for Dale and 2.2 hectares for Dugda. Individual land holding is larger in Dugda than Dale because of the large scale of commercial vegetable production in Dugda area.

The use of Personal Protective Equipments (PPEs) is not given attention with only 0.5% in Dale and 5.6% in Dugda claimed they are using it properly

Training of farmers by development agents on how to use pesticides, health and safety in relation to pesticides and the benefits of IPM was reported by only 2.1% and 9.2% of the farmers in Dale and Dugda respectively.

Reading and understanding of labels on pesticide containers and following instructions

Containers of pesticides being used in the two districts have labels in English and Amharic with details of the chemical concentration in how to use it. However, only 9.2% of the pesticide users in Dale but 67.5% of farmers in Dugda could read labels on pesticide containers; of which 15.8% of Dale and 53.8% of Dugda pesticide users could understand the written labels; but only 7.4% and 29.1% of the pesticide user farmers in Dale and Dugda respectively could follow the instructions correctly.

The reasons for not reading, understanding and/or following the instructions of labels on pesticide containers were indicated to be either illiteracy and/or following what neighbours, family members or other farmers used to apply.

Moreover, 74.8% of Dale pesticide users and 1.9% of Dugda pesticide users reported that they bought pesticides without labels from open markets; and 65.3% of Dale and 17.4% of Dugda farmers used to use pesticides with labels they don't understand.

Health impacts of pesticides

According to the Rotterdam Convention documents and other health related studies of pesticides, pesticide poisoning is classified in to mild, moderate and severe poisoning.

The symptoms of mild pesticide poisoning are head ache, fatigue, skin irritation, loss of appetite, weakness, perspiration, eye irritation, thirsty and irritation of nose and throat.

The symptoms of moderate poisoning include those mentioned above and trembling, excessive salivation, blurring of vision, chest pain, difficulty of breathing, flushed (yellow) skin, abdominal cramps, vomiting, mental confusion, twitching of muscle, weeping, excessive perspiration, profound weakness, rapid pulse and persistent cough.

The Symptoms of severe pesticide poisoning include the symptoms of mild and moderate poisoning and severe stages of inability to breath, constriction of pupils, convulsion and secretion from respiratory tract, fever and death.

The responses of farmers about the health impacts of pesticides indicated that 12.4% in Dale and 10.8% in Dugda ever felt mixed illness of mild, moderate and severe poisoning after pesticide application. All of the poisoned farmers were not using proper PPE when they were applying pesticides and only 5 each from both districts attended health institutions and got treatment.

The chemicals they were using just before they felt the poisoning were 2,4D, ethiosulfan, helerate 5% EC, mancozeb, selecron and most of them said that they use a mix of these pesticides.

Among the pesticide sprayers, 26% fathers who applied pesticides in Dale and 24.4% father who applied pesticides in Dugda were poisoned. The main causes of pesticide poisoning were improper handling during preparation for 48% in Dale and 11% in Duga; during application for 48% in Dale and 66.7% in Dugda and poor storage for 4% in Dale and 15.5% in Dugda districts. Intentional suicide attempt was the case in 6.7% of the farmers in Dugda district.

When farmers were asked if they have heard of pesticide poisoning incidents in their communities, 34 respondents from each of the districts replied that they heard of it. Twenty five respondents from each district indicated that they knew people who were poisoned but recovered; 11.8% of farmers from Dugda indicated that they knew people who were poisoned but recovered with long term effects and 26.5% from Dale and 14.7% from Dugda said that they knew people died of severe pesticide poisoning incidents.

Regarding reporting of pesticide incidents, only 0.5% of Dale and 10.4% of Dugda farmers said that they know a channel of incident reporting either to their local offices of health or agriculture.

Even if we did not face in the randomly selected households of the two districts, suicide attempts using pesticides was a common phenomenon during the time of survey. We met families who lost husbands, sons and daughters because of suicide committed using pesticides but they could not give us the type of chemical they use, what stages they passed during poisoning and what the reasons for committing suicides were. The common explanation we got from the two districts was that they took the victims to the nearest health institutions.

The assessment of health institutions in the two districts, however, indicated that the health professionals do not have proper training on how to handle pesticide poisoning incidents. It is also found out that every pesticide poisoning incident was registered as merely caused by Malathion without checking the container of pesticides that cause the incident and moreover, it has been difficult to get separate record for pesticide poisoning incidents.

Pesticide storage and empty containers

As has been mentioned repeatedly, the less pesticide risk perception of farmers was reflected in many practices including the place of storage. The preferred pesticide storage place for 76.7% the farmers in Dale and 71.4% farmers in Dugda was kitchen. Any place in the house was also a place of pesticide storage for 23.3% farmers in Dale and 21% farmers in Dugda.

Pesticide containers were found thrown in the field and near water bodies. The farmers in Dale (56.4%) and Dugda (41.2%) also indicated that they have been using pesticide containers for water and/or food storage.

When farmers were asked what they used to do with obsolete pesticides, 54.5% of the farmers in Dale and 23.7% farmers in Dugda indicated that they used to use it whenever is the expiry date; and only 1.5% of Dale farmers and 7.5% of Dugda farmers indicated that they used to ask advise of agriculture development agents.

Conclusion

As all the situations indicated, the task of risk communication to these farmers in the two districts is at its infant stage which should start from telling them that pesticides are “POISONS” not “MEDICINES”.

During the survey, a representative from the Federal Ministry of Health was involved in the process and representatives of local health offices of Dale and Dugda were also assigned as supervisors of the data collection where they could get the details of the situation and the seriousness of the problem. This is a fertile link which can synergize the collaboration of the local agriculture and health offices in mitigating the environmental and human health hazards in the two areas.

The Federal Ministry of Agriculture has strong initiatives like the Pesticide Risk Reduction Project and also supporting the initiative of an association called “Pesticide Stewardship Association” which involves policy makers, intergovernmental agencies, NGOs, Universities, research institutions, pesticide companies, the private sector and grassroots farmers. This association is also trying to commit itself in mitigating the environmental and human health impacts of pesticides in Ethiopia.

This piece of research and other researches organized and conducted by the support of MOA and FAO could, therefore, be baseline for the initiation of pilot projects in these areas which can scale up to national level as a program

Recommendation

Based on the qualitative and quantitative survey results, the following are recommended:

1. A well-organized pilot project at different levels of the pesticide delivery system in the two districts is recommended
2. A well-organized pilot project which can deal with the role of local health institutions and individual health workers in mitigation of pesticide related human health and environmental impacts
3. Establishment of centres for handling poisoning cases in health institutions is important and the public should also be aware of on what to do with such cases
4. A separate and identifiable pesticide poisoning recording system in health institutions

5. Involvement of NGOs and research institutions in the process
6. The use of print and electronic media for information dissemination is recommended
7. Pesticide poisoning reporting with all its preconditions should be initiated in these districts and be scaled up to national level so that the DNA can have proper report which can assist towards informed decision
8. Studies like this should not be project based which will phase out without proper implementation and impact; it should rather be linked with programs of ministries and other governmental and non-governmental institutions.

6. Session 4: Baseline study plan on pesticide use by farmers and capacity building of health professionals, including three PhD proposals

6.1 Baseline study plan on pesticide use by farmers and capacity building of professionals (Work Package E of PRRP –Ethiopia)

Presenter: Ato Bekele Dinku, APHRD

The aim of the work package E of PRRP Ethiopia is to execute a study on the overall impact of the new pesticide registration/post registration system. At the beginning of PRRP-Ethiopia a baseline study has to be conducted that investigate the state of things before the project has had an impact in Ethiopia and after five years the same study will be repeated to assess the impact of the project. The baseline and impact studies will focus on registered pesticides before and after implementation new registration system, pesticide use by farmers, farmers knowledge, capacity building health professionals, empty container management, environmental risk of pesticides, risk on human health, knowledge of pesticide users(retailers, applicators etc.).

In view of this a baseline study start-up meeting was held in October 2011 to introduce the objectives and to discuss the approach and methods among stakeholders. During the start-up meeting, study on registered pesticides was also presented.

Following the above activities, terms of reference for baseline consultants for both capacity building of health professionals and pesticide use by farmers are formulated and a bid has been floated to hire local consultants to conduct the baseline study

Baseline study on capacity building of health professionals

Develop proper methodology regarding the knowledge of health professionals with respect to pesticide health issues. Sub-activities:

- Identify and select groups of health professionals/experts.
- Establish study areas and define how many professionals will be interviewed in each study area and per group of professionals/experts.
- Consider the recommendations of the baseline study start-up meeting.
- Write questionnaires for the surveys of each expert/profession group.
- Identify the appropriate tools for conducting the survey and entering and storing the collected data.
- Summarize the above in a detailed study plan, including planning, logistical aspects and estimated local costs.
- Identify and train local trainers for the survey that will in turn train local interviewers/enumerators in collaboration with the project.
- Supervise the training of interviewers and enumerators by local trainers.
- Organise and supervise the health professionals survey as described in the study plan. Arrange logistics in collaboration with APHRD. Assure electronic data collection and quality control.
- Analyse the health professionals survey data in collaboration with the PRRP national and international experts and submit a detailed study report to PRRP-Ethiopia.
- Prepare at the end of every month a brief progress report including preliminary findings and submit to the PRRP-Ethiopia coordinator and APHRD.

When appropriate, activities of the survey will be planned and conducted in collaboration and in combination with other work packages of the project and/or other agricultural projects in Ethiopia.

A. Pesticide use by farmers and farmer knowledge

Develop proper methodology for farm surveys, considering farmer interviews to gather information on pesticide use and farmer knowledge on pesticide use, pest management and empty container management, as well as information on the food basket in a quantitative way. Sub-activities:

- Adapt an agro-ecological zoning system based on spatial data (e.g. soil map, altitude, land use, crops, farm size, socio-economic information, hydrology, rainfall, temperature, administrative boundaries).
- Establish study areas and define how many farmers will be interviewed in each study area.
- Consider crops such as cereals (tef, maize and wheat), pulses, vegetables, oil crops (sesame), fruit (citrus), stimulants (commercial coffee and chat), fibre crop (cotton) and flower in the study areas. Also consider hot spot areas for pesticide use and different farming systems (smallholders, large scale state-owned and private).
- Make use of the recommendations of the baseline study start-up meeting.
- Write questionnaires for the mentioned surveys.
- Identify the appropriate tools for conducting the farm surveys and entering and storing the collected data.
- Summarize the above in a detailed study plan, including planning, logistical aspects and estimated local costs.
- Identify and train local trainers for this farm survey that will in turn train local interviewers/enumerators in collaboration with the project.
- Supervise the training of interviewers and enumerators by local trainers.
- Organise and supervise the farm surveys as described in the study plan. Arrange logistics in collaboration with APHRD. Assure electronic data collection and quality control.
- Analyse the farm survey data in collaboration with the PRRP national and international experts and submit a detailed study report to PRRP-Ethiopia.
- Prepare at the end of every 2 months a brief progress report including preliminary findings and submit to the PRRP-Ethiopia coordinator and APHRD.

B. Knowledge of pesticide users

Develop/adapt base line survey methods to gather information regarding the knowledge of pesticide users. Sub-activities:

- Identify and select pesticide users groups (retailers, distributors, pesticide applicators and other groups).
- Select agricultural sectors and study areas for the survey.
- Define how many people will be interviewed per pesticide users group and per sector/area.
- Make use of the recommendations of the baseline study start-up meeting.
- Make questionnaires for each pesticide users group and sector/area.
- Summarize the above in a detailed study plan, including planning, logistical aspects and estimated local costs.
- Identify and train local trainers for this pesticide users survey that in turn train local interviewers/enumerators in collaboration with the project.
- Supervise the training of interviewers and enumerators by local trainers.
- Organise and supervise the pesticide users survey as described in the study plan. Arrange logistics in collaboration with APHRD. Assure electronic data collection and quality control.

- Analyse the pesticide users survey data in collaboration with the PRRP national and international experts and submit a detailed study report to PRRP-Ethiopia.
- In combination with the report of the farm survey, prepare at the end of every 2 months a brief progress report including preliminary findings and submit to the PRRP-Ethiopia coordinator and APHRD.

When appropriate, activities of both surveys will be planned and conducted in collaboration and in combination with other work packages of the project and/or other agricultural projects in Ethiopia.

Questions and answers

Comment by Dr Belay Simane

The baseline study is vital and will help the country to design its future strategy. Understanding the size of the work and its complexity i suggest the following.

1. If you adopt a phased approach than covering the whole country.
2. Include statistician /biometrician to interpret the data in the right way. The methods have to be validated at the beginning otherwise data will be wasted because of improper planning.
3. If other issues of agriculture is also added in collaboration with other consultants.

Answer by Dr Joost Lahr (Alterra)

The advice of biometrician will be sought and the analysis will be done using Monique software

Comment by Dr Joost Lahr (Alterra)

It is good to team up with CASCAPE project on Good Agricultural Practice (GAP) in order to apply knowledge and recommendations of PRRP and TCP to the field, e.g. by innovative farmers.

Questions by Dr Yitbarek Woldehwariat

The baseline study plan on pesticide use is a very nice plan. However, farmers have also non-pesticide control practices like use of botanicals for pest control. Do you include in the survey to collect such information?

Answer by Ato Bekele Dinku

Yes studies in connection to safer alternatives of pesticides also include botanicals

6.2 Aquatic Ecological risk assessment of pesticide in Ethiopia

Name of presenter; Ato Berehan Melese, PhD student, Wageningen University, The Netherlands

Goal:

- Is to establish ecological risk assessment frame work of pesticides currently under use, for the Ethiopian surface water systems

Questions and answers

Question by Dr Belay Simane

When we talk about water pollution, the major issue is pollution from nitrogen and phosphorus related fertilizers. Is it possible to include Nitrate analysis in the study. This means soil health has also to be considered in addition to water bodies

Answer by Professor Paul

We will study the effects of pesticides in a multi-stressed environment, so we need to measure other stressors e.g. nutrients as well.

Answer by Berehan

The PRIMET software contains some elements of the soil. Therefore, soil health is considered

Question

What do you mean by toxicity study?

Toxicity test will be done on aquatic macro-invertebrate Spp. Taken from fresh surface water systems and LC-50 and EC-50 tests will be considered on aquatic environment. Surface water has been selected because it has been top prioritized for protection.

6.3 Human health effects of chemical pesticides in Ethiopia

Name of presenter: Dr Beyene Negatu, PhD student, Utrecht University, The Netherlands

Introduction

Although pesticides are important in agriculture, can pose environmental and health risks if not properly handled and managed

Justification

- Ethiopia is in the process of intensifying its agriculture
- No detailed, as yet investigating health effects of exposure to pesticides
- Studies related to knowledge, attitude, practices (KAP) of farmers, farm owners, farm workers, agricultural extension workers (AEW) and health professionals (HP) are also lacking in Ethiopia

Phase I specific objectives:

- To assess use of pesticides and consequent occupational exposure to pesticides
- To assess self-reported health symptoms associated with pesticide exposure
- To assess KAP of farmers, farm owners, farm workers, AEW and HP

Phase II specific objective:

- To study in detail selected health effects showing an association with pesticide exposure in phase I with more objective measurements

Data collection and analysis

A cross-sectional questionnaire survey and observations, central east Ethiopia

- Pesticide exposure factors, self-reported health effects (symptoms), confounding factors, Pesticide use and health related KAP, Professionals' KAP
- The data will be computerized and analysed using SAS

Expected out comes

- Baseline study on health effects due to (occupational) exposure to Pesticides
- Identified gaps in pesticide and health related KAP
- A platform in designing strategies for prevention and minimization of morbidities due to pesticide exposure under Ethiopian current occupational settings

6.4 Sustainable pesticide governance in Ethiopia

Name of presenter: Belay Tizazu Mengistie, PhD Student, Wageningen University, The Netherlands

Summary of the PhD project

The growing problem of pesticide misuse has become a great concern in developing countries. For a long time pesticides attracted interest from the Ethiopian governments and farmers for their positive effects in protecting crop yield losses resulting from pests and other plant diseases. Recently, the negative effects of pesticides on human health, natural food chains, and the environment are increasingly being taken into account by both state and non-state actors. Striking a balance between positive and negative effects is complicated as most likely, pesticides will continue to maintain their vital role in an agriculture-based country such as Ethiopia. However, recently a shift can be noticed in farmers' selection and application of pesticides, initiated mainly by farmers themselves and to a lesser extent also by other actors such as the government, pesticide companies and distributors.

Therefore, sustainable growth of the agricultural sector and protection of human health and the environment require effective management of pesticides. Although, the Ethiopian government should play an important role in this regard, it has failed to do so in many instances. Scientific research on pesticide governance and its shortcomings in Ethiopia is lacking. This PhD project seeks to fill this gap.

This research aims to analyse the gap/barriers between formulated state pesticide policy and its implementation and to review the actual and potential contribution from state(Public) and Private actors (users i.e. vegetable and flower growers, traders importers, wholesalers and retailers) in changing in pesticides use practices. To achieve this, a conceptual framework, drawn principally from the different theories of environmental governance is applied to assess the role of state and market actors (public -private relationships) in implementing a healthy and socially and environmentally sound flower and vegetable production system in central rift valley regions of Ethiopia. As challenges on pesticides are not the concern of a single institution, this research assumes that sustainable use of pesticide will not be achieved without the participation of all concerned actors.

Questions and answers

Question by Dr Abdurrahman Abdullahi

The pesticide registration and control proclamation No 674/2010 is not yet implemented, then how do you evaluate a proclamation which has not been implemented.

Answer by Alemayehu Woldeamanuel.

I do not agree by your statement saying that the proclamation is not yet implemented. Currently the proclamation is being implemented. for e.g. in terms of import permit, business licenses, several aspects registration, although full-fledged regulation, some guidelines and directions are necessary for better implementation of the proclamation.

Answer by Belay Tizazu

Partially, i agree with your idea because, regulation and directions/ procedures to enforce pesticide policy or are not readily available. But as i observed those APHRD staffs are doing their day to day activities (for example import permit) based on the proclamation and it is possible to say the proclamation is partially implemented.

Question by Dr Abdurahema

You cannot get 50 pesticide retailers in Debrezeit and Meki areas but you said you will involve 50 retailers in connection to your questionnaire.

Answer by Belay Tizazu

During my pilot study / pre-test /in the study areas of Debre zait, Meki and Ziway town, i observed more than 50 retailers who are engaged in pesticide trading. I did this survey with the help of concerned stakeholders like extension workers, plant protection experts of the respective districts. Even though it is difficult to get data on the actual number of certified and uncertified retailers in their shop, am sure i can get even more than 50 retailers to generate primary data for the purpose of my PhD project .

Question by Dr Yitbarek W/Hawariat

There are many papers on perception, knowledge of pesticide application in Ethiopia. However, you need to identify different stakeholders, poor farmers, commercial farmers and also allow state farms to check the perception and knowledge is different among stakeholders

Answer by Belay Tizazu

Yes, I totally agree with your idea and it is the 3rd sub-section of my project. As you mentioned there are many papers on knowledge, practice and perception of pesticide. But what makes my Ph D project is different from the existed paper, I will consider and review potential contributions from state (public) and private actors(pesticide importers, retailers, small scale vegetable producers, large scale commercial flower producers) to fill the gap and to recommend sustainable pesticide governance arrangements

Question

What is the contribution of the PHD study in connection to Governance?

Answer by Belay Tizazu

I will contribute new theory for pesticide governance and management in developing countries like Ethiopia. Because i will review and customize different theories and concepts from an environmental governance perspective to analyse the roles played by the Ethiopian state agencies and by market actors in governing the use pesticides in a more sustainable way.

Question by Tadesse Amara

What new knowledge Will you add to Science?

Recently scholars identified a variety of new forms of governance addressing environmental problems, among which network-like arrangements of public and private actors, and civic-private partnerships. Governance is a new and fashionable concept in Ethiopia. Scientific research on

pesticide governance and its shortcomings in Ethiopia is lacking. Therefore, this PhD project work will add new knowledge to science

What problem solving plan do you have?

Governance is a key concept in My study. Private governance and a different, public-private governance, produce a significant contribution of the rules that govern the adverse impacts of pesticide in Ethiopia. Private governance beyond the state is emerging as a prominent consideration in addressing environmental problems, focusing on the activities of private non-state actors and the influences of private rules and standards. Therefore, by generating data from regulatory body(state), implementers of the policy (at district level) and pesticide users, I have a plan to triangulate their response to address the problem and recommend options for policy makers for sustainable pesticide use in Ethiopia

7. Final remarks by the chairman of the afternoon session

At the end of the discussion the chairman summarized the discussion and suggested the way forward to focus on;

1. Information dissemination to the public emphasizing the need for data management (Data bank) in connection to sustainable pesticide management
2. Integration of works done by different stakeholders (Altera, FAO, JICA etc.) to ensure sustainability and safeguard the environment and the people.

Different opinions were raised as to how draft the way forward and finally agreement was reached that 3 people each from PRRP-Ethiopia core group: FAO, APHRD and Alterra draft the way forward.

8. List of participants

No	Name	Organisation	Position	E-mail address
1	Dr Dereje Gorfu	Ethiopian Institute of Agricultural Research	Senior Researcher	dgorfu@gmail.com
2	Gulelat Teshome	Ethiopian Standards Agency	Expert	gulelatt@gmail.com
3	Hassenn Ali	FAO Ethiopia	Assistant FAOR	hassen.ali@fao.org
4	Tadsse Amera	PAN Ethiopia	Director	atadesse2002@yahoo.com
5	Muhiye Endrie	Ethiopian conformity Assessment Enterprise	Team leader	muhiyeh@yahoo.com
6	Dr Abdurahman Abdulahi	Desert control organization for Eastern Africa	Chief Research officer	dlcoea@ethionet.et
7	Gizachew Assefa	Ministry of agriculture /APHRD	Expert	gizohuu@yahoo.com
8	Shimelis Hassen	Ministry of Agriculture /APHRD	ASP -Coordinator	Shimelishassen@yahoo.com
9	Professor Paul van den Brink	Alterra Wageningen UR	International Expert	paul.vandenbrink@wur
10	Joost Lahr	Alterra Wageningen UR	International Expert	joost.lahr@wur.nl
11	Francesca Mancini	FAO Rome		Francesca.mancini@fao.org
12	Geruld Wyrwal	FAO Rome	Agriculture officer	gerold.wyrwal@fao.org
13	Nigussie Alemayehu	FAO- Ethiopia	Agricultural and Rural development Expert	nalemayehua@yahoo.com
14	Merkuz Abera	Baherdar University	Chair Plant protection	merkuzabera @yahoo.com
15	Belay Tizazu	Wageningen University	PhD student	belaytizazu@yahoo.com
16	Dr Belay Simane	Addis Ababa University	Associate professor	simaneb@yahoo.com
17	Berhan Melese	Ministry of Agriculture	PHD student	birhanme @yahoo.com
18	Bernard Mtonga	FAO Ethiopia	Consultant	Bernard.mtonga@fao.org
19	Dr Tarekegne Berhanu	Ministry of Agriculture	Lead analytical chemist	tarekegnbr@yahoo.com
20	Bekele Dinku	Ministry of agriculture	Chemist	bekeledb@yahoo.com
21	Melaku Gizaw	Ethiopian Health and Nutrition Institute	Researcher	melakugizaw@gmail.com
22	Dr Ytbarek W/hawariat	Wolo University	Researcher / Lecturer	yitbarek.wh07@gmail.com
23	Glenn Humhries	Ethiopian Horticultural Producers and Exporters Association	Training Coordinator	chpea_training@ethionet.et
24	Eshetayehu Tefera	Freelance consultant	Consultant	Eshett2002@yahoo.com
25	Mesfin Yilma	Ministry of Labour and Social Affairs	Case team coordinator	mesfinyilma88@yahoo.com
26	Yoshio Izawa	Japan International Cooperation Agency	Chief Advisor	IZD00054@miftyi.com
27	Habtamu Wodajo	Environmental Protection Authority	Expert	habwodajo@yahoo.com
27	Abraham Tesfaye	Ministry of Agriculture	Public relation Expert	abrtsf@gmail.com
28	Gashaw Debela	Ministry of Agriculture	Camera man	g.debela@yahoo.com