Mission report (WP B2.1 /MR 6)

In the framework of PRRP- Ethiopia



Topic: PRIMET software and main results WP B2.1

Names: Paulien Adriaanse, Louise Wipfler, Mechteld ter Horst

(Alterra), Peter van Vliet, Marloes Busschers, Caroline van der Schoor (Ctgb), Joost Vlaming (Envista Consultancy),

Alemayehu Woldeamanual (PHRD)

Date: 29 August-2 September 2014 at Alterra, Wageningen

Pesticide Risk Reduction Programme - Ethiopia

1. Introduction

The Pesticide Risk Reduction Programme – Ethiopia (PRRP-Ethiopia) is a joint collaborative project on pesticide registration and post-registration which was established through a Memorandum of Understanding signed in August 2010 by the Ministry of Agriculture (MoA) of Ethiopia, the Alterra Institute of Wageningen University and Research Centre, The Netherlands, and the Food and Agriculture Organization of the United Nations (FAO).

PRRP-Ethiopia is executed by the Plant Health Regulatory Department (PHRD) of MoA, in close collaboration with Alterra and FAO, and receives financial and technical support from the Government of the Netherlands and FAO.

This workshop is the final workshop of WP B2.1, geared towards the development of a scientific evaluation procedure of dossiers, incl. capacity building of the PHRD, the Plant health regulatory Department of the Ministry of Agriculture of Ethiopia. Use of the developed software was the central theme of this workshop, next to gathering the main results of WP B2.1 and evaluating the WP.

2. Objectives

The workshop had the following goals and objectives.

The main goal of the workshop was to let the dossier evaluation team of the PHRD and their management gain experience with the software package for risk assessment. In addition, the workshop aimed to (1) obtain feedback on the developed software, (2) prepare the PRRP-management meeting of end September by collecting the main results of WP B2.1 of the PRRP project from Ethiopian perspective and (3) collectively evaluate WP B2.1

Objectives:

- 1. At the end of the workshop the attendants must be able to
 - a. execute risk assessments in the field of Human Health (operators and workers, consumers incl MRL setting), Drinking Water from groundwater and surface water and Environment,
 - b. understand the basics of the concepts and methodologies used
 - c. use the available software
 - d. archive and filing in coherence with the dossier management in Ethiopia.
- 2. The workshop would further
 - a. procure feedback on the PRIMET (and related) software user manual
 - b. procure feedback to the software developers on user-friendliness, robustness, transparency and ways of archiving of the software tool

- c. collect the main results of the WP B2.1 of the PRRP project from Ethiopian perspective for the period from January 2010 up to present
- d. evaluate together WP B2.1: weak and strong points with respect to outcome, cooperation

The training focussed on the technical aspects of the software. Training with respect to the content of the risk assessments in the field of operators, workers, consumers (incl MRL setting), drinking water and the environment was not included as two earlier workshops (December 2012 and May 2013) had already focused on these aspects.

The programme of the workshop and the list of participants can be found in Annex 1 and 2.

3. Results of activities

Day 1 (Friday 29th of August)

The day started at 13.15 hr with a warm welcome and a short introduction of the participants. Each participants gave his/her expectations of the training and issues that should be addressed. The expectation mentioned most was to learn about the practical aspects of the PRIMET registration software and to obtain knowledge to use the tool in pesticide registration. Also connection to PREMAS was expected to be addressed.

Then, Alemayuhu Woldeamanuel and Paulien Adriaanse gave an overview of the PRRP project and the work package B2.1, respectively (Annex 3 and 4). The PRIMET Registration Ethiopia software was explained by Louise Wipfler (main concepts, Annex 5)) and Joost Vlaming (software use, Annex 6). After these plenary lectures the hands-on training started focusing on the environmental risk assessment, while addressing a number of realistic cases. The cases were introduced by Peter and the results were discussed plenary.

Day 2 (Monday 1st of September):

Monday started with a discussion on the expectations related to PRRP, the objectives of the PHRD and the expected developments in the coming years. The main expectations of the PHRD regarding the software were:

- Friendly and easily manageable software linked to local and International research results
- Obtain full-fledged PRIMET software that consider all scenarios (field and greenhouse)
- Fully built capacity to operate the software using developed manual
- Assess the limitation in connection to implementation of the software and capacity of experts using the follow-up plan.

See Annex 7.

A list of Needs for future assistance in connection to B2.1 and PRRP-ET was drafted and a list of other issues was drafted and issues were prioritized (short-term/ long-term). The lists serve as preparation for the discussion on Tuesday on the meeting with the Steering Committee in October 2014. Involved in the preparation for the Steering Committee: Weldehawariat Assefa, Elias Saheledingle, Dr Haimanot Abebe and Alemayehu Woldeamanuel. See also Annex 7.

Then, Paulien Adriaanse gave an overview of the concepts and theory behind the protection goals Surface water for drinking water and Groundwater for drinking water (Annex 8), followed by Mechteld ter Horst who explained the software details related to drinking water (Annex 9).

The plenary lectures of Mechteld and Paulien were followed by a hands-on training with the PRIMET software, focused on the drinking water protection goals. The cases were introduced by Mechteld and the results were discussed plenary. In the second part of the afternoon, Joost gave an explanation of the installation of PRIMET (Annex 10). After discussion it was decided that PRIMET would be installed on local PCs. This means that no central database will be used. This enables the evaluators to assess the risks independently and compare their results, as part of the quality management.

During the discussions two issues came up that should be addressed before the end of the project:

- Guidance is needed on how to translate the Data requirement form to input for PRIMET
- Check the handling of the registration process in the Handbook, for 2 crop cycles.

The day ended with feedback of the participants to the PRIMET registration software (Annex 11). Two groups formulated their feedback to the software:

To be solved in the short term:

- Removing of all the bugs
- Finalizing the user manual considering all the changes (gaps and bugs)
- Introduce alerting mechanism for inserting unrealistic data -> comment by Alterra: this is already implemented, but should be checked
- Sequence of Data requirement form and the input data of PRIMET shall match
- Give one constant value for 'dummy' value -> consistency needed
- Make use of standardized units, the units of the Data requirement form and PRIMET should match
- Awareness creation of applicants-> not related to PRIMET.

To be solved in the long term:

 Decision making should be supported. How to translate the assessments to decision making -> not related to PRIMET. This will be discussed in the workshop of WP B1, immediately following this current workshop

- PRIMET registration accommodate the risk assessment for operators at field conditions, i.e. as done in the field (issue mentioned by both groups)
- The limitations of PRIMET registrations that come up during use in the coming years should be solved-> continue of support and updating of software (issue mentioned by both groups)
- Make the software write-protected -> comment by Alterra: this will be difficult to achieve as it involves complex rules
- How to organize the work if, in the future two assessors work on the same dossier (due to specialization of assessors)?
- Bystanders should be added (no pressing issue)

Day 3 (Tuesday 2nd of September):

The day started with an introduction to operators and workers assessments by Louise Wipfler (Annex 12) in the software followed by the hands-on training lead by Marloes Busschers. Main conclusion of the hands-on training was that the German model used is not very straightforward. Louise, Mechteld and Marloes will try to improve the spreadsheet.

This was followed by an inventory of the most important results according the PRHD of WP B2.1 and of the PRRP project in total (Annex 13). The results marked as most important will be presented to the Stakeholders and the Steering committee and are summarized below:

- The software tools PRIMET and PREMAS
- The greenhouses
- Regulations and directives developed
- Tools for decision making
- Laboratories (construction, equipment and capacity building).

At the Steering committee meeting, the project group would like to plead for a follow up project. The idea is that the follow up project focuses on finishing the software, implementation of PRRP and a help desk function for small questions. The implementation could be tackled as follows: PRHD employees and one or two Dutch experts perform registrations for a few dossiers. In this way the entire pesticide registration procedure developed during PRRP (including among others risk assessment using PRIMET, administration using PREMAS and decision making) is practiced.

Furthermore WP B2.1 was evaluated (Annex 14). All project members filled in an evaluation form prepared by Paulien, specifying an item that went well and an item that could be improved. In general the evaluation by the PHRD participants was very positive. All agreed that communication and cooperation between the Dutch and Ethiopian partners was a strength of the project. Also number of capacity building workshops and the given technical assistance was very good. Main positive points mentioned were the development of the PRIMET (and PREMAS) software. Point to improve: An implementation period (i.e. practicing the entire pesticide registration procedure developed) was not foreseen in the project plan

and this is considered to be a major problem. It is therefore important to plead for a follow up project. Some participants mentioned that timely disbursement of budget was sometimes late.

After the lunch consumer health assessments were addressed by Caroline van der Schoor. After a short introductions the hands-on training started. First tier and higher tier options were addressed. Some of the add-in functions did not work on all laptops. This will be solved by Alterra. At the end of the day Harold van der Valk discussed the archiving of results in relation to the management of the dossiers (Annex 15).

4. Deliverables

According to the ToR 6 of this workshop the following deliverables were written up, partly thanks to the active feedback of the 8 Ethiopian participants :

- 1. Description of the example case studies for running each risk assessment as described in the PRIMET manual. These examples will be added as Annexes to the PRIMET manual for future beginning users:
- # 2 cases for operators and workers (both indoor+outdoor) [Marloes]
- # 2 cases for consumers (acute+chronic) + 2 cases for MRL setting for export [Caroline]
- # 2 cases for drinking water from groundwater (chronic) and 2 from surface water (acute+chronic) [Mechteld]
- # 2 cases for each protection goal within Environment (acute+chronic, in-crop+off-crop as appropriate) [Peter+Mechteld]
- 2. List of feedback items for improvement PRIMET [Louise+Joost]
- 3. List of feedback items by PHRD for technical manual [Louise]
- 4. List with most important results of WP B2.1 from Ethiopian perspective as input for PRRP meeting end September in Ethiopia [Alemayehu]
- 5. Summary of the collective evaluation of outcome and cooperation of WP B2.1 [Paulien]
- 6. Workshop report [Paulien]

Shortly after the workshop and ultimately 3 October the following products will be finalized:

- 1. Software installation package, running for all aspects improved according to the drafted list of feedback items by PHRD [Louise and Joost Vlaming]
- 2. Manual for the PRIMET software + associated spreadsheets improved according to the drafted list of feedback items by PHRD [Louise]
- 3. Annexes ready for insertion in PRIMET manual with the example cases [Mechteld]

5. Unsolved issues

The following points are important, but cannot be effected within the current WP B2.1 work package budget and project duration:

- Set up and run through a completed test plan for PRIMET software+external (by Alterra adapted) spreadsheets and repair identified bugs
- Write up of additional chapter in PRIMET technical manual on Guidance for determining input parameters for all software (linkage Data Requirements form, selection correct physico-chemical parameters etc)
- Incorporate all software(i.e. the external spreadsheets) into PRIMET, incl. an automated archiving system
- Set up an help desk for all upcoming small questions from PHRD
- Coach PHRD in the implementation of the delivered software during the future years
- Adapt software to new developments at PHRD work process or content (e.g. new crops to consider, new scenario for greenhouses for environmental risk assessment)

6. Actions to be taken / recommendations

See the second list under Deliverables. Most important items are the software to improve and next, the PRIMET technical manual.

The presentations for the Stakeholder meeting (30 Sept) and Steering Committee (2 Oct) in Ethiopia will be made, using the Ethiopian feedback and List with most important results of WP B2.1 of this workshop.

Most important recommendations for follow-up of this WP are:

- (i) the required follow-up/coaching during implementation of the software by the PHRD,
- (ii) the repair of upcoming bugs and
- (iii) the definition of input parameters for the software (additional chapter in PRIMET technical manual).

Annex 1: Program (per day), revised 26 August

Workshop: PRIMET and main results WP B2.1 29 August-2 September 2014, Alterra, Wageningen, The Netherlands

	time (min)	PROGRAM	who?	reporting	
Thursday 28 Aug					
DAY 1		workshop chair of day 1: Paulien			
Friday 29 Aug 2014					
13:15	30	start, welcome and to get to know each other, program of the workshop and the day	P +L	P	
13:45	30	framework of the project (A) and WP B2.1 (P)	Alem+P	L	

		time (min)	PROGRAM	who?	reporting
			Theory behind/ concepts PRIMET - overview (protection goals, traffic		
14	4:15	20	lights)	L	Р
14	4:35	15	Software explanation- overview general (input, output, screens)	J	L
14	4:50	30	BREAK with snack		
15	5:20	30	Software explanation protection goal : Environment	L	Р
15	5:50	60	case studies, including archiving. Interpretation by Peter. The attendants will present the results of the case studies to each other	Peter + L	P
16	6:50	15	short break		
17	7:05	90	continuation case studies , including archiving. Interpretation by Peter. The attendants will present the results of the case studies to each other	Peter + L	Р
18:35 wrap up, conclusions of the day		Р	L		
DAY 2 Monday 1			workshop chair of day 2: Louise		
September					
Ç	9:00	10	short introduction of the program of the day	L	
Ç	9:10	45	Expectations, objectives and latest developments from the perspective of the PHRD Weldehawariat Assefa, Elias Saheledengle and Alemayehu and other PRRP representatives	P+Alem+2 directors	L
Q	9:55	40	Introduction to groundwater for drinking water and surface water for drinking water (concepts/theory)	M+P	L

	time (min)	PROGRAM	who?	reporting
10:35	20	software details drinking water, fate models used, handling of models by PRIMET etc	М	L
10:55	30	coffee break		
11:25	60	Case studies groundwater for drinking water	М	Р
12:25	75	Lunch, photoshoot		
13:40	90	Case studies surface water for drinking water, presentation of results by participants	М	L
15:10	15	Explanation of installation of PRIMET, where can I find the exe and the documentation (directory structure, website, overview)	J	
15:25	20	short break		
15:45	60	discussion: feedback on PRIMET and user manual, bugs, small issues and feature requests	IJМ	
16:45		wrap up, conclusions of the day	L	
18:15		DINNER and photo shoot(CTGB, Floor, Joost VI, Mechteld, Paulien, Louise, Paul, Paul de Boer, Joost L)		

	time (min)	PROGRAM	who?	reporting
DAY 3		chair of the day: Mechteld		
Tuesday 2 September				
9:0	0 10	short introduction of the program of the day	М	
9:1	15	software details on worker and operator and consumers	L	M
9:2	5 75	case studies operator and workers, including archiving. The attendants will present the results of the case studies to each other	Marloes	M
10:4	20	coffee break		
11:0	0 60	workshop: collection of the most important results of WP to be presented to the Stakeholders meeting and the Steering committee	P	L of M op aanwijzing van de groep
12:0	0 60	evaluation of WP: collaboration, results, lessons learned,	P	L of M op aanwijzing van de groep
13:0	+	Lunch		<u> </u>
14:1		case studies consumers, including archiving	Caroline	М
15:3	0 20	short break		
15:5	30	discussion on archiving in relation to the management of the dossiers.	L+Harold	M

	time (min)	PROGRAM	who?	reporting
16:20		wrap up, conclusions of the day and of the last 3 days of the workshop. Outlook to next two days	M	L
DAY 4 and DAY 5		to be filled in by Harold vd Valk for guidance on decision making		
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Annex 2: List of participants

	Name of participant	Role of participant
1	Weldehawariat Assefa	Plant Health Regulatory Directorate Director
2	Elias Saheledingle	Director
2	Alemayehu Woldeamanuel (APHRD)	Ethiopian PRRP project coordinator
3	Floor Peeters	Dutch PRRP project coordinator and CTA
4	Melese Haile Teferi	APHRD dossier evaluation expert
5	Dr Haimanot Abebe Alage	APHRD dossier evaluation expert
6	Yismayike Yitagesu Setegn	APHRD dossier evaluation expert
7	Shimelis Assen Ali	APHRD dossier evaluation expert
8	Saba Debebe Lakew	APHRD dossier evaluation expert
9	Paulien Adriaanse	Dutch WP B2.1 expert and coordinator
10	Louise Wipfler	Expert in PRIMET software, RA (Drinking water+Environment)
11	Mechteld ter Horst	Expert in PRIMET software RA (Drinking water+Environment)
12	Joost Vlaming	Software engineer (Envista consultancy)
13	Harold van der Valk	Consultant (FALCONSULT Pesticide Management – Environmental

		toxicology)				
14	Marloes Busschers	Expert and trainer on Human health				
		(occupational) and toxicity data (Ctgb)				
15	Caroline van der Schoor	Expert and trainer on Human health				
		(consumer) and MRL data (Ctgb)				
16	Peter van Vliet	Expert and trainer on Environment and				
		ecotoxicity data (Ctgb)				

Annex 3: Current status of PRRP-Ethiopia by Alemayehu Woldeamanual

Pesticide Risk Reduction Programme- Ethiopia rrent status of Pesticide Risk Reduction Programn

Floor Peeters, Alterra, Wageningen-UR, the Netherlands
Alemayehu Woldeamanuel, Ministry of Agriculture

joint collaborative programme on pesticide registration and postregistration











Towards a sustainable use of pesticides in Africa

History of PRRP-Ethiopia

2009: programme development initiated

2010: funding obtained and projects and MoUs

approved

Late 2010: first programme activities started







Content of presentation

- · Motives to start the programme
- · History of PRRP-Ethiopia
- · Overall goal of the programme
- · Partners & Funding
- · Objectives of the programme
- · Programme structure and content
- · Achievement so far
- Challenges
- · Activities for next phase
- · Benefits as output of the programme

Motives to start the programme

- On-going intensification of agriculture in Ethiopia
 - to meet national demands for food
 - to increase agricultural exports
- · Problems with pesticide use
- inadequate management, residues, obsolete pesticide stocks, potential health and environmental effects, etc
- Development of new pesticide legislation (August 2010)
- · More environmental and health awareness and regulations
- · Promotion of IPM and biological control in crop protection
- Need for comprehensive programme to strengthen sound pesticide management and regulation in the country

Overall goal of programme

Overall goal of programme

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 partners



Ministry of Agriculture – Animal and Plant Health Regulatory Directorate (APHRD)



ALTERRA CWK/Team Environmental Risk Assessment



Plant Production and Protection Division

Funding of PRRP

Government of Ethiopia - Ministry of Agriculture

- Contribution of Ethiopian counterpart, Animal and Plant Health Regulatory Department

Government of the Netherlands - Ministry of Foreign Affairs - € 1 950 000 (4 years)

FAO - Technical Cooperation Programme

- US\$ 465 000 (2 years)

SAICM - Quick Start Programme

- US \$ 190 540 (2 years)









Objectives of project - reminder

- 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.

Work Package General activities and programme Consistency between directives and guidelines A - Legal framewor B - Registration **Programme** structure C - Post-registration Sustainability of the registration & D - Sustainability E - Impact Impact assessment

WP O: Programme management and general issues

Goal

- · Overall implementation of the programme.
- · Information exchange, awareness building, publicity

How?

· Daily management and coordination within the project and reporting the progress etc.

WP A: Legal Framework

· To ensure consistency between the legal framework and the methodologies, guidelines etc. that will be developed during this programme.

How?

· Adaptation of the current regulations, as a result of the strengthening of the registration and post registration system.



WP B: Development of pesticide Goaregistration system

Development of:

- · B.1: Pesticide registration management unit
- B.2: Scientific evaluation system for registration of agricultural pesticides, and bio-pesticides

How?

- · On-the job-training on dossier evaluation. Development of procedure manual, new application forms, database with registered pesticides, a webpage etc.
- · A scientific evaluation system will be developed for efficacy, human health, residues and environmental



WP C: Development post-registration

system Goal

To develop a well functioning post registration system.

- . C.1: reference laboratory for pesticide quality control C.2: monitoring system
- · C.3: inspection system
- · C.4: storage of pesticides
- · C.5: public awareness and capacity building of professionals C.6: training of pesticide distributors, retailers and pesticide
- applicators
- · C.7: empty container management

How?

- · Development of guidance, standards and protocol
- Capacity building through workshops and training.
- · Infrastructure development

WP D: Sustainability of developed systems

 To develop approaches and mechanisms that will ensure the financial and scientific sustainability of the Ethiopian pesticide management system in the long

How?

- · Economic feasibility study
- · Development of financial mechanisms
- PhD and MSc grant



WP E: Impact assessment

· To evaluate the impact of new developed systems related to (post) registration of pesticides.

- Start project: research on reference situation (e.g. pesticide) use, pesticide impact and knowledge about pesticides)
- · After 5 10 years: same research to assess impact of the activities within project will be evaluated.







Project progress- June 2011- June 2014

WP O: VISIBLITY(9 types of posters)



News letters and website

- Newsletters
- Website



Special topic: Pesticide registration in a nutshell





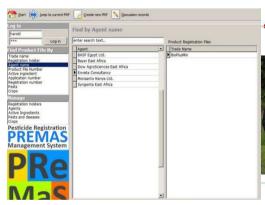
Workpackage A Legal Framework

- · Elaboration of the Pesticide Registration and Control Regulation.
- · A revised full-fledged draft of the Regulation has been finalized
- · Validated by a stakeholder workshop in February 2013
- · Planned for submission to the Council of Ministers in September 2014
- · New Directive on pesticide efficacy testing formulated
- · Development of Several directives are under progress



- · Pesticide registration process and administration reviewed
- Pesticide Registration Management System (PREMAS) developed
- 10 Staff trained on equivalence determination (for generics)
- · 10 APHRD staff trained on pesticide registration procedure
- · 11 APHRD staff made a study tour in the Netherlands and South Africa on pesticide registration procedures
- · APHRD staff and board members trained on pesticide registration decision making.
- · Webpage development on pesticide registration and regulation is under progress







The real work...



WP B2.1 Development of Scientific evaluation system for agric.pesticides

- Efficacy
- ☐ 15 crop protection researcher/ experts trained on efficacy testing of chemical pesticides
- ☐ 16 crop protection researcher/experts trained on chemical pesticide trial execution, statistical analysis, reporting and evaluation
- ☐ 20 efficacy testing protocols developed for 20 crop/pest combinations and experts trained
- ☐ 18 Crop protection researchers trained on developed efficacy testing protocols
- ☐ 11 crop protection researchers Efficacy testing of bio-pesticides
- ☐ 5 APHRD experts trained on bio-pesticide efficacy data evaluation
- ☐ Guideline on acceptance of data generated outside Ethiopia and efficacy evaluation manual for pesticide dossier have been
- ☐ Contract agreement to construct 6 green houses for pesticide efficacy testing has been finalized

Development of Scientific evaluation system for registration of chemical pesticides (continued)

Trainee on efficacy testing



Twenty efficacy testing protocols developed for 20 crop/pest combinations

- · Coffee bery disease (Colletotrichum kahawae) on coffee
- · late blight (Phytophthora infestans) on potato
- . powdery mildew (Ervsiphe cichoracearum) on mango
- · rusts (Puccinia spp.) on wheat
- · Botrytis on roses
- powdery mildew (Sphaerotheca pannosa) on roses
- Seed born diseases in wheat
- red teff worm (Mentaxya ignicollis) in teff
- epilachna (Chnootriba similis) in teff
- aphids in cotton
- pea aphid in leguminous crops
- stalk horers in maize
- · bollworms in cotton
- · onion thrips (Thrips tabaci) in onion
- weevils in maize
- scales in citrus
- wooly aphids (Eriosomatinae) in apple
- · Shoot flies on teff
- · weeds in cereals
- · weeds in in perennial crops

Development of Scientific evaluation system for registration A guideline on acceptance of efficacy data from neighboring of chemical pesticides (continued)

Development of guideline for accepting efficacy data in the neighboring countries



Ethiopia and neighboring countries



Development of Scientific evaluation system for registration of chemical pesticides (continued)

Human health and MRLs and Environment

- 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
- 11 stakeholders and APHRD staff trained on dossier evaluation
- Evaluation manual for registration of chemical pesticides in connection to environment, human health (occupational and consumer health) is finalized

Development of Scientific evaluation system for agricultural pesticides (cont.)

Conceptual exposure models formulated and scenarios developed for priority protection goal.



Scientific evaluation system for biological pesticides Work package C. Post-registration system

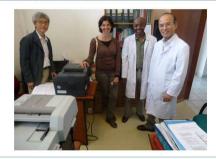
- Project agreement signed in August 2012 (SAICM-UNEP)
- TORs to hire international consultants on bio-pesticides have been developed
- · workshop on efficacy testing of bio-pesticides and training on evaluation of efficacy data submitted in the bio-pesticide dossier have been conducted in May 2013 using th projet fund (already mentioned above)
- Equipment purchased for pesticide quality laboratory
- Two national experts trained on pesticide analysis in Belgium
- List of registered pesticides updated and uploaded into Pesticide Stock Management System
- PSMS partly used for registered pesticides (and obsolete stocks) in the daily work
- Two field surveys carried out on pesticide use.
- National pesticide container management study and strategy finalized

Post-registration system

- Equipment purchased for pesticide quality laboratory
- Training of two 2 national experts on pesticide analysis in Belgium



Post-registration system (continued)



Work package D. Sustainability of the developed systems

- 3 PhDs on track (started on September 2011 and will end on September 2015)
 - Environment
 - Human health
 - Pesticide governance
- Stakeholders meetings organised (regulated community, private sector and farmers)
- National workshop on post-registration and sustainability conducted
- Consultative meeting on the status of Rotterdam Convention
- Study on financial and institutional feasibility of pesticide registration and post registration system nearly finalized

Work package E-Impact assessment

- · Baseline study startup meeting organized
- · Report of study on registered pesticides finalized
- Baseline study on capacity building of health professionals is under progress (expected to get finalized in August 2014
- 94 Health professionals have been trained on field survey data collection method and completing of questionnaire with regard to knowledge of health professionals
- 94 Health professionals have been trained on pesticide poisoning diagnosis and treatment

Challenges

Implementation!

Implementation of PRRP results will bring a fundamental changes to the Ethiopian pesticide registration and management procedures!

It very is important to gradually implement the newly developed approaches and procedures in day-to-day work of the Ministry of Agriculture, and not wait until the end of the programme.

However, this is constrained because staff numbers have been limited and infrastructure is not yet complete (e.g. quality control laboratory)

Challenges



- · Not able to hire national consultants on time
- Post-registration activities which are not yet funded (e.g. strengthening of inspection)

Some of the activities for next phase :July- Dec/2014 Benefits expected as outcome of Programme

- · Continue elaboration of Directives under the Regulation
- · Web site for pesticide registration on-line
- Finalize financial and institutional feasibility study on pesticide registration and post registration system
- · Finalize baseline study on capacity building of health professionals
- · Finalize the refurbishment of pesticide quality laboratory
- · Construction of 6 greenhouses at Holeta and Debrezeit Agricultural Research Centre
- Develop pesticide management curriculum for agricultural universities and vocational schools

Continue on-the-job-training

- > Training workshop on pesticide registration data evaluation and decision making using PRIMET model
- > Training on Pesticide Registration Management System software

- · Economic benefits, e.g.:
 - Enhancement of food security
 - Improvement of cost-effectiveness of pesticide use
 - Ensuring high quality agricultural products for export
 - Sustainable agricultural production systems
- · Health, e.g.:
 - Reducing risks associated with the use of pesticides
 - Improved food safety
- · Environment, e.g.:
- Reduced pesticide contamination
- Protection of biodiversity

THANK YOU



Annex 4: Progress WP B2.1 August-September 2014 by Paulien Adriaanse

Pesticide Risk Reduction Programme - Ethiopia

Alemayehu Woldeamanual, PRRP-Ethiopia, Paulien Adriaanse, Joost Lahr, Alterra

joint collaborative programme on pesticide registration and post-registration









WP B2.1 Efficacy

Achievements up to now (cont.):

- · Chapter for Evaluation manual on the assessment of efficacy
- · On the job training on efficacy dossiers and assessments



WP B2.1 - purpose





- evaluation system for the registration of pesticides
- Evaluation of dossiers for chemical pesticides is done in three areas:
- # Efficacy
- # Human health and residues (incl. developing Maximum Residue Levels, MRLs) # Environment

WP B2.1 Efficacy

In progress:

- Official approval of efficacy testing protocols for 20 crop-pest combinations
- Official approval of Regulation for efficacy testing and acceptance of efficacy data generated outside Ethiopia
- Construction of greenhouses at 2 selected locations with PRRP-budget

WP B2.1 Efficacy





- · 4 training work shops with PHRD, EIAR
- Efficacy testing protocols for 20 crop-pests combinations developed
- Pre-evaluation form Efficacy trials developed
- General guideline for efficacy testing developed + guideline on acceptance of pesticide efficacy data generated outside Ethiopia -> Regulation

WP B2.1 Human Health and MRLs



Achievements up to now:

- 4 training workshops with PHRD, EFMHCACA, EHNRI and **ECAE**
- Selection of criteria for registration plus appropriate exposure models (operators indoor+outdoor, workers) on Occupational health risks
- Agreement on how to assess MRLs and Consumer Risks
- · Two chapters in Evaluation manual

WP B2.1 Human Health and MRLs

Achievements up to now (cont.):

With Environment:

- 2 training workshops to test the proposed evaluation methodology with the aid of 6 pilot compounds (first, for PHRD, second for more stakeholders)
- SEARCH-based data requirements forms extended and updated

Situations in Ethiopia

protected

WP B2.1 Environment

Achievements up to now:



- 5 workshops plus 1 technical visit with APHRD and other stakeholders
- · Environmental protection goals agreed and prioritised
- Agreement on registration criteria and risk classification criteria for all environmental protection goals
- Agreement on methodology for Ethiopian-specific exposure assessment for priority protection goals of drinking water from sw and gw
- Two chapters in Evaluation manual written

WP B2.1 Environment

Achievements up to now (cont.):

- Ethiopian-specific exposure scenarios (3 sw, 3 gw), involving
- # agreement on scenario zones and most relevant crops (based upon ranking of most risky and relevant pesticides)
 # geo-data gathered on climate and soils in Ethiopia
 # agreement on detailed protection goals, models to be used
 # gathering data on crop calendar (15 crops), irrigation
 # developing TOXSWA meta model for streams receiving runoff
 # parameterising drift, PRZM, TOXSWA (pond), PEARL and
 TOXSWA meta models for 3+3 scenarios and all crops, testing,
 evaluating results and improvement e.g. selection 99th
 percentile procedure
 # report: halfway

WP B2.1 Environment

Achievements up to now (cont.):

- Exposure scenarios for surface waters:

 not protected
- Innovative (cf EU) because:
 # explicit consideration of worst-casedness in selection scenarios
 # 33 years of meteo, i.e. sound selection of temporal
- # 33 years of meteo, i.e. sound selection of temporal worst-case percentiles

WP B2.1 Environment

Achievements up to now (cont.):



With Human Health and MRLs:

- 2 training workshops to test the proposed evaluation methodology with the aid of 6 pilot compounds (first, for PHRD, second for more stakeholders)
- · Initial acquaintance with PRIMET tool
- SEARCH-based data requirements forms extended (esp. missing data for ecotoxicology) and updated

WP B2.1 PRIMET tool



Achievements up to now (cont.):

- PRIMET tool: re-design of its structure (suitable for registration, i.e. robust, transparant, reproducible, simple, well-structured)
- Additional finances made available (feasibility + execution)
- Tool incl. external parts and manual archiving/reporting
- 29 Aug 2014: PRIMET ready for testing by PHRD and next, implementation

WP B2.1 Human Health, MRLs and Environment

Main deliverables (Sept 2014):

- 12 workshops and trainings 2010-2014
- · Updated Data requirements + Evaluation manual
- Report on development of exposure scenarios for drinking water from surface water and groundwater in Ethiopia
- · PRIMET software (incl. some other)



· PRIMET manual, incl. example calculations

WP B2.1 Human Health, MRLs and Environment

Deliverables for 29 Aug-2 Sept workshop:

- List of feedback items for improvement PRIMET [L+J+A+PHRD] (user-friendly, archiving, clarity, bugs, related software...)
- · List most important results WPB2.1 (Ethiopian perspective) as input stakeholders and Steering Cttee meetings Sept-Oct in Ethiopia [A+PHRD]
- Summary evaluation [P]

14 d later:

- PRIMET manual, incl. cases [M+L+Ctgb+A]
- Workshop report [P+A]





WP B2.1 Human Health, MRLs and Environment

Programme for 29 Aug-2 Sept workshop:

• Friday: 13.15-18.35: workshop





- · Saturday: free
- Sunday: 10.00: outing to Dutch farm, lunch +touristic visit
- Monday: 9.00-16.45: workshop +

18.15: dinner Drinks and Bites (8-9 am: breakfast Floor, Alemayehu, Weldehawariat, Elias with Cees Slingeland)

- Tuesday: 9.00-16.30: workshop
- · Wed-Fri: WP B1 with Harold (a.o. Thu 14-15 h visit Ctgb Floor, Alemayehu, Weldehawariat, Elias)



Annex 5: Concepts of PRIMET_Registration_Ethiopia by Louise Wipfler



Required input data per project

- Active ingredient related:
 - Physico-chemical data (molar mass, solubility etc)
 - Fate data (sorption, DT50, etc)
 - Toxicity data (AOEL, ADI, etc)
 - Ecotoxicity data (LD50, etc)
- Crop type
- Application scheme (dose, application type, etc)
- PRIMET checks for each protection goal if the required data are available. If not → no assessment



Results

- Main assessment results:
 - ETR per protection goal
 - Interpretation of risk (low risk, possible risk, high risk)
- Protection goal results:
 - Summary screen with the main components of ETR per specific protection goal
 - Detailed overview of input, intermediate and output data
 - All results can be exported to xls files for archiving



Crop types considered

Crop	Representative for the crop class
Tomato (grown horizontally)	Fruity vegetables
Tomato (grown vertically-greenhouse)	Fruity vegetables
Onion	Bulb vegetables
Cabbage	Leafy vegetables
Potato	
Teff	
Wheat	
Maize	
Barley	
Faba bean	Pulses
Sweet potato	
Cotton	
Mango	Pome/stone fruit
Sugarcane	
Banana	
Lemon	Citrus
Coffee	
Flowers (greenhouse)	

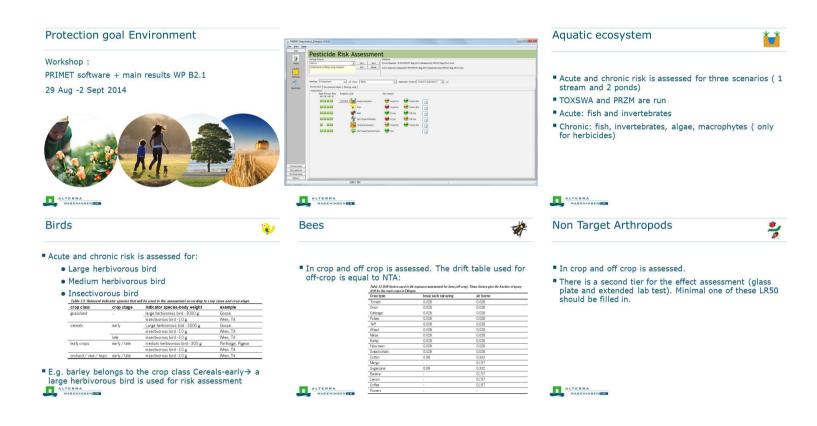


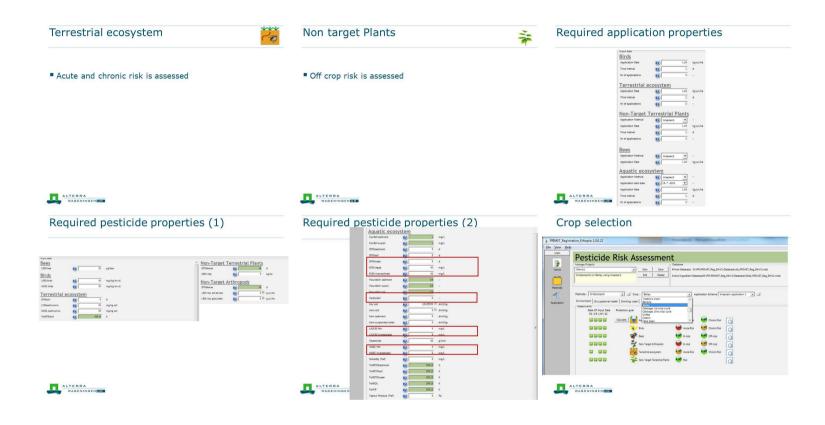
Calculation of results

- All risks are assessed instantaneously, except for;
 - Aquatic ecosystem risks
 - · Surface water for drinking water
- For these protection goals external models (TOXSWA and PRZM) are run by PRIMET and the results are used in the assessment



Annex 6: Protection goal Environment by Louise Wipfler, Peter van Vliet and Mechteld ter Horst





PT Dean									
reaction Date Square exception a Inquident Installaction point near sign teament 2400 kg/he out appropriate is Balay									
Acute Blak	UCSN/ECSO (mg/l)	Safety Fador	Pacc	PEC (Hall)			EM -		
Fish				1	29	20	1	29	20
CTR + 1 - 1 - + CTR + + 30	TR > 10 5	100	50	7982		9,329	1.55		0.1066
Invertebrates				1	29	26	1.	24	20
CTR + 1 - 1 en ETTR += 100	TR > 100 5	100	50	79.02		9,129	1.58		0.1866
Chronic Risk	NOEC (mg/l)	Safety Fador	PHEC	PEC SHIPS			ER + recreec		
Fine:				1	29	26	1	20	26
CTR + 1 1 × CTR + 20	TR > 10 5	30	500	79.02		9,129	0.153		0.01566
Investebrates				1	24	20	1	24	20
	TR > 100 3	30	500	79/02		9,129	0.158		0.01866
Aquaric Plants	6CS0 (PGF)	Survey Factor	PNSC	PEC (sigh)			ETR + PEC/PHEC		
Hars				-1	20	2b	1	20	26
CTR < 1 1 40 ETR < 000 E	TR > 200 50	30	5000	79.02		9,129	0.0150		0.0003866













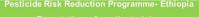








Annex 7: Expectations and objectives from perspective of PHRD by Weldehawariat Assefa, Elias Saheledengle and Alemayehu Woldeamanual



Expectations from the training

Weldehawariat Assefa, Elias Saheledingle, Dr Haimanot Abebe and Alemayehu Woldeamanuel Ministry of Agriculture

joint collaborative programme on pesticide registration and postregistration











Expectations from PRIMET workshop

- Friendly and easily manageable software linked to local and International Research results
- Obtain full fledged PRIMET software that consider all scenarios (field and greenhouse)
- Fully built capacity to operate the software using developed manual
- Assess the limitation in connection to implementation of the software and capacity of experts using the follow-up plan

THANK YOU



Pesticide Risk Reduction Programme- Ethiopia Long and short term plan

Weldehawariat Assefa, Elias Saheledingle, Dr Haimanot Abebe and Alemayehu Woldeamanuel

Ministry of Agriculture

joint collaborative programme on pesticide registration and postregistration











Needs for future assistance in connection to b∠.1 and PRRP-ET

- Develop evaluation manual in relation to physical and chemical properties and for Public health products- long term
- Execute remaining activities planned under B2.2 (UNEP-SAICM) with support of Alterra – Long term
- Strengthen the post-entry inspection and control of pesticides
 - 1 Pesticide inspection , quality control of pesticides equivalence (lab training)-short term
 - 2. conduct training on proper application of pesticides for crop protection experts, development agents and smallholder farmers Long term

Other issues(continued)

- Construct standard centralized store for storing pesticides and interim stores for safeguarding and disposal of obsolete pesticide stocks-Long term
- Initiate MSc studies on pesticide residue and quality control of pesticides – Long term
- · Development of food basket Long term
- Make the software write protected-short term
- Develop follow up plan for implementation of PRIMET.PREMAS and other activities-short term
- · Assess the limitation of PRIMET software-Short term
- Amend the PRIMET software to include field situation-Long term
- Update the PRIMET software when the need arises-Long term

THANK YOU



Develop efficacy extrapolation document in relation to Ethiopian conditions short term

- Formalize testing protocols and efficacy directive by MoA (to be done by the PHRD and MoA in Ethiopia) Short term
- Finalize developing all directives mentioned in the proclamation short term
- Capacity building in relation to residue and quality control of pesticides-Long term
- Initiate PSMS training to track the pesticide utilization in the country (PHRD has to consult FAO to quickly start the training)-Short term
- Find a way to solve re-accumulation of obsolete pesticide problem in the country-Long term
- Implement the national container management strategy developed for Ethiopia-Long term

Annex 8: Introduction to concepts behind the scenarios for drinking water from surface water and groundwater in Ethiopia, by Paulien Adriaanse



joint collaborative programme on pesticide registration and post-registration



Summary sw and gw scenario development

- Workshop 5-9 November 2012 development of scenarios to estimate concentrations in surface water and groundwater used for drinking water production.
- Present were:
 # Alemayehu Woldeamanual- APHRD- PRRP coordinator
 # Dr Dereje Gorfu –EIAR- crop characteristics
 # Mr Engida Zemedagegenhu-Water Works Design and Supervision Ethiopia- groundwater knowledge
- From Alterra: several gw and sw scenario development and model experts: Mechteld ter Horst, John Deneer, Jos Boesten and Paulien Adriaanse

Summary sw and gw scenario development

 B2.1: Development of a scientific evaluation system for the registration of pesticides – Evaluation of dossiers of chemical pesticides

2

So:

- · Registration procedure:
- Developing scientific methods to assess risks in Ethiopian context and for use pattern requested by registrant
- · Nov '11 workshop: Environment drinking water high priority
- Nov '12 workshop: Focus on risks for drinking water production from surface water and groundwater

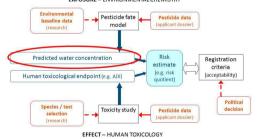
Definition of protection goals: results





- First priority to protect is surface water, used for drinking water (Nov '11 workshop, important rural areas + main source for drinking water in Rift Valley)
- Second priority is groundwater: 90% rural areas and 40% major towns get drinking water from gw source (Nov'12 workshop, Water Works Design and Supervision Ethiopia)

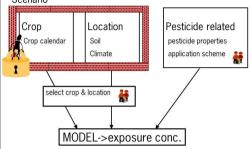
Risk assessment drinking water



Summary sw and gw scenario development

- PEC: <u>local relevant concentrations</u>, so specific for Ethiopian conditions
- Concentrations according to GAP use (not point sources, industry)
- Concentration depends on # protection goal (what, where, how strict) # agro-environmental conditions, compound properties
- Fixed set of agro-environmental conditions is called scenario

2. Relation model, scenario, input data Scenario

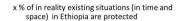


Summary sw and gw scenario development

- Scenario should be based upon
 EU: 'realistic worst case approach'
 (Directive 91/414/EC of EU)
 Ethiopia: phrase included in Proclamation (Feb 2013)
- Realistic worst-casedness or the vulnerability of the scenario is often translated as '90th-percentile occurrence in time and space'

Interludum: Vulnerability

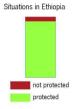
Scenarios should be protective



50% means half of all situations in Ethiopia are protected = average situation

90% means that 90% all situations in Ethiopia are protected = EU translation of "realistic worst case situation"





Interludum: Vulnerability

Scenarios should be protective, "realistic worst case"

Proposal: 99th%-ile occurrence in time and space is protected, so 1% is not protected

More strict than in EU because humantoxicological standard is used in Ethiopia (exceedance means casualties)



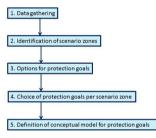
Situations in Ethiopia



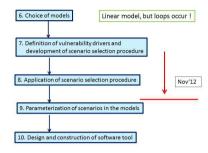
Summary sw and gw scenario development

- Scenario development according to scheme developed by Alterra, based on experience in scenario development in EU since early '90 (soil, groundwater, surface water, greenhouses in NL and EU, groundwater and surface water in China)
- See next slides: in Nov '12, we walked through procedure for surface water and groundwater, separately
- First define protection goals into detail, next develop scenarios, parameterise these and develop software

Definition of protection goals



Scenario selection and parameterization



Definition of protection goals

How to define protection goals into detail?

Answer questions:

- · What do you want to protect?
- · Where?
- · When and how strict?

Why is definition of protection goals important?
If protection goals have been defined into detail

- · we know which exposure concentrations we need to assess, so
- · we can design scenarios, so
- we can perform standardized, cheap, reproducible risk assessments for registration

Summary sw and gw scenario development



- Inventory of agro-environmental characteristics and existing environmental standards in Ethiopia (CR1, Nov '11) + workshop Nov '11
- More details on meteorology (precipitation, yearly totals, daily totals, evaporation, 30 years, model-based, so no data gaps, 80*80 km²), soils (oc, 5*5 km², ISRIC, HWSD)
- More details on groundwater (Mr Engida)
- More details on crops and pesticide use (Dr Dereje)
- More details on pesticide use, registration (Alemayehu)

Definition of protection goals



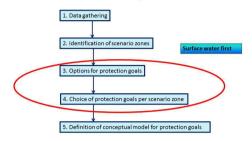
Definition of protection goals



Summary sw and gw scenario development

- Two zones identified:
 < 1500 m and > 1500 m,
 same for sw and gw scenarios,
 similar to zones used for Efficacy assessments in Ethiopia
- Correspond to distinction between Kolla and Woina Dega traditional agro-ecological zones
- Use of more than 1 zone gives flexibility in registration procedure, but may be difficult to uphold
- Important for scenario selection procedure (%-ile selection)
- To be approved by political level, i.e. Pesticide Advisory Board?

Definition of protection goals



Protection goals: surface water

- We need set priorities, so limit number of protection goals for which we can work out the scenarios
- Proposal: take 2 most vulnerable goals, i.e. where we expect the highest concentrations

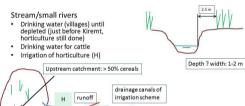
Proposal

- River type: stream/small river near villages, entire Ethiopia (most vulnerable + widespread)
- 2. Pond/lake type: temporary pond, (cattle drinking) Rift Valley, east Ethiopia (also vulnerable)
- 3. (Rift Valley lakes: used when groundwater unsuitable for drinking water, less vulnerable because of size)

Definition of protection goals

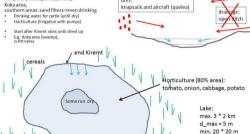


Protection goals #1: surface water



drinking water





Protection goals #3: surface water

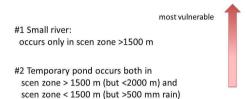
Rift Valley lakes

d_centre = 2 m

- Drinking water for man and cattle
- E.g. lake Ziway, lake Nagano, select smallest lake



Protection goals sw in scenario zones



Definition of protection goals



Protection goals gw in scenario zones

#1 Alluvial aquifers along small rivers #2 Volcanic aquifers of shallow wells

#1 and #2 may be close to each other



#3 Alluvial aquifers at RV margins and lowlands (map circles around yellow locations, overlain with scenario zones)

#4 Fractured basement rocks of shallow wells

Definition of protection goals



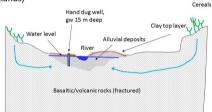
Protection goals#1: groundwater

Alluvial aquifers along small rivers (diverging rivers, highlands)

Hand dug wells, min 3 m deep, average 15 m deep Top layer is clay, thickness varies Water infiltrates from soils above with mainly cereal production Gentle slopes General there is water in well, esp. if rain is high and geological formation favourable Close to gw #2 (some km)

Protection goals#1: groundwater

Alluvial aquifers along small rivers (diverging rivers, highlands) $$_{\mbox{\scriptsize Ceret}}$$



Protection goals#2: groundwater

Volcanic aguifers of shallow wells

Drilled wells, min depth 50 m, up to 100 m deep Clay layer on top

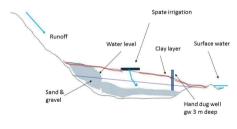
Water from above fractured volcanic rocks, either barren (bushes), or cultivated: then often terraced (otherwise erosion) with pesticide use. Cereals dominate, some pulses (faba bean)

Can be flat land, steep slopes, but gw is deep or population is high (therefore deeper)

Close to gw#1 (some km)

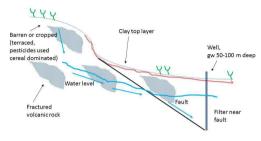
Protection goals#3: groundwater

Alluvial aquifers at the Rift Valley margins or lowlands



Protection goals#2: groundwater

Volcanic aquifers of shallow wells



Protection goals#4: groundwater

Fractured basement rocks of shallow wells

Drilled wells, min 10-12 m deep, max 50 m deep, Fed by runoff from massive basement rocks If fractured zone thick: water all year round, if thin, dry from Dec to June. Fractured zone often near small rivers More arid zones, sorghum, limited teff, so limited pesticide use, so not so vulnerable

Protection goals#3: groundwater

Alluvial aquifers at the Rift Valley margins or lowlands

Most vulnerable are shallow wells (3 m, hand drilled), then near surface water. (Otherwise depth from artesian to 230 m)
Top layer of clay.

Water comes from runoff/percolation from hills/mountains, runoff from volcanic rocks, irrigation return water (spate irrigation)

Protection goals gw in scenario zones

#1 Alluvial aquifers along small rivers: occurs only in scen zone >1500 m most vulnerable

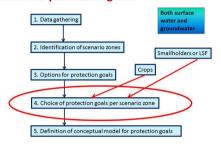
#2 Volcanic aquifers of shallow wells: occurs only in scen zone >1500 m

#1 and #2 may be close to each other

#3 Alluvial aquifers at RV margins and lowlands (map circles around yellow locations, overlain with scenario zones):

occurs mostly in scenario zone <1500 m, may be in scenario zone >1500 m (but then < 2000 m),

Definition of protection goals



Types of farming in scenario zones

Smallholders

- these are evenly distributed across scenario zone >1500 m,
- these are evenly distributed in zone 1000-1500 m in scenario

Large Scale Farms (LSFs)

- these occur in both scenario zones, irrigated, along major rivers (4, 5 up to max 10 km away)

(dominant < 1500 m because big rivers, flat, fertile alluvial, less >1500 m, may be irrigated, mostly rain fed, mostly cereals)

Crops in types of farming and scenario zones

Smallholders:

Zone > 1500 m:

Teff, maize, wheat, barley, vegetables (all),

Also potato, pulse (faba bean, field pea, French bean, chickpea, lentils), pome/stone fruit,

Zone < 1500 m (1000-1500 m):

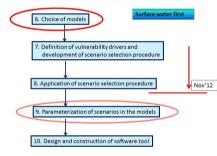
Teff, maize, wheat, barley, vegetables (all),

Also potato, sweet potato, banana (few pesticides), mango

Coffee (no pesticides, so not needed)

Vegetables are: onions, tomato, pepper, cabbage, French beans

Scenario selection and parameterization



Crops in types of farming and scenario zones

Large Scale Farms, LSFs:

zone > 1500 m:

wheat, barley, maize

Also pulses (faba bean, field pea, French bean, chickpea), coffee, citrus, vegetables (on, tom, pepp, cabb)

zone < 1500 m:

sorghum, sesame, French bean (Faseolis vulgaris)

sugarcane, cotton, maize

Also citrus, sweet potato (for planting mat.), vegetables (tom, on, pepp, cabb)

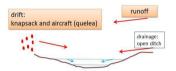
Vegetables are: onions, tomato, pepper, cabbage, French beans

Selected models for surface water

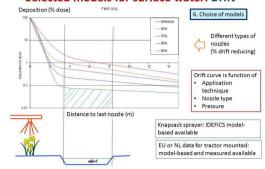
Entry routes

6. Choice of models

Most important entry routes of pesticides in to the surface water



Selected models for surface water: Drift



Selected models for surface water: Runoff

Proposed model:

- PRZM (Pesticide Root Zone Model) model (Carsel et al., 1998)
 - Simulates pesticide runoff from agricultural fields
 - Used in USA and EU





6. Choice of models

N.B. PRZM calculates

Selected models for surface water: Fate in SW

Selected model: TOXSWA



TOXSWA

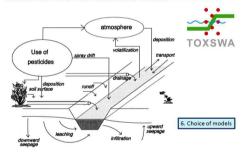
- Developed by ERA team of Alterra
- Used in NL and EU pesticide registration
- · Ditch, stream and pond scenarios parameterised for

TOXSWA in EU





Selected models for surface water: Fate in SW



Selected models for surface water: Runoff

Proposal for Ethiopia

9. Parameterization of scenarios in the models

- Take the R4 (worst case EU) standard PRZM input - Parameterising soil for PRZM is too ambitious in PRRP
- Use Ethiopian weather (daily rainfall and evapotranspiration)
- · Use Ethiopian crops





Selected models for surface water: Fate in SW

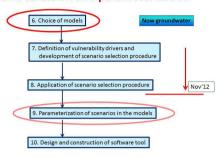
9. Parameterization of scenarios in the models

Proposal for Ethiopia



- Temporary lakes
 - EU FOCUS pond properties (sediment, sus.sol, macrophytes)
 - Ethiopian lake dimensions
 - E.g. minimal dimension of lake were people and/or cattle still drink water
 - EU FOCUS pond properties (sediment, sus.sol, macrophytes)
 - Ethiopian contributing area and crops

Scenario selection and parameterization



Groundwater protection goal

The EuroPEARL meta-model

6. Choice of models

 $Ln(C_1) = \alpha_0 + \alpha_1 * X_1 + \alpha_2 * X_2$

C_i: the concentration (µg/L) in leaching water at 1 m depth, given a net soil deposition of 1 kg/ha

 α_0 , α_1 , α_2 : regression parameters that depend on

- temperature and annual rainfall

- not compound specific, but specific to a region

 X_1, X_2 depend on

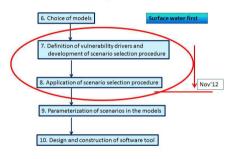
- soil properties (organic matter and water content)

- compound properties (Kom, DT50 degradation)

TIKTAK ET AL: MAPPING GROUND WATER VIJENERABILITY TO PESTICIDES

J ENVIRON QUAL, VOL. 35, JULY-AUGUST 2006

Scenario selection and parameterization



Summary sw and gw scenario development

7. Definition of vulnerability drivers and development of scenario selection procedure

- · Simple back-of-envelope calculations demonstrated that runoff is main driver for concentration in surface water (dimensions water body and spray drift are less important)
- · Main vulnerability driver is runoff, translated as number of days with daily rainfall above 20 mm
- Determine probability of P_{day}>20 mm in time and space
- · Repeat procedure for selected protection goals, i.e. # small streams >1500 m # temporary pond 1500-2000 m
- # temporary pond < 1500 m but > 500 mm

Groundwater protection goal

6. Choice of models

Parameters α_0 , α_1 , α_2 determined by regression of output of EuroPEARL (spatially distributed model, used in NL and EU) and the metamodel output:

• α_0 , α_1 , α_2 taken for climate zone warm, wet (up to >800 mm rain, >12.5 C)-> most representative for Ethiopia

Consequences of extrapolating the EuroPEARL metamodel to Ethiopia

- Ethiopia → more wet and higher temperature
- Meta model → increasing q results in increasing concentration

Defensible because conservative

Summary sw and gw scenario development

7. Definition of vulnerability drivers and development of scenario selection procedure

· Procedure (small streams): # use grids (80*80 km2) and select grids > 1500 m # each grid, each year: Number of d with P_{day}>20 mm -> 33 values (33 yrs)-> rank per grid and select 99th%ile = nr 33 for each grid (now temporal %-ile)

plot this single value per grid on the map # rank all grids (>1500 m) and select 3 grids with highest %-ile (96.5, 98.2 and 100%) (now spatial %-ile) # next, select most suitable grid for protection goal:

here: small streams in agricultural areas

Summary sw and gw scenario development



Three candidate locations for surface water protection goal #1: 191 selected small streams in areas > 1500 m (streams present + intensive agriculture)

Summary sw and gw scenario development

Temporary ponds:

Criteria: # streams >10 km apart # flat area # cultivated area



Top eleven candidate locations for surface water protection goal #2a: 373 selected temporary ponds in areas < 1500 m + > 500 mm rain: ponds, intensive agriculture, many crops, many people

Summary sw and gw scenario development

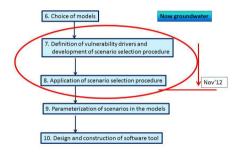
Temporary ponds:

Criteria: # streams >10 km apart # flat area # cultivated



Top twelve candidate locations for surface water protection goal #2b: 217 selected temporary ponds in areas 1500-2000 m: ponds, intensive agriculture, many crops

Scenario selection and parameterization



Summary sw and gw scenario development

Definition of vulnerability drivers and development of scenario selection procedure

- Scenario selection procedure possible with aid of simple analytical model (metaPEARL) run for spatial distributed data (percolation, oc-5*5 km)
- Thus leaching calculated for selected grids (e.g. 1500 m)
- Done for 49 compounds (leaching is f(properties), K_{om} = 10, 20, 30, 60, 120, 240, 480 L/kg and DT₅₀ = 10, 20, 30, 60, 120, 240, 480 d)
- 98-100%ile selected for each compound, -> 49 compounds overlain-> common grids qualify as candidate locations

Summary sw and gw scenario development



Six candidate locations for groundwater protection goals #1 and 2: 219 selected alluvial aquifers along small rivers and volcanic aquifers on shallow wells > 1500 m: cereals grown, pesticides intensively used

Summary sw and gw scenario development



Six candidate locations for groundwater protection goal #3a: 250 selected alluvial aquifers in the Rift Valley margins and lowlands < 1500 m: springs or wells with intensively cultivated, higher situated recharge areas

Summary sw and gw scenario development

10. Design and construction of software tool

• PRIMET tool for sw and gw concentrations



Summary sw and gw scenario development



Six candidate locations for groundwater protection goal #3b: 323 selected (2056 m) alluvial aquifers in the Rift Valley margins between 1500-2000 m: west of lake Ziway, gw from shallow wells, intensive agriculture, high pesticide use, but only 11 out of 256 5*5 km grid cells represent 95-98%-lie

Summary sw and gw scenario development

Documentation:

- Berhan M. Teklu, Paulien I. Adriaanse, Mechteld M.S. Ter Horst, John W. Deneer and Paul J. Van den Brink. Surface water risk assessment of pesticides in Ethiopia. (In prep)
- Adriaanse, P.I., Ter Horst, M.M.S. et al, 2014. Development
 of scenarios for drinking water from groundwater and
 from surface water for use in the registration procedure
 of Ethiopia. Alterra report, in prep.

Summary sw and gw scenario development

So, next steps

8. Application of scenario selection procedure

· Selection of scenario locations

9. Parameterization of scenarios in the models

Next, parameterisation of models:
 # crop development data, association crops to sw and gw scenarios
 # obtain horticultural irrigation data
 # parameterise PRZM (write post-processing program for 33 years Ethiopian meteo) and TOXSWA models for selected

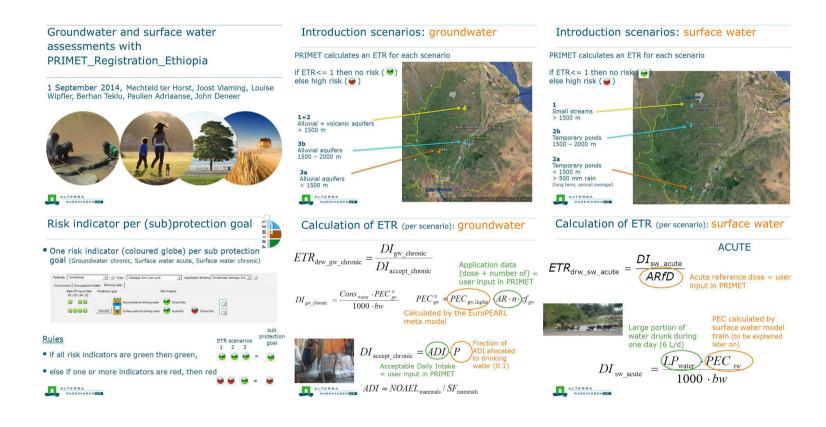
Summary sw and gw scenario development

crops and scenarios (TOXSWA only for ponds)

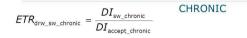




Annex 9: Groundwater and surface water assessments with PRIMET_Registration_Ethiopia by Mechteld ter Horst



Calculation of ETR (per scenario): surface water



Daily drinking water consumption (2 L/d) PEC calculated by surface water model train (to be explained later on)

Cons water PEC sw $DI_{
m sw_chronic} =$



Fraction of ADI allocated



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 $ADI = NOAEL_{\text{mammals}} / SF_{\text{mammals}}$

Calculation of PEC_{gw}: EuroPEARL metamodel

Parameters $\mathbf{a_0}$, $\mathbf{a_1}$, $\mathbf{a_2}$ determined by regression of output of EuroPEARL (spatially distributed model) and the metamodel

 $\mathbf{a_0}$, $\mathbf{a_1}$, $\mathbf{a_2}$ taken for climate zone warm, wet (up to >800 mm rain, >12.5 C)-> most representative for Ethiopia

Consequences of extrapolating the EuroPEARL metamodel to

Ethiopia → more wet and higher temperature metamodel → increasing q results in increasing concentration

Defensible because conservative





Calculation of PEC_{aw}: EuroPEARL metamodel



 $Ln(C_1) = a_0 + a_1 * X_1 + a_2 * X_2$

CL: the concentration (µg/L) in leaching water at 1 m depth, given a net soil deposition of 1 kg/ha

 a_0 , a_1 , a_2 : regression parameters that depend on

- temperature and annual rainfall
- not compound specific, but specific to a region

X₁, X₂ depend on

- soil properties (organic matter and water content) - compound properties (Kom, DT50 degradation)



Calculation of PEC_{sw}: small stream

Procedure for calculating the PEC_{sw} for the small stream



Calculation of PEC_{aw}: EuroPEARL metamodel



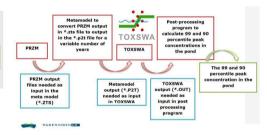


 $k_{\rm g}=$ degradation rate coefficient in soil (1/d), where $k_{\rm g}=\ln(2)/\text{DegT50}_{\text{soil}}$ $\Theta=\text{volume fraction of water (default value = 0.25 m³/m³)}$ $p_{\rm gw}=$ depth groundwater (default = 1m) $p_{\rm gw}=$ q= volume flux of water (m/d)



Calculation of PEC_{sw}: temporary pond

Procedure for calculating the PEC_{sw} for the temporary





- 2 calculate buttons
 - Tab Environment, tab Drinking water
 - both starting the same series of simulations





PRIMET Input data: Pesticide



- (1) relationship between K_{oc} and K_{om} : $K_{om} = K_{oc}/1.724$
- (2) LR50 nta, glass plate test = 1st tier effect assessment LR50 nta, extended lab test = 2nd tier effect assessment One of these needed for NTA risk assessment.
- (3) Relationship between NOAEL mammals and ADI (slide 5)



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Calculation of PEC_{sw}: PRIMET - simulations

- Sequence of scenarios and simulations:
 - i. 191 (stream-> PRZM, PRZMpost)
 - ii. 217 (pond-> PRZM, PRZMpost, TOXSWA, TOXSWApost)
 - iii. 373 (pond-> PRZM, PRZMpost, TOXSWA, TOXSWApost)



PRIMET Input data: Crops



- PEC_{aw} is identical for every crop for the same pesticide and the same application scheme
- Surface water:
 - · Select from a list of crops relevant for Ethiopia
 - Crop parameters are fixed in the template input files of the models.
 - By selecting a crop in PRIMET, the correct model input files are selected for the simulations



PRIMET Input data: Pesticide



PRIMET Input data: Crops



Surface water - Crops differ per scenario

Crop type	Small stream scenario] > 1500 m	Temp. pond scenario < 1500 m	Temp. pond scenario 1500-2000 m
Tomato	X	X	X
Onion	X	X	X
Cabbage	X	X	X
Potato	X	X	X
Teff	X	X	X
Wheat	X	X	X
Maize	X	X	X
Barley	X		X
Faba bean	X		X
Sweet potato		X	
Cotton		X	
Mango		X	
Sugarcane		X	
Banana		X	
Lemon	Х	X	X
Coffee	X	X	X
Flowers			



PRIMET Input data: Crops



- Surface water crops with 2 crop cycles
 - Tomato, Potato (Irish), Cabbage, Onion

PRIMET: Exercises! (after the break)

- 1st crop cycle = rainy season (Kremt; no irrigation)
- 2nd crop cycle = dry season (Bega, irrigated)
- Handling in registration process:
 - If applying PPP in a specific season (rainy or dry) or under specific circumstances (irrigated, non-irrigated) select corresponding crop
 - If authorisation for applying a PPP in the crop in general. Perform assessments for 1st and 2nd -> use highest ETR



PRIMET Input data: Application Scheme

- Dose (kg ai/ha)
- Number of applications
- Time interval between applications (d)
- Start date of the first application (dd-mmm)
- Application method
 - Knap sac (small holders)
 - Tractor mounted (large farm)









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"It takes about 15 cups of coffee to help me feel creative. Thinking outside of the box is easy after you start to hallucinate."

PRIMET Input data: Application Scheme: spray drift

Spray drift deposition as percentage of the application rate for Ethiopian crops

Crop type Deposition (%), tractor mounted knapsack spraying



Data source: Step 3 FOCUS Drift Calculator of the EU FOCUS Surface Water Scenarios

pragmatic choice

omato	0.127	0.127
Onion	0.127	0.127
Cabbage	0.127	0.127
otato	0.1229	0.127
eff	0.127	0.127
Vheat	0.1229	0.127
1aize	0.127	0.127
arley	0.127	0.127
aba bean	0.1229	0.127
weet potato	0.1229	0.127
otton	0.1229	0.127
lango	1.0459	=
Sugarcane	0.1229	0.127
anana	0.1204	0.127
emon	1.0459	H .
Coffee	1.0459	-
lowers		-

Annex 10: PRIMET installation and file structure by Joost Vlaming



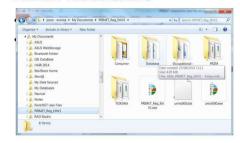
joint collaborative programme on pesticide registration and post-registration



PRIMET Installation

- You receive file: PRIMET_Reg_EthV1-setup.exe (by e-mail or from Joost V)
- Double click file and run installation procedure (see demo)
- Default installation to
 ..\My documents\PRIMET_Reg_EthV1

PRIMET File Structure



PRIMET File Structure

- [Consumer]
- → folder containing consumer model spreadsheets
- [Database]
- folder containing two PRIMET databases
 (Aldb_PRIMET_Reg_EthV1.mdb & db_PRIMET_Reg_EthV1)
- [Occupational operator small and larger scale]
- → Folder containing German model spreadsheet
- [PRZM]
- → folder containing PRZM executable and scenario data files
- [TOXSWA]
- → folder containing PRZM executable and scenario data files
- PRIMET_Reg_EthV1.exe → THE Primet software file
- unins000.dat & unins000.exe → Primet de-installation files

Conclusion

- PHRD accepts the conclusion of using PRIMET in a stand-alone configuration (i.e. no databases shared over a network).
- This enables the independent running of assessments
 - For quality control
 - Without the possibility of oher users changing input data.

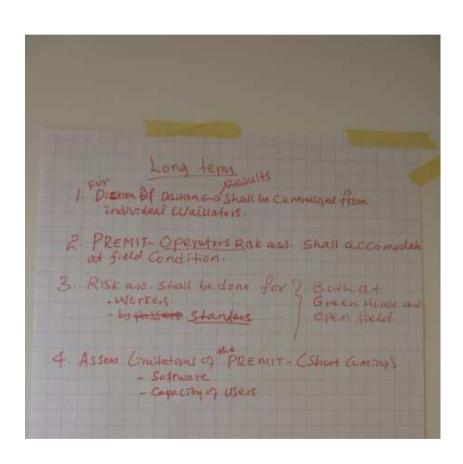
Issue: PRIMET stand-alone or shared data?

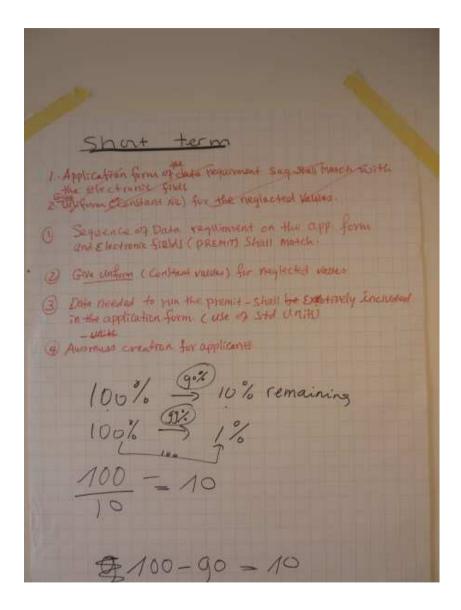
- Default installation puts software and dbs on each PC
- Data (as in databases: Al properties; Project definitions, Application definitions) are NOT shared.
- Export of results is the archived version of an assessment for the Dossier.

PRIMET: Pro's and Con's of stand-alone dbs.

- CONs
 - Cannot reproduce someone else's Projects/assessments with one click.
 - Cannot use someone else's Active Ingredient
- PROs
 - Flexible; everyone can work independently
 - Cannot edit (mess up) someone else's Projects/Al data
 - Two assessors can totally independently run assessments to compare and avoid errors

Annex 11. Lists prepared by 2 subgroups on remaining activities for PRIMET by WP B2.1





Group - I

SHORT TERM ACTIVITIES

- * Remove all the bugs
- * Make the Soft was poright frotested so that to be able to share information with out Changing date.
- * Finalize Efficience user manual considering all the changes (Jups and buyes)
- * Aleating mechanism while inserting unrealistic data.
- * Follow up plan for the implementation of the softween

LONG TERM ACTIVITIES

- * Incorporate new Seneros logan field use)
- I Up date the Software when the meed arises.
- * Making the Software strigget protected



Annex 12: Protection goal Occupational health by Louise Wipfler and Marloes **Busschers**

Occupational risks

Workshop:

PRIMET software + main results WP B2.1

29 Aug -2 Sept 2014



Operator in greenhouse

$$ETR_{oi} = \frac{SE_{oi}}{AOEL} \qquad SE_{oi} = \frac{DE_{oi} \cdot Ab_{d,oi} + IE_{oi} \cdot Ab_{i,oi}}{bw \cdot 100}$$

- AOEL= acceptable operator exposure level (mg/kg bw d)
- DE = dermal exposure, function of application rate
- IE = inhalation exposure, function of Application rate and surrogate exposure value (SV)
- SV can be 1 mg/kg or 20 mg/kg (dusting of carnations)
- PPE may reduce the exposure

Occupational risks

- Worker indoor /outdoor
- Operator indoor (greenhouse)
- Operator outdoor (German model)



Personal protective equipment:	Exposure reduction	PPE _{0€}	
Protective gloves (mixing/loading)	99%	100	
Protective gloves (appl.)	90%	10	
Protective garment + sturdy footwear (appl.)	90%	10	

Personal protective equipment:	Exposure reduction	PPE	
Particle filtering half mask (mixing/loading)	90%	10	_
Half mask with combined filter (mixing/loading)	90%	10	
Particle filtering halfmask (appl.)	90%	10	
Half mask with combined filter (appl.)	90%	10	_



Worker indoor outdoor

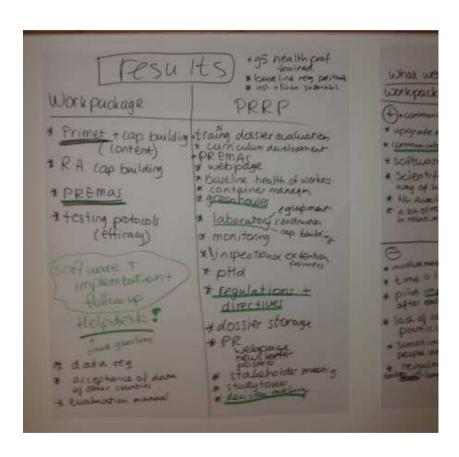
$$ETR_{wio} = \frac{SE_{wio}}{AOEL}$$
 $SE_{wio} = \frac{DE_{wio} \cdot Ab_d}{bw \cdot 100}$

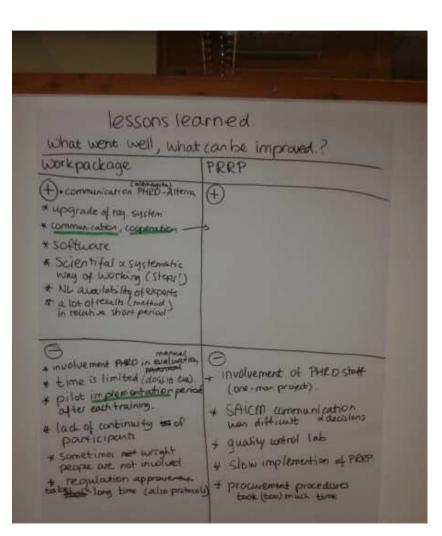
- - AOEL = acceptable operator exposure level (mg/kg
 - Ab= absorption dermal (%)
 - DE is function of application rate



Operator outdoor: German model

Annex 13: Main results and strong points and points to improve for WP B2.1 and PRRP as a whole by PHRD participants





Annex 14: Evaluation form to evaluate WP B2.1





Evaluation of:

WP B2.1 Scientific Dossier Evaluation of Pesticide Risk Reduction Program PRRP-Ethiopia by PHRD, Ctgb and ERA-Alterra team, 2010 - September 2014

Please add specification or example of observed phenomenon.

Could you please give your opinion on PROCESS

1. General cooperation PHRD-ERA team	5	4	3	2	1
2. Communication	5	4	3	2	1
3. Organizational set-up	5	4	3	2	1
4. Involved personnel, partners	5	4	3	2	1
5. Financial operation	5	4	3	2	1
6. Duration of project	5	4	3	2	1
7. Other (specify)	5	4	3	2	1

CONTENT 8. Usefulness for PHRD 9. Quality ERA involvement 10. Other (specify)	5 5 5	4 4 4	3 3 3	2 2 2	1 1 1	
5 = very good, very high3 = average, just OK, adequate1 = very bad, very low						
Could you mention a strong/positive point plus a weak point to improve in process or content? Positive point for						
· 						
Weak point for						

Thank you 🕲 🕲 🕲 🕲 🕲 🕲

Annex 15: Digitally archiving of PREMAS and PRIMET by Harold van der Valk

Pesticide Risk Reduction Programme – Ethiopia

Pesticide Registration Management System (PREMAS

joint collaborative programme on pesticide registration and post-registration









Digitally archiving PREMAS & PRIMET Mas

- Digital registration dossier will be required by the new Regulation
- PREMAS
- PREMAS db (incl. backups)
- Generated (templated) letters
- Standard report formats
- Dossier files (received from applicant)
- PRIMET
 - PRIMET dbs (incl. backups)
 - Risk Assessment results as used in registration process

Digitally archiving PREMAS & PRIMET



- Location of files, as suggested by Dereje Tsegaye (IT, MoA)
 - PC physically located at PHRD office
- Networked access only by PHRD group members
- Dedicated (no other use), on 24/7 and with two hard drives for backups/mirroring

Digitally archiving PREMAS & PRIMET



Suggested structure PREMAS operational



Operational PREMAS files are placed on the network PC

On network PC:

Operational PREMAS files in \PREMAS\

- \PREMAS\Database\
- \PREMAS\Letter templates\
- \PREMAS\Report templates\

Suggested structure PRIMET operational



Operational PRIMET files are placed on the client PCs

On local (client) PC*:

- \PRIMET\Database\ (=PRIMET_DB and AI_DB)
- \PRIMET\PRZM\
- \PRIMET\TOXSWA\
- \PRIMET\primet2014.exe

*PRZM and TOXSWA contain executables and many temp files

Suggested structure Archive

On network PC:

Archived PREMAS & PRIMET files in

- \Archive\
 - − \Database archive\ (zipped copies of PREMAS dbs)
 - \<prf no.-product name>\<application no.>
 - \Admin\ (letters and checklists created from templates)
 - \Dossier\ (misc. files received)
 - \PRIMET\ (evaluation results; see next sheet for naming convention)
 - \Occupational\ (evaluation results)
 - \Consumer\ (evaluation results)

Suggested structure PRIMET (2/2)



On network PC:

Archived PRIMET assessment result files in

- ..\Archive\..\Primet\
- Files having the name
- <A.I.>-<Crop1>-<Protection goal>-<ddmmyyyy>.xls
- 1 : crop name as in PRIMET crop list

