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**Conference of the Parties of the Stockholm
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Item 6 (o) of the provisional agenda*

Technical assistance

**Reports of the case-studies on regional and subregional
centres for capacity-building and technology transfer under
the Stockholm Convention****

Note by the Secretariat

1. As referenced in document UNEP/POPS/COP.1/31, the annexes to the present note contain the results of four case-studies on regional and subregional centres for capacity-building and technology transfer, proposed pursuant to paragraph 4 of Article 12 of the Stockholm Convention on Persistent Organic Pollutants.
2. Annex I contains the case-study report of the International Centre of Insect Physiology and Ecology (ICIPE) Nairobi, Kenya.
3. Annex II contains the case-study report of the Universiti Sains Malaysia.
4. Annex III contains the case-study report of the South Pacific Regional Environmental Programme (SPREP)/Basel Convention Regional Centre.
5. Annex IV contains the case-study report of the Basel Convention Coordinating Centre for Training and Technology Transfer for Latin America and the Caribbean, in Montevideo, Uruguay.
6. The above case-study reports are presented as submitted by the institutions being studied, and have not been formally edited.

* UNEP/POPS/COP.1/1.

** Stockholm Convention on Persistent Organic Pollutants, Article 12, paragraph 4; Conference of the Plenipotentiaries of the Stockholm Convention, resolution 4; Report of the Intergovernmental Negotiating Committee on the work of its sixth session (UNEP/POPS/INC.6/22), annex I, decision INC-6/10.

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Annex I

International Centre of Insect Physiology and Ecology (ICIPE)

Nairobi, Kenya

Proceedings of the
Regional Training Workshop on
Persistent Organic Pollutants (POPs) and Alternative Approaches to Malaria Control
in Africa.

20th - 27th June 2004

International Centre of Insect Physiology and Ecology (ICIPE)

Nairobi, Kenya

September 2004

Acronyms and abbreviations

BEP	Best Environmental Practices
Bti	<i>Bacillus thuringiensis israelensis</i>
CHW	Community health workers
COP	Conference of Parties
DDT	Dichloro diphenyl trichloroethane
GEF	Global Environmental Facility
ICIPE	International Centre of Insect Physiology and Ecology
IEC	Information, Education and Communication
IPM	Integrated Pest Management
IRS	Indoor residual spraying
ITNs	Insecticide treated nets
IVM	Integrated vector management
KAP	Knowledge, Attitude and Practices
KEMRI	Kenya Medical Research Institute
MoH	Ministry of Health
POPs	Persistent Organic Pollutants
SCS	The Stockholm Convention Secretariat, Geneva
TOT	Training of Trainers
UNEP	United Nations Environmental Programme
WHO/AFRO	World Health Organization, African Regional Office

Executive Summary

Just as integrated pest management (IPM) has become the method of choice in crop pest management, the WHO/AFRO and ICIPE intends to bring integrated vector management (IVM) to the same level of development and utilization. These integrated strategies will allow for a sharp reduction in the use of pesticides, with lower overall costs and reduced negative environmental effects, while providing the required sustainability, health and environmental acceptability. It is envisaged that further research into alternatives is a pre-requisite for managing and reducing reliance on POPs. ICIPE is well placed to provide countries with the needed capacity strengthening through training and overall technology transfer by applying Best Environmental Practice (BEP) for sound management of POPs through case studies and demonstration projects.

In consultation with the Stockholm Convention Secretariat (SCS) and in recognising ICIPE's experience and expertise, malaria was identified as an issue of major concern in the eastern and southern African region. Considering that DDT, one of POPs under the Convention has been in use for control of malaria vectors and that there is a global move to phase it out or reduce its reliance, ICIPE was requested to conduct a case study to assist countries using DDT or intending to revert to it to implement IVM as a sustainable and effective strategy for vector control. This decision was based on the fact that ICIPE has developed a strong base and expertise on Integrated Pest Management (IPM) and Integrated Vector Management (IVM) as alternatives to chemical control of disease pests and vectors and could therefore assist countries in Africa to reduce the reliance on DDT for mosquito control and instead implement IVM strategy. The urgency of hosting this workshop was realized as more and more countries are considering reverting to the use of DDT.

In this connection ICIPE organized a 5-day training workshop from 21-26 June, 2004 for 14 participants from seven countries in the eastern and southern African region who are involved in vector borne disease control in their countries. The main objective of the workshop was to create awareness on the Stockholm Convention and the national obligations on POPs and to provide technical skills on integrated vector management as an alternative approach to the use of DDT for indoor residual spraying. The ministries of health from 8 countries were requested to nominate 2 officers to attend the workshop in Nairobi. However, only 7 countries nominated participants as follows: 2 each from Kenya, Ethiopia, Zimbabwe, Uganda, and one each from Zambia and Tanzania. 4 were invited from Malawi (due to double nominations) making a total of 14 participants. The program of the workshop included 3 days of lectures and group work and 2 days of field visit to Malindi on the Kenya coast, where the community is involved in malaria control.

By the end of the workshop, the participants expressed their willingness to collaborate with ICIPE in implementing integrated vector management strategy in their countries as a comprehensive method to vector control in order to reduce reliance on DDT or to stop governments reverting back to its use as some countries have suggested. ICIPE, with assistance from her partners will strive to work with the workshop participants to push the IVM agenda forward.

1.0 Introduction

In collaboration with WHO/AFRO, ICIPE intends to bring integrated vector management (IVM) to enhanced levels of development and utilization similar to integrated pest management (IPM) widely used in crop pest management. The use of integrated strategies will lead to a sharp reduction in the use of pesticides, with lower costs and reduced negative environmental effects, while providing the required sustainability, health and environmental acceptability. Further research into alternatives is a pre-requisite for managing and reducing reliance on POPs pesticides.

The Stockholm Convention especially stresses the need for Best Environmental Practice (BEP) for the sound management of POPs. It also encourages research and development of alternatives to DDT. ICIPE has the capacity to provide much of the needed technological transfer for countries that continue to rely on DDT for malaria vector control.

The UNEP Chemicals in Geneva identified ICIPE to undertake a case study designed to identify and explore issues associated with the regional delivery of technical assistance under the Stockholm Convention on POPs under the terms of reference in Annex 1. The training workshop was designed for public health professionals who are actively involved in the management and decision-making process related to vector control and vector-borne disease control.

The objectives of the workshop were:

- To provide technical and managerial skills on integrated vector management
- To strengthen the capacity of national disease control programmes on environmentally sound alternatives and management options for POPs, with particular emphasis on reliance on the use of DDT.

Expected outcome

The capability of public health officers and vector control specialists to implement integrated vector management as alternative approach to use of pesticides for vector control improved

1.1 Opening remarks by Director General of ICIPE

The training workshop was formally opened by Dr. Hans Herren, the Director General, of ICIPE. In his opening remarks he emphasised the link between capacity building and technology transfer. With regard to DDT, he noted that there are enough alternatives to DDT and in his opinion there is no need to revert to DDT use. Some of the alternatives are even better than DDT. He added that ICIPE has been using Integrated Pest Management (IPM) for 10 years and indicated that IPM has proven to be a satisfying counterforce to pesticides. Recognising that easy solutions are not sustainable solutions, there was a strong possibility that pesticide use will alternately lead to resistance. He cited ICIPE's development of the *Bacillus thuringiensis israelensis* (Bti) demonstration factory as a way of applying environmentally friendly solutions to malaria vectors.

1.2 Remarks by UNEP/GEF Regional Office -Takehiro Nakamura

Mr. Nakamura of the UNEP Division of GEF Coordination Office in Nairobi gave an overview of UNEP/GEF activities and emphasised the role of this unit in the GEF family especially emphasising the UNEP/GEF POPs activities.

He said that GEF is funding activities in the search for better alternatives to DDT as well as demonstration projects for alternatives to DDT. In this connection, UNEP is collaborating with other United Nations specialized agencies such as the World Health Organization, World Bank in capacity building at national and regional levels.

1.3 Workshop objectives by Dr John Githure

Dr. Githure highlighted ICIPE's mandate which he said is to conduct research, train and develop methods for managing pests and vectors in environmentally friendly ways. ICIPE has developed strong programs on both IPM and IVM as alternatives to chemical control of pests.

He said that the workshop was convened at ICIPE in response to Article 12 of the Stockholm Convention on POPs through a request from UNEP Chemicals in Geneva to provide technical assistance to countries in the region to fulfill their obligations under the convention on alternatives to DDT.

Two main outcomes were expected from the workshop. First was that the capability of public health officers and vector control specialists to implement IVM as an alternative approach to use of pesticides for vector control would be improved. Secondly, to have ICIPE established as a UNEP Regional Center for capacity building and technology transfer on POPs.

2.0 Workshop process and deliberations

The first three days were devoted to learning about malaria vector control in Africa, The Stockholm Convention with specific emphasis on DDT and group work on IVM as the way forward to reducing reliance on DDT. One and half days were devoted to field visit in Malindi on the Kenyan coast where the participants learnt the organizational structure of community initiatives on IVM implementation as well as community based activities undertaken in the control of malaria under the IVM approach as shown in the Programme (Annex 2). The one-week training workshop was attended by 14 participants drawn from Kenya, Uganda, Tanzania, Ethiopia, Zimbabwe, Zambia and Malawi (Annex 3).

2.1 Presentations

2.1.1 Overview of the Stockholm Convention on POPs: - Francis . Kihumba

Mr. Kihumba – who is the designated national POPs focal point for Kenya, provided an overview of the Stockholm Convention. The presentation introduced the main principles and spirit of the convention. The Stockholm Convention is a global treaty to protect human health and the environment from persistent organic pollutants (POPs). POPs are chemicals that remain intact in the environment for long periods, become widely distributed geographically, accumulate in the fatty tissue of living organisms and are toxic to humans and wildlife. POPs circulate globally and can cause damage wherever they travel. In implementing the Convention, Governments will take measures to eliminate or reduce the release of POPs into the environment. The presenter gave the history of the convention from initiation to inception.

2.1.2 National Obligations Related to DDT under the Convention - Dr Paul Saoko

The Stockholm Convention stresses that all Parties¹ must eliminate production and use of DDT, except Parties that notify the Secretariat that they need it for disease vector control programs. Use of DDT may only be allowed when locally safe, effective and affordable alternatives are not available to the Party. However Parties must set-up special public DDT register and must still comply with reporting and other obligations. All Parties must promote research and development for alternatives to DDT. The use of DDT is subject to review by the Conference of Parties (COP) to see when DDT is no longer needed for disease vector control. The Parties using DDT are asked to develop and implement a plan of action, as part of the implementation plan and that shall include:

- (a) Development of regulatory and other mechanisms to ensure that DDT use is restricted to disease vector control

¹ Parties refer to States that have ratified the Stockholm Convention

- (b) Implementation of suitable alternative products, methods and strategies, including resistance management strategies to ensure the continued effectiveness of these alternatives.
- (c) Measures to strengthen healthcare and to reduce the incidence of the disease.

2.1.3 Health Impacts

The participants were orientated on the health impact of DDT. This was essential in decision-making and also to prepare them to make a case for using alternatives to DDT in their respective countries. The presentation noted that concentrations of DDT and its metabolites are clear barometers of exposure. Although DDT levels are noted to be on the decrease globally, there are populations and wildlife that experience concentrations of DDT above critical levels. For instance, investigations in Mexico and South Africa reveal that human breast milk contains DDT at concentrations that exceed the guidelines for the acceptable daily intake by infants as set by the WHO. DDT like other POPs substances is dangerous when it gets into the human body even in minute quantities. Children get exposed to POPs through direct exposure to contaminants but most profoundly in the uterus. Most of the toxicological studies have concentrated on lethal doses in relation to cancers, gross abnormalities and death in order to come up with safe levels.

2.1.4 Science based decision making for DDT

This presentation introduced several alternatives that have been incorporated into IVM strategies. These include the use of pyrethroids, which have been stabilized and now have long residual capacity, insecticide-treated nets (ITNs), house spraying, space spraying, larviciding, IVM and biological control methods. The Mexican successful shift from DDT is an example that could well work in the eastern African region. DDT is arguably cheap but what is cheap might end up costing more in the long term. Malaria control programs therefore require more investments in alternatives to DDT and also need to be integrated into development programs and other activities to guarantee success.

2.1.5 DDT in the environment, Kenya situation - Dr. Paul Saoko

In order to illustrate the persistence of DDT in the environment, the result of the recently launched National Inventory of POPs (specifically DDT) was presented. It noted that DDT was first introduced in Kenya as an acaricide in 1956 to combat tick menace. It was then banned for use in livestock in 1976. It was subsequently banned for agriculture in 1986 but was restricted for use only in disease vector control. A study carried out in Kenya in the mid- 1980s indicated that high levels of DDT was used in both agricultural and public health undertaking. High levels of DDT were observed from a test of 367 domestic eggs from 61 farms in Central Kenya and 41 maternal blood, milk, subcutaneous fat and umbilical cord blood samples from mothers who delivered through caesarean section at the Kenyatta National Hospital. It means that other Kenyans have been exposed to DDT through the food pathways and have bequeathed the DDT and other persistent organic pollutants soup to their children who are now more than 20 years old.

2.1.6 Eliminating/reducing the use of DDT by selecting alternative management strategies – Francis Kihumba

Participants were briefed on document UNEP/POPS/IN/7/4 which highlights on information and guidance needed to assist for evaluating continued need for DDT use for disease vector control and also discussed broadly the alternative regimes for controlling malaria vectors.

The participants covered information gathering on production and use of DDT, its alternatives and systems strengthening. The document provided a framework for collecting information on reliance on DDT and highlighted various alternatives to DDT, namely, biological, chemical and environmental controls as well as general human, and environmental safety issues.

It also gave participants an idea of what information they need to collect with regard to alternatives to DDT which can eventually help their countries comply with the convention.

3.0 Summary of Country Reports

Prior to the commencement of the workshop, participating countries had been requested to prepare country reports using a structured questionnaire (Annex 4). The exercise was aimed at gaining insights on the basic understanding of the Stockholm Convention in general and its phase out program for DDT especially with regard to introduction of DDT alternatives among the countries.

Participants presented their country reports (Annex 5) in which the following issues were common to all

the countries that participated in the workshop:

- All are signatories to the Convention,
- Two countries (Ethiopia, Malawi) are parties
- Others except Kenya were not sure what status or ratification process has been undertaken.
- All participants work with vector borne disease departments.
- All claimed malaria to be a major problem in their country
- One country (Ethiopia) currently uses DDT for spraying to control vector borne diseases while Uganda is in the process of reverting back to DDT use.
- Few had accurate inventories of DDT or sectors where it is used.

4.0 Integrated Vector Management

4.1 *ICIPE's role in capacity building on IVM - Dr Githure*

ICIPE plays a crucial role in malaria control in Africa by providing guidance and technical assistance to the national malaria control programs in Africa especially on the ecology and behavior of malaria vectors. The institute seeks to strengthen vector control capability in the national research and teaching institutions in Africa. Currently the institute is working towards promoting use of IVM strategies in different ecological settings in Africa. ICIPE has been designated as a WHO Collaborative Center on IVM and has conducted a six-weeks Regional Training Course on IVM for 17 senior level malaria control managers drawn from 16 countries. Current projects at ICIPE cover larval control of malaria vectors, behavioral and chemical ecology of malaria vectors, vector competence of malaria vectors, bio-prospecting for mosquito repellents and larvicides from plants and control of mosquito larvae using microbicides. A demonstration factory to produce *Bacillus thuringiensis israelensis* for larval control has been set up at the institute.

4.2. *IVM Philosophy - Dr Novak*

A background understanding on the principles of IVM was deemed necessary for the participants since vector control is an essential component of any vector borne disease control program. IVM was defined as the “*the rational use of all appropriate means of control in a mutually compatible, safe and cost-effective manner in order to achieve vector suppression and control of disease transmission*”. A holistic and ecological definition expounds the above definition by WHO by stating that it is “*a unified plan of control that selects the most appropriate methods of control, based on the environmental conditions and the population dynamics at a level that does not cause health problems*”. The main objectives of vector control are to reduce vector breeding sites to the strictest minimum wherever possible, reduce the abundance and longevity of disease vectors and to reduce the human vector contact. The presenter acknowledges that there is no “silver bullet” and that intervention models have to be developed based on ecological peculiarities.

I.

4.3. *Practices of IVM - Dr J Shililu*

A practical and step-wise development of an IVM strategy was provided to the participants. This presentation highlighted the primary need to develop an IVM control strategy based on disease stratification, identification of target vectors, and selection or integration of control methods. A key factor in this process is to identify obstacles to the introduction of IVM. The criteria for selection of IVM tools should consider cost-effectiveness, long-term economic advantage, benefits, operational applicability, safety, suitability for the local conditions, acceptability and administrative/logistical feasibility.

5.0 Group work reports

The participants broke into two groups to discuss the POPs convention, alternatives to DDT, capacity building and technology transfer. The groups noted the following:

5.1 *Capacity to implement the Stockholm Convention and Technology transfer*

- There is need to prepare countries for phasing out and elimination of DDT use
- Countries intending to introduce DDT need to be made aware of the implications of their intentions
- There is need to assist malaria endemic countries to identify appropriate alternatives to DDT

- There is need to identify a regional centre that coordinates activities leading to DDT phase out and introduction of alternatives

5.2. *Research needs*

- Conduct field testing and demonstration projects on IVM in different eco-epidemiological settings
- Conduct cost benefit analysis of DDT and alternatives
- Evaluate the health and environmental impacts of DDT and alternatives
- Monitor pesticide/insecticide resistance

5.3. *Networking*

- Information exchange is lacking amongst disease endemic countries
- Underutilization of locally available expertise (no readily available inventory of
- Reactivate or set up coordination structures and mechanisms

6.0 **Relevance of case study site in Malindi**

Malindi District is located on the Kenyan coast north of Mombasa. It is one of the major tourist destinations on the Kenyan coast. Malaria is endemic in the region and like other parts of the Coast Province, the disease has a major impact on the economic and social conditions. It is the leading cause of morbidity and mortality accounting for more than 14,000 outpatients seen annually at the District Hospital.

The field visit and training was conducted by community-based workers. The participants visited sites where non-chemical control measures for mosquitoes spearheaded by the community were successful. The idea of using grass-root communities to introduce alternatives to DDT was effectively demonstrated at the field site and this is expected to be replicated in countries with similar socio- cultural and economic background.

It was evident that mosquito breeding in the area is as a result of man-made alteration to the ecosystem. Unfortunately, municipalities are not doing enough and this prompts communities to take action to remedy the malaria menace. For example, the communities regularly clean up their compounds and participate in the National Malaria Day. Many groups are also joining up to address malaria issues supported by the business community. These groups are involved in buying mosquito netting materials making mosquito nets and environmental management such as filling up stagnant pools of water and burning debris. Information on mosquito ecology and life cycle is provided to community organized groups by KEMRI and ICIPE staff.

The Malindi community initiative was started by training two groups of TOTs for experts drawn from Ministry of Health, Malindi municipality and schools. They were taught methods of mosquito control as well as communications skills.

The knowledge gained has helped the community to recognize that 90% of the breeding habitats of mosquitoes are man-made. Each group has developed mosquito scouting teams that identify the sites where mosquitoes are breeding and implement control action

6.1. *Field Visits*

The participants visited the following communities:

The Shella Women Group

The group's main focus is preparing ITNs which has led to a dramatic reduction in malaria cases.

The Ngala Community Group

This group promotes malaria awareness through drama and skills. They also participate in draining pools of stagnant water. They do environmental management as well as promote personnel protection of workers. The group involves school children, elders and the unemployed youth as well as school leavers.

The Maweni Women Groups

This group also cooperates with the Ngala women group to identify areas that have stagnant pools of water in the estate and drain them.

The Shilago Group

This group is coordinated by teachers of Bahari Secondary School which also educates communities to reduce mosquitoes at source. It also has environmental activities such as tree planting.

Malindi Solid Waste Management Project

The Project concept appreciates that most of the receptacles that hold water in which mosquitoes breed are also a solid waste problem. They include cans, plastic containers, and coconut shells. Schools are encouraged to collect plastics, metal cans and the school with the largest mass wins a prize. It was apparent that the community has very innovative ideas to re-use plastics.

The community leaders reported that at least 80% of the population associate malaria with mosquitoes. They reported that cases of malaria have gone down as a result of knowledge dissemination and the use of environmental management and use of insecticide treated nets.

The achievements made by the community were listed as follows:

- 1) They have recorded that over 90% of the mosquito larval habitats in Malindi are man-made and that they can easily be eliminated by environmental management.
- 2) More than 40% of the people use bed nets
- 3) Many community-organized groups are providing technical assistance in the control of mosquitoes and malaria.
- 4) Through consultations with the Municipal Council, the Ministry of Health and other stakeholders they have developed and started to implement innovative community-based environmental management and larviciding with safe bio-pesticides.

The participants carried out a review of the field work and responded as follows:

- All participants noted that the workshop and field visit stimulated their eagerness for their institutions to collaborate with ICIPE on community based malaria control programme.
- The field experience was useful as it put into perspective practical application of the plenary sessions given to them
- Cost effective way to deal with mosquitoes as an alternative to chemicals is environmental management and larval control.
- The use of ITN has a definite role as alternatives to DDT.
- Women groups are dynamic as channels for reaching the wider community and they should be encouraged to implement IVM strategy.
- ICIPE tested technologies should also be tested in individual countries prior to implementation. Capacity building should consider human resource development and laboratory improvement.

7.0. Conclusions and Recommendations

1. There is need to assist malaria endemic countries to identify and evaluate appropriate alternatives to DDT.
2. There is need to identify a regional center that coordinates activities leading to DDT phase-out and introduction of alternatives, and act as the reference point on technologies relating to the phase-out of DDT.
3. There should be linkages and modalities for permanent partnership within the region for organizations and institutions involved in the implementation of the Stockholm Convention on persistent organic pollutants.
4. More data/information on adverse effects of DDT need to be disseminated as a basis and foundation of a complete switch to alternatives.
5. There should be focal point in each country to address the effective implementation of IVM and introduction of other alternatives to DDT
6. The Stockholm Convention focal points in every country need to organize awareness creation forums/meetings with policy makers for introduction of alternatives to DDT and IVM in particular.
7. There should be regional information sharing and exchange mechanism between and among all the countries in the region on implementation of IVM.
8. Strongly recommended the creation of a regional website on IVM
9. Funding should be made available for the implementation of control programs based on the IVM initiative.

10. Communities are important drivers to promote IVM. They should be encouraged to access financing through the Global Environment Facility Small Grants Program, as the Stockholm Convention is a focal area in GEF.

Annex 1

Terms of Reference:

1. In consultation with the Stockholm Convention Secretariat, identify an issue of major concern within the region that will be targeted by the case study.
2. Develop a work program for addressing the issue identified in paragraph 1 above. The work program should include, but not be limited to the following parameters:
 - (a) To arrange a field visit to anywhere in the region that looks at improved technology, event, facility or any other technical or man-made environmental occurrence that warrants introduction to the wider region;
 - (b) To include participants from multiple countries in the region to which such a field visit has relevance. A request should be made to national Stockholm Focal Points to make recommendation from their respective countries on suitable candidates for participation in the field visit;
 - (c) To ensure that the field visit selected has relevance to the Stockholm Convention and will allow the countries participating to gain information that will assist them in filling their obligation under the Convention;
 - (d) To facilitate discussion and consideration by the participants of the possible implementation of the technology/practice in their countries and the pros and cons of its success;
 - (e) To contract and include at least one (1) regional expert to make presentation and act as resource person for the field visit.
3. Undertake the case study with a budget of USD\$40,000.00 that will be contributed by UNEP. An in-kind contribution of not less than 10% of the budget is to be provided for the case study by the implementing institution.
4. Provide a written proposal on the study to the Stockholm Convention Secretariat at least four (4) week before implementation date. Include details of the proposed field visit, what will be examined, where it is located and a provisional agenda for the exercise, the schedule/format, a detailed presentation of expected expenditures and implementation strategy for the study.
5. Make a written report on the implementation of the case study upon its completion, including information on success/problems with organisation, implementation, finances, technology and any other information deemed pertinent to the assessment of the study.
6. Carry out a survey of the participants in the case study (pre/post) to obtain their views on the usefulness/success of the field visit, their gain (if any) in knowledge, and the appropriateness of the model for technical assistance, and make the individual questionnaires from the survey available with the report of the study.
7. Complete the study by 31 July 2004, and present the report on the study to the Stockholm Convention Secretariat on or before 30 August 2004.

Annex 2

Program of the Workshop**Sunday 20 June -** Arrival of Participants and Registration**Monday 21 June**

09:00 Welcoming remarks by Director General, ICIPE – H. Herren
 09.10 Remarks by Programme Officer, GEF/UNEP Coordinating Office – T. Nakamura
 09.20 Objectives and Expectation of the Workshop – J. Githure
 09.30 Introduction of Participants
 09.40 Overview of the Stockholm Convention on POPs - F. Kihumba
 10.30 *Tea Break and Group Photograph*
 11.00 National obligations related to DDT under the convention – P. Saoke
 11.30 Discussion
 12.30 *Lunch Break*
 14.00 Science based decision making for DDT, - P. Saoke
 14.30 DDT in the Environment, the Kenya situation– P. Saoke
 15.00 Discussions
 15.30 *Tea Break*
 16.00 Eliminating/Reducing the use of DDT by selecting alternative management strategies – outcome of INC 6 – F. Kihumba
 16.30 Recap of issues and discussions – F. Kihumba
 17.00 End of day 1

Tuesday 22 June

08.30 Country Reports (Kenya, Uganda, Ethiopia, Tanzania, Malawi, Zambia, Zimbabwe)
 10.30 *Tea Break*
 11.00 Integrated Pest Management and Integrated Vector Management:
 (J. Githure, J. Shililu, B. Novak)
 12.30 *Lunch Break*
 14.00 Selection criteria for alternative to DDT (Policy reform, Cost Capacity Building)
 14.30 Group Work

- Review of Management issues
- Technology transfer criteria
- Research
- Networking

 17.00 End of Day 2

Wednesday 23 June

08.30 Group Work continues

- Capacity building
- Regulatory and policy reform
- Financing technology transfer
- Initiating Action

 10.30 *Tea Break*
 11.00 Plenary session for group work
 12.30 *Lunch Break*
 14.00 Summary and Recommendations
 17.00 End of Day 3

Thursday 24 June

09.00 Depart for Malindi .
 14.00 Field visit in Malindi
 18.00 End of Day 4

Friday 25 June -

09.00 Community-based activities in Malindi field visits
16.00 Review of field visit
18.00 End of Day 5

Saturday 26 June

09.00 Return to Nairobi

Sunday 27 June - Departure of participants

Annex 3

List of Participants and Facilitators

	NAMES	COUNTRY
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12	Mr. John Chipwanya	<p>Entomologist Ministry of Health Community Health Science Unit Area 3, Private Bag 65 Lilongwe MALAWI Phone: 265-1-752 450 Fax: 265-1-751 247 Email: johnchipwanya@yahoo.co.uk</p>
13	Mr. Samuel Muiruri	<p>Medical Entomologist Division of Vector Borne Diseases P.O Box 20750 Nairobi KENYA Fax: 254-20-2725737 Phone: 254-20-2725737 Email: schisto@africaonline.co.ke</p>
14	Mr. Philip Kangethe	<p>Medical Entomologist Division of Vector Borne Diseases P.O Box 20750 Nairobi KENYA Fax: 254-20-2725737 Phone: 254-20-2725737 Email: schisto@africaonline.co.ke</p>

Facilitators		
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2	Dr. Robert Novak	Professor of Entomology University of Illinois, Champaign, USA rjnovak@uiuc.edu
3	Dr. Josephat Shililu	Scientist ICIPE, Nairobi, Kenya Tel: 254-20-861680 Fax: 254-20-860110 Email: jshililu@icipе.org
4	Mr. Francis. Kihumba	National Coordinator - POPs Project National Environment Management Authority P.O Box 67839, Nairobi, Kenya. Tel: 254-20-722-431110
5	Dr. Paul Saoke	Director Physician for Social Responsibility P.O Box 54840 Nairobi, Kenya Tel: 254-20-720-264297
6	Dr. Charles Mbogo	Chief Research Officer ICIPE/KEMRI Kilifi, Kenya Tel: 254-041-22063 Email: cmbogo@kilifi.mimcom.net
7	Ms. Lydia Kibe	Social Scientist Community Based programs ICIPE/KEMRI, Malindi, Kenya Tel: 254-041-22063 Email: lkibe@kilifi.mimcom.net

Annex 4

Questionnaire on POPs with reference to DDT

1.0 Country -

2.0 Status with Regard to persistent organic pesticides (POPs) Convention

Signatory	Yes	No		
Party			Yes	No
Don't Know				

3.0 Address of Country POPs Focal Point

4.0 Country background regarding multilateral Agreement on chemicals and wastes

5.0 For your country state the position of the Stockholm Convention in respect to:

POPs inventory—

Draft National Implementation plan—

Request for exemption- -----

6.0 Management structure for DDT in the country (if applicable)

Historical pesticide use of DDT in the country-

Quantity which is used –

Sectors in which it is used –

Priority issues on DDT (phase out or ban) -

Specific ecological issues/concerns on health and environment –

7.0 What is your country doing as regards to:

Alternatives to DDT –

On going research programs and projects –

Reduction/elimination of DDT-

8.0 What is your country doing in relation to: Capacity Building Activities in relation to elimination/reduction of DDT use; -

9.0 State any issues you would like the workshop to prioritise –

Ethiopia Country Report**Background Information**

- | Population 67 million (85% rural)
- | Population density 50 persons/Km²
- | Health coverage 61%
- | Infant Mortality Rate 110/1000 live births
- | Under five mortality rate 160/1000
- | Maternal Mortality rate 700/100,000
- Major malaria eco-epidemiological strata
 - | >2500 m.a.s.l - malaria free highland areas
 - | 1500-2500 m.a.s.l – highland fringe malaria (frequent epidemics)
 - | <1500 m.a.s.l – malaria endemic, with seasonal transmission, except in the areas far from permanent breeding sites.
 - | Stable malarious areas-, year round transmission
 - |

The Malaria Situation – Distribution & Seasonality

- | 75% of the land malarious (altitude < 2000 m),
- | >46 million(68%) of the population at risk,
- | Transmission season- Sept.- Dec., April- May, (seasonal & unstable)
- | Coincide with major harvesting season; aggravate economic loss,
- | Major epidemics occur every 7-8 years, focal epidemics are common,
- | Increasing trend in malaria transmission
- | Increased frequency of epidemics

Increase in Annual Number of Cases & Frequency of Malaria Epidemics

- | Prolonged drought followed by rains increases mosquito breeding,
- | Generally low protective immunity aggravated by drought, famine & displacement,
- | Population movement to and from malarious areas,
- | Deteriorating quality and coverage of preventive activities due to diffuse of trained manpower & equipment following decentralization.

Activities & Progress - Early Diagnosis and Treatment

- Enabling Factors Towards the Achievement of the Abuja Targets
- Improving health Service Coverage 51% to 61% 2003,
- | Community based health services expanding through training of CHWs – Over 4368 & 790 MCs trained & deployed,
- | Training of health extension workers for village based health services starting,
- | Refresher training on diseases management – 2714 health workers
- | Nationwide assessment of efficacy study on Fansidar in progress,

Activities & Progress -Insecticide Treated Nets

- | IRS only covers about 20-30% of the total epidemic prone areas in the country (50%),
 - Poor targeting & timing of spraying in some areas,
- | Re-plastering of sprayed surfaces a serious problem,
- | Diffuse of equipment & vector control manpower following decentralization, compromising quality and coverage of service.

IEC, Social Mobilization & Advocacy

- | IEC materials production & distribution (four major languages, with support from UNICEF)
- | Posters and leaflets
- | Mass media education
- | Educational seminars
- | Daily Radio messages in three major languages (Sep – November 2003)
- | Advocacy
- | Resource mobilization (emergency & regular)
- | Briefing to media
- | Commemorating the Africa Malaria Day,
- | Need for impact assessment/behavioral change

Epidemic Prevention & Control

- Detecting & Containing Malaria Epidemics with in two weeks from onset
- | Training in epidemic monitoring, preparedness & response,
- | Use of norm charts for epidemic monitoring,
- | East Showa Epidemic Early warning project,
- | Further input required to strengthen detection and containment of malaria epidemics with in two weeks,
- | Need to strengthen district epidemic preparedness plans.

SWOT Analysis

- | Allotment of annual Govt. budget (USD 4 million) for drugs & insecticides(S)
- | Underdeveloped Malaria epidemic forecasting, early detection, prevention and control capacity (W)
- | Lengthy process of fund transfer & slow procurement & distribution of drugs & insecticides(W)
- | Slow clearance of emergency supplies (W)
- | Support from GFATM & Health extension package approach (OP)

- | Lack of trained manpower, High tax and duties on ITNs and Insecticides(T).
- | Low health service coverage and poor infrastructure,

Future Outlook

- | Strengthening the RBM partnership,
- | Strengthen Epidemic forecast, early detection, prevention and control,
- | Improve region & district level timely preparedness for epidemics,
- | Inclusion of basic malariology courses in the training curriculum of health workers,
- | Strengthen Community-based Malaria Prevention and Control through the Health Extension Package approaches,
- | Focused Operational research for evidence based decisions on choice of drugs,

Persistent Organic pollutants and DDT

1. Ethiopia is signatory in the Stockholm Convention and this has been ratified by the government

POPs focal point

- | Environmental Protection Authority (EPA). Country level agent regarding multilateral agreement on chemicals and waste is still EPA.

Stockholm convention (status)

- | Signatory & party(Ratification,2003)
- | Countrywide inventory of POPs is underway.
- | National Implementation strategy in progress
- | Inventory of chemicals to be followed by identification of priority areas & subsequent implementation
- | Request for exemption: DDT use for public health purpose only (MCP)

Management structure for DDT

Historically both for agricultural and public health use from at least the 1950s

- | Later, ban from agricultural use in 1990 when Pesticide Registration decree was in place
- | For MCP, DDT was sprayed in all malarial areas as blanket coverage until early 1980s
- | After late 1980s selective spraying was in place
- | Quantity of DDT used: After the start of selective spray, DDT consumption was about 360MT/annum

DDT use In Ethiopia

Management Strategy continued

- | Priority issues on DDT (phase out/ ban): Will phase out (when alternatives are in place)
- | Specific ecological issues/concerns on health and environment: limited studies indicate Eviron.& health hazards(detection of DDT, Lindane & dieldrin in blood of people in some localities, DLCOEA),another study also revealed DDT,HCH & dieldrin in breast milk
- | There is concern that DDT is not environmentally friendly (no hard data)
- | Activities for DDT replacement: Restricted use (MCP only).
- | Sector for which DDT was used: both for Agriculture and P.H (MCP)

Current country activities as regards to DDT.

- | Alternative to DDT – IVM pilot projects envisaged and pending approval by GF
- | Ongoing research programmes & projects – Planned pilot projects as above, small projects in different Insts. & NGOs (e.g. botanicals, ITC in southern Ethiopia)
- | Will phase out (when alternatives are in place)

Capacity building in relation to DDT reduction

- | Will phase out (when alternatives are in place)
- | HRD: FMOH, MoA, EPA & Research Institutes are working on HRD
- | In-service/pre-service training of health personnel, on malaria prevention & control
 - Up-grading training for vector control personnel
 - Post- graduate training

- IVM in health extension packages, training on IVM of Health workers(CHA/HA/PHW) as needed.
- Logistics: Purchasing & maintenance of spray pumps & parts, motorcycles & vehicles

Issues to be prioritized by the workshop

- I Transfer of environmentally friendly appropriate technology towards the scaling up of IVM alternatives.
- I Any vector control option/alternative to come in replacing DDT should obviously be cheaper environmentally friendly options hence be greatly subsidized like TB, Leprosy, Polio vaccination malaria (as malaria is no one killer in Africa) Contribution from stakeholders for better IVM options.

COUNTRY REPORT: UGANDA

By

Michael Okia
Malaria Control Programme, Ministry of Health, Uganda

and

Joseph Okello-Onen (PhD)
Livestock Health Research Institute (LIRI), Uganda

1 Status with Regard to persistent organic pesticides (POPs) Convention

Signatory	Yes	No	
Party	Yes	No	Don't Know

A Cabinet memo was prepared for ratification but it was referred back to the National Environment Management Authority (NEMA)

2 Address of Country POPs Focal Points:

Executive Director, National Environment Management Authority (NEMA), P.O. Box 22255, KAMPALA.
Tel. 256-41-251064/5/8;
Fax: 256-41-257521;
E-mail: info@nemaug.org
Contact Person: Mr. Patrick Kamanda

3. Country background regarding multilateral Agreement on chemicals on chemical and wastes:

Uganda is a party to the Basel Convention on the Multilateral Agreement on chemicals and chemical wastes. NEMA established in 1995 by the National Environmental Statute has put in place a regulatory framework and tools to manage the environment such as EIA guidelines and regulations, environmental audit guidelines and regulations, waste management regulations, etc that promote the adoption and use of cleaner technologies and practices.

4.0 For your country state the position of the Stockholm Convention in respect to:

POPs inventory: Not yet done. NEMA has just prepared a National Chemical Profile for the country.

Draft National Implementation plan: NEMA has developed a NIP proposal with UNEP that has been accepted in provisionally and was awaiting approval before being formally submitted to the Global Environment Facility (GEF).

Request for exemption: Uganda has requested for exemption to re-introduce DDT for indoor residual spraying for malaria vector control.

5.0 Management structure for DDT in the country (if applicable)

Historical pesticide use of DDT in the country: DDT was widely used in agriculture between the 1950s until the 1970s. DDT was also used during the Malaria Eradication Pilot Project in South-western Uganda between 1959 and 1963 in then Kigezi District, now, Kisoro, Kanungu, Kabale and Rukungiri Districts.

Quantity which is used: Currently there is no DDT in use in Uganda but the government (MOH) is intending to re-introduce it for malaria vector control

Sectors in which it is used: Nil

Priority issues on DDT (phase out or ban): DDT being re-introduced for malaria vector control

Specific ecological issues/concerns on health and environment: How to prevent DDT leakage into the agricultural sector and contamination of humans and the environment and ensuring the enforcement of the regulations in this regard.

6.0 What is your country doing as regards to:

Alternatives to DDT:

- They are already available and in use in the country e.g. Icon, Deltamethrin, Fendona, Pirimiphos-methyl.
- Utilizing ITNs throughout the country
- Soon to introduce IVM (IRS in epidemic prone areas and congested areas), ITNs countrywide, live-bait technology in the cattle corridor, environmental management in urban centres in particular, bio-control where appropriate)

On going research programs and projects: Insecticide resistance tests on pyrethroids and DDT being conducted

Reduction/elimination of DDT: Nothing

7.0 What is your country doing in relation to: Capacity Building Activities in relation to elimination/reduction of DDT use:

Nothing, Uganda intends re-introduced DDT for malaria vector control

8.0 State any issues you would like the workshop to prioritise:

- Development of strategies and legislation and regulatory measures to prevent DDT leakage to the agricultural sector and contamination of humans and the environment and ensuring their enforcement.
- Help Uganda finalize and operationalize the National Implementation plan on POPs i.e. financial and technical assistance in planning, implementation, monitoring and evaluation of the Stockholm Convention on POPs).

Zimbabwe Country Report on POPs

By

M. J. Chimbari (University of Zimbabwe)

E. Chirebvu (Ministry of Health)

Background on pesticide use in Zimbabwe

I Legislation

- Ø Fertilizer, Farm Feeds and Remedies Act (1952)
- ? Prohibits use and distribution of pesticides not registered with Plant Protection Research Institute
- Ø Hazardous Substances and Articles Act (1972)
- ? Classification of registered pesticides
- ? Regulations on protective clothing
- Ø Pesticide regulations (1977) control registration of pesticides on the following conditions
- ? Candidate pesticide must be registered in country of origin
- ? Registration requires that a representative of the manufacturing company be resident in Zimbabwe

Country's position on POPs

- I Signatory to Stockholm Convention (23 May 2001)
- Ø Activities on POPs placed under Ministry of Environment and Tourism (UNEP focal point)
- Ø Implementing agency for POPs is the HSCD in the Ministry of Health and Child Welfare
- Ø For easy accountability plans to move HSCD to Ministry of Environment and Tourism are at an advanced stage

HSCD Activities

I Work in close liaison with

- Ø Plant Protection Division in Ministry of Agriculture for registration of pesticides
- Ø Ministry of Environment and Tourism

I Operationalizes the National Implementation Plan

- Ø NIP workshop on POPs: 6-7 July 2004
- Ø POPs inventory: to be completed by end of year
- Ø Monitoring compliance of pesticide distributors and users to conditions of registration

I Facilitates and conducts research on POPs

Use of DDT for malaria control in Zimbabwe

- I 1949 – 1960 IRS for countrywide malaria control used Hexachlorobenzene (HCB) while the low veld sugar estates used dieldrin
- I 1960 DDT was introduced to complement HCB but its use was on a small scale
- I 1974 - 1976 DDT became the principle insecticide for malaria control

- | 1976 – 1980 no insecticide was used because of disruptions caused by the war of liberation
- | 1980 –1987 extensive use of DDT resumed
- | 1987 – 1991 DDT was used interchangeably with Deltamethrin
- | Zimbabwe’s decision to abandon use of DDT was motivated by the need to protect tobacco export
- | 1991 –2003 only pyrethroides (deltamethrin, lambda-cyhalothrin and alphacypermethrin) were used
- | 2004 DDT re-introduced
- Ø Better efficacy compared to pyrethroids in use
- Ø Cheaper than pyrethroids

Ongoing research on insecticides

- | Implications of agricultural chemicals on insecticide resistance (Masendu PhD studies)
- | Monitoring of malaria vector resistance to DDT and pyrethroids
- | Evaluation of candidate malaria vector insecticides

Research needs

- | Determination of residual DDT in the environment (soil and plant products)
- | Determination of presence of DDT and its derivatives in breast milk and in fish
- | Susceptibility of malaria vectors to DDT
- | Prospective studies on DDT alternatives currently in use and those that may be used in the future
- | IVM field trials

- | **We conclude that the Stockholm convention is not adequately popularized particularly among malaria disease control managers and worse so among the general populace**

MALAWI Country report

by
Doreen Ali
Alwin Mbene
John Chiphwanya
Lutho Zungu

Historical background

- Over 300 metric tones of DDT have been used in the past in:
 - Agricultural sector for pest control
 - Public health sector for vector control
- DDT was banned in the 1980s

Malawi POPs focal points

- Pesticides Control Board, Box 51300, Limbe. MALAWI
 - Environmental Affairs Department,
P/Bag 394, Lilongwe 3, MALAWI
- The above institutions are Designated
National Authorities on chemicals and wastes

Current situation

- Synthetic pyrethroids are currently in use
- Countrywide survey on POPs conducted
- POPs inventory available in the country
- Country NIP in process
- Malawi is signatory & Party to Stockholm convention

Malaria vector control in Malawi

- Currently Pyrethroids are being used for vector control
- DDT requested for vector malaria control

Way forward

- Need to implement IVM
- Capacity building required for IVM implementation

1.0 Country - Zambia

2.0 Status with Regard to persistent organic pesticides (POPs) Convention

Signatory	Yes	No		
Party			Yes	No
Don't Know				

3.Address of Country POPs Focal Point:

Environmental Council of Zambia (ECZ), Box 35131, Lusaka , Zambia

4.0 Country background regarding multilateral Agreement on chemicals and wastes

Basel Convention (Zambia is a party)
 Rotterdam Convention (Zambia has signed but not yet ratified)
 Stockholm Convention (Signatory)

5.0 For your country state the position of the Stockholm Convention in respect to:

POPs inventory—

Phase one inventory was carried out last year. Gaps identified in the tools which require to be updated. More inventory to be carried out later in the year.

Draft National Implementation plan—

Ongoing activity scheduled to be completed August 2005

Request for exemption- -----

DDT for malaria vector control
 Chlordane for termite control in construction sites

6.0 Management structure for DDT in the country (if applicable)

Historical pesticide use of DDT in the country-

DDT was previously used in the 1940-1970s

Quantity which is used –

Current estimates for 2004/05 transmission period = 20,000-35,000kg

Sectors in which it is used –

Specifically used in public health (malaria vector control, IRS)

Priority issues on DDT (phase out or ban) –

Phase out

7.0 What is your country doing as regards to:

Alternatives to DDT –

Currently, no alternatives that have the qualities of DDT have been found. However, IRS is to be supplemented with other environmental management interventions targeting the source systems such as drainage clearing, environmental modification and larviciding.

On going research programs and projects –

Inventory on past usage of DDT. Other than that no research is going on.

8.0 What is your country doing in relation to: Capacity Building Activities in relation to elimination/reduction of DDT use; -

No specific programme is in place apart from the current IVM strategy that is being developed to reduce reliance on IRS.

- 9.0 State any issues you would like the workshop to prioritise –**
- Cheaper and effective alternatives other countries are using
 - Decontamination of DDT in case of spillage/accidents
 - Trans-boundary movement of DDT and disposal

1 Country - Tanzania

2 Status with Regard to persistent organic pesticides (POPs) Convention

Signatory	Yes	No		←
Party			Yes	No
Don't Know				

3 Address of Country POPs Focal Point

Tropical Pesticide Research Institute, Arusha, Tanzania

4.0 Country background regarding multilateral Agreement on chemicals and wastes

National Environmental Management Council, Dar-es-Salaam, Tanzania

5.0 For your country state the position of the Stockholm Convention in respect to:

POPs inventory—

No Information

Draft National Implementation plan—

Available for IRS only

Request for exemption- -----

An exemption was requested in 2001 for public health use of DDT

6. Management structure for DDT in the country (if applicable)

Historical pesticide use of DDT in the country-

Past 40 years in agriculture and Public Health

Quantity which is used –

No information

Sectors in which it is used –

Public Health for mosquito control

Priority issues on DDT (phase out or ban) –

Banned

Specific ecological issues/concerns on health and environment –

Accumulation in the environment and health impact

7. What is your country doing as regards to:

Alternatives to DDT –

Use synthetic pyrethroids and carbamates

On going research programs and projects –

None

8 What is your country doing in relation to: Capacity Building Activities in relation to elimination/reduction of DDT use; -

Community education and training on IVM

9 State any issues you would like the workshop to prioritise –

Discussions on cheap, effective and affordable alternative insecticides

1 Country - Kenya

2 Status with Regard to persistent organic pesticides (POPs) Convention

Signatory	Yes	No	←
Party			Yes No
Don't Know			

3 Address of Country POPs Focal Point

National Environmental Management Authority, Nairobi

4.0 Country background regarding multilateral Agreement on chemicals and wastes

National Environmental Management Authority implements the SC agreements

5.0 For your country state the position of the Stockholm Convention in respect to:

POPs inventory—

Don't know

Draft National Implementation plan—

Not yet finalized by NEMA

Request for exemption- -----

No

6. Management structure for DDT in the country (if applicable)

Historical pesticide use of DDT in the country-

Past 40 years in agriculture and Public Health

Quantity which is used –

No information

Sectors in which it is used –

Priority issues on DDT (phase out or ban) –

Banned

Specific ecological issues/concerns on health and environment –

7. What is your country doing as regards to:

Alternatives to DDT –

Use pyrethroids and ITNs

On going research programs and projects –

Scaling up ITNs and conducting demonstration projects on IVM

8 What is your country doing in relation to: Capacity Building Activities in relation to elimination/reduction of DDT use; -

Community education and training on IVM

9. State any issues you would like the workshop to prioritise –

Availability of effective and affordable alternative insecticides

Annex 6

Workshop Evaluation Summary Report

Name _____ (not mandatory)

Country _____ (not mandatory)

I. Organization and Execution of the Course:

	Strongly Agree (≥ 80%)	Agree (50 -79%)	Disagree (20-49%)	Strongly Disagree (<20%)
1. This course was valuable and timely for my country	75%	25%	-	-
2. The course was well designed	42%	78%	-	-
3. The information presented was relevant for my work	42%	78%	-	-
4. The length of the course was adequate	25%	50%	25%	-
5. The course stimulated me to think Of the Stockholm Convention in general and DDT alternatives in particular	50%	42%	8%	-
6. Supplementary reference materials were adequate, useful	42%	42%	16%	-
7. We spent enough time relating theory to practice through group exercises	42%	33%	25%	-
8. The field visit was relevant and its content helpful for the search of alternatives to DDT	25%	42%	25%	8%
9 I am now better prepared to play a role in the implementation of the SC in general and issues on DDT in particular	58%	34%	-	8%

1= Very good; 2=Good; 3=Fair; 4=Poor

General information

1. Accommodation

1	2	3	4
£=58%	£=33%	£=9%	£

2. Meals

1	2	3	4
£=58%	£=17%	£=25%	£

3. Guesthouse staff friendliness and service

1	2	3	4
£=75%	£=25%	£	£

4. Travel arrangements (from your country)

1	2	3	4
£=84%	£=8%	£=0	£=8%

5. Living allowance

1	2	3	4
£=58%	£=42%	£	£

Other Comments

1. Are there subjects that you would have liked, but were not covered?

- *Would have liked to go through the Convention provisions in more details*
- *Mechanisms of influencing ministers in countries that have not signed the convention on importance of alternatives to DDT should be explored.*
- *Resistance management as a way of protecting alternative candidate insecticide should be instituted.*
- *There was still need for more information on the role of GEF regarding the funding of projects on alternatives to DDT.*
- *Promising DDT alternatives should be evaluated for their efficacy and cost-effectiveness.*

2. Collaboration with ICIPE:

Does the course stimulate you/your institution to collaborate with ICIPE to develop future projects?

Yes £= 100% No £

If yes briefly explain how?

All participants said that the workshop stimulated their institution to collaborate with ICIPE. One participant said that he is involved in a committee driven project similar to the Malindi project and would like to adopt the ICIPE strategies.

One participant acknowledged that sub-Saharan African have similar health problems and countries should share expertise and experiences to address some of these problems like malaria and other vector borne diseases by developing and undertaking joint projects.

Another suggested that the collaboration should be on recommending alternatives for evaluation in different eco-zones and implement demonstration projects on IVM and capacity building.

3. Please use the space below for any additional comments or suggestions you may have:
- a) *There should be active government involvement in deciding the role of vector control in disease management especially for malaria.*
 - b) *That ICIPE tested technologies should be tested in individual countries prior to implementation.*
 - c) *That capacity building should consider human resource development and laboratory development.*

Annex II

Universiti Sains Malaysia

A Case Study: The Regional Delivery of Technical Assistance

1. Introduction

As requested in a decision of INC 6/10 and INC 7/8, the Stockholm Convention Secretariat (SCS), United Nation Environmental Programme (UNEP) had commissioned Universiti Sains Malaysia to undertake a case study to look into the feasibility of technical assistance to countries in the Southeast Asian Region to implement the Stockholm Convention on Persistent Organic Pollutants (POPs). Upon consultation with the Stockholm Convention Secretariat, a study programme was proposed with the following objectives:

- (i) To determine the need for the elimination of POPs stockpiles particularly polychlorinated biphenyls (PCBs) and PCB contaminated oils and transformers.
- (ii) To provide technical information on the setting up of chemical, industrial and domestic waste incineration facilities in countries of the region.
- (iii) To study the needs and requirements of each country in the setting up of such facilities.
- (iv) To look at how the regional delivery of technical assistance can be provided in relevant issues.
- (v) To determine other important issues relating to the compliance of the Stockholm Convention.

The Stockholm Convention calls for the reduction and elimination of 12 POPs chemicals. Most of these chemicals have been banned from import into the Southeast Asian countries. The major concern would be the elimination of the stockpiled POPs such as the organochlorine pesticides and PCBs. Most of these developing countries do not have proper waste chemical incineration facilities to eliminate these stockpiles of POPs. It would be beneficial to the region to have safe chemical incineration facilities that would remove stockpiled POPs as well as reduce the releases of polychlorinated dibenzodioxins (PCDDs) and polychlorinated dibenzofurans (PCDFs).

PCDD/PCDF, included in the 12 Stockholm Convention POPs, are also of major concern in the region. Domestic wastes are commonly disposed of via landfills and open burning with very few domestic waste incinerators being used in the region. State-of-the-art domestic waste incineration facilities that comply with the controlled releases of PCDD/PCDF are hardly available in the region.

1.1 Definition of Region

The region under study comprised Southeast Asian countries including Brunei Darussalam, Cambodia, Indonesia, Lao PDR, Malaysia, Philippines, Singapore, Thailand, and Viet Nam. These countries are the ASEAN member countries which have close cooperation programmes within the region even though they are diverse in term of economic developments. The map of the region is shown in Figure 1. More than half of the region is made up of water bodies with the Indian Ocean in the West, the Pacific Ocean in the East and the South China Sea in the middle of the region. Except for Lao PDR, all the other countries have access to the sea.



Figure 1. Map of the Southeast Asian Region

I. Countries of the Region

Brunei is a small sultanate on the northeast coast of the Island of Borneo. It has an area of 5,765 square kilometres and a population of about 348,000. The climate of Brunei is governed by the equatorial monsoon winds with a daily average temperature of between 24 °C and 30 °C. About three-fifths of the country are covered with tropical rain forest and the country is almost totally dependent on its vast reserves of petroleum and natural gas. The country has an international airport and two sea ports. Its capital is Bandar Seri Bagawan.

Cambodia lies in the southwest of the Indochinese Peninsula with Thailand on the west border and Viet Nam in the east. It has a land area of 181,916 square kilometres and a population of 11.5 million (1998 census). Two dominant topographical features of Cambodia are the Mekong River and the Tonle Sap. The Mekong enters Cambodia from Lao PDR and flows southward to Viet Nam and into the South China Sea. The Tonle Sap is a large lake (up to 3,000 square miles during the rainy season) that is rich in varieties of freshwater fish. Similar to other Southeast Asian countries, the Cambodian climate is very much dependent on the monsoon winds. The daily temperature ranges from 28 °C to 35 °C. Phnom Penh, with a population of about one million, is the capital city with an international airport located at nearby Pochentong.

Indonesia is made up of five large major islands and about 13 thousand smaller islands. To the west lies the large island of Sumatra followed by Java Island and Kalimantan, the southern portion of Borneo Island, followed by Celebes Island and lastly the western part of New Guinea called Irian Jaya. In between these islands lies the independent state of East Timor. Indonesia is the largest country in this region with the highest population at 231 million (2002 estimate). The three islands of Sumatra, Kalimantan and Irian Jaya make up about 75% of the total land area of Indonesia of about 1.9 million square kilometres. Major parts of these large islands are covered with tropical rain forest and are sparsely populated. The climate of Indonesia is controlled by its island structure and position on the equator. The annual mean temperature ranges from 23 °C to 31 °C. Java Island is highly populated and the capital city, Jakarta, is located there

with a population of about 10 million. Indonesia has several international and regional airports in several major cities such as Jakarta in Java, Medan in Sumatra and Denpasar in Bali.

Lao PDR (Lao People's Democratic Republic) or Lao PDR is a landlocked country located on the Indochinese Peninsula. It is bound on the north by China, on the northeast and east by Vietnam, on the south by Cambodia, on the west by Thailand, and on the northwest by Myanmar (Burma). Lao PDR extends about 1,050 kilometres from northwest to southeast and has a total area of approximately 236,800 square kilometres. Lao PDR is an under-populated country of about 5.5 million people making it the least densely populated country in the region. The capital is Vientiane with a population of about 500,000. Lao PDR has the typical tropical monsoon climate of the region, though the mountains provide some variations in temperature. The annual average temperature is between 16 °C – 21 °C in the cool months (December to February) and 29 °C - 32 °C in March and April. Lao PDR is one of the world's poorest countries. The disruption during the civil-war period and the economic policies of the early years of the LPDR resulted in the economic stagnation within the country. Lao PDR has several mineral resource, including coal, iron, copper, lead, gold, tin, gypsum and precious stones.

Malaysia is made up Peninsular West Malaysia and the two states of Sabah and Sarawak on the northern part of Borneo Island divided by the South China Sea. The total land area of Malaysia is about 330,000 square kilometres; two-thirds are covered with tropical rain forest particularly in East Malaysia. Both Peninsular and East Malaysia are located at the same latitude and experience a similar equatorial climate influence by the monsoon winds. Temperatures are uniformly high throughout the year with the average daily temperature ranging between 25 °C to 33 °C. The total population of Malaysia is about 23 million (2000 census) with about 80 percent residing in Peninsular Malaysia. The capital city of Kuala Lumpur has a population of about 1.4 million. An international airport is located near the administrative city of Putra Jaya. Malaysia's economy has been transformed since 1970 from one based primarily on the export of raw materials (rubber, timber and tin) to one that is among the strongest, most diversified, and fastest growing in Southeast Asia.

The Philippines is an archipelago consisting of approximately 7,100 islands and islets lying about 500 miles off the coast. The total land area of the Philippines is about 300,000 square kilometres. It is bound by the Philippine Sea to the east, the Celebes Sea to the south, and the South China Sea to the west and north. Manila is the biggest city and the national capital with an international airport servicing the region. It is located on Luzon, the largest island, which has a land area of 40,420 square miles. Mindanao, at 36,537 square miles is the second largest island and lies in the south. The Philippines is a country of rich resources and it is in the process of developing its full potentialities. The climate of the Philippines is tropical and is strongly affected by monsoon (rain-bearing) winds. Thus, temperatures remain relatively constant from north to south during the year with the daily average of 25 °C to 32 °C. The country is rich in mineral resources; the economy is primarily agricultural, although a high degree of domestic and foreign investments has spurred the rapid development of its industrial potential.

Singapore is a city-state located at the southern tip of the Malay Peninsula, about 137 kilometres north of the Equator. It consists of the diamond-shaped Singapore Island and about 60 small islets with a combined area of about 697 square kilometres. The main island is separated from Peninsular Malaysia to the north by the Johore Strait, a narrow channel crossed by a road and rail causeway that is more than half a mile long. Singapore is the largest port in Southeast Asia and one of the busiest in the world. It has a population of about 4 million with a high literacy rate of 94 percents. Singapore is in the equatorial monsoon region of Southeast Asia, and its climate is characterised by uniformly high temperatures and nearly constant precipitation throughout the year. The average daily range temperature is between 25 °C to 32 °C. Singapore's economy has always differed from those of the other Southeast Asian countries in that it never has been primarily dependent on the production and export of commodities. In addition to enhancing its position as a world trade centre, it has developed powerful financial and industrial sectors to become the most advanced economy in Southeast Asia.

Thailand is located in the centre of mainland Southeast Asia. Its area of 513,115 square kilometres consists of two broad geographic areas: a larger section in the north and a smaller peninsular section in the south. The main body of the country is surrounded by Myanmar to the west, Lao PDR to the north and east, Cambodia to the southeast, and the Gulf of Thailand to the south. Peninsular Thailand stretches southward from the southwestern corner down the Malay Peninsula until the Isthmus of Kra and to its southern border with Malaysia. It has a population about 61 million (1998 census) with a varied ethnic make-up. Bangkok,

Thailand's capital has a population of about 5.6 million and is the location of an international airport and seaport to the South of the city. The major influences on Thailand's climate are its location in the tropical monsoon zone of mainland Southeast Asia and certain topographic features that affect the distribution of precipitation. The average daily temperature ranges from 25 °C and 29 °C. Thailand is rich in mineral resources although its economy is based on primary industries and agriculture.

Viet Nam is a country occupying the eastern part of the Indochinese Peninsula. It has an area of 331,000 square kilometres. From north to south it extends about 1,650 kilometres and at its narrowest part is about 30 miles wide. Vietnam is bordered by China to the north, the South China Sea to the east and south, the Gulf of Thailand to the southwest, and Cambodia and Lao PDR to the west. The capital, Hanoi, is located in the north, while the country's largest city, Ho Chi Minh City (formerly Saigon), is in the south. Viet Nam has a population of about 76 million (1999 census) with the most densely populated regions in the Red River Delta in the north and the Mekong River Delta in the south. The northern part of Vietnam is on the edge of the tropical climatic zone with a lower average daily temperature range of 17 °C – 23 °C) while further south, the average daily is higher (25 °C - 27 °C). The economy is not well developed even though Viet Nam has quite substantial natural resources. Due to extended war and severe economic crisis, Viet Nam remains one of the most under-developed countries in the region.

The countries in the region are well connected by air and sea transport. National airlines service the regional capitals and large cities. The flight times linking cities are between one to four hours. Table 1 shows the distance between the capital cities of each country in the region.

Table 1: Distances (km) between capital cities in the Southeast Asian Region

	Bandar Seri Begawan	Bangkok	Hanoi	Jakarta	Kuala Lumpur	Manila	Phnom Penh	Singapore	Vientiane
Bandar Seri Begawan	0	1909	1913	1697	1623	1099	1374	1453	1976
Bangkok	1909	0	900	2322	1184	2206	535	1434	522
Hanoi	1913	900	0	2916	1929	1713	945	2096	408
Jakarta	1697	2322	2916	0	1185	2788	1986	893	2725
Kuala Lumpur	1623	1184	1929	1185	0	2467	1001	318	1651
Manila	1099	2206	1713	2788	2467	0	1770	2395	1991
Phnom Penh	1374	535	945	1986	1001	1770	0	1151	753
Singapore	1453	1434	2096	893	318	2395	1151	0	1862
Vientiane	1976	522	408	2725	1651	1991	753	1862	0

1.3 Human Development and Technological Achievement of the Region

To assess the standard of living, quality of life and human development as well as the economic development of the region, it is practical to look at the global rankings for countries located in this region. Since 1990, the United Nations Development Programme (UNDP) has developed the Human Development Index (HDI). This is an effort to measure the average achievement in basic human development in one simple composite index for each country so that they may be ranked. The HDI is a composite of three basic components of human development: longevity, knowledge and the standard of living. Longevity is measured by life expectancy. Knowledge is measured by a combination of adult literacy and the mean for the number of years of schooling. The standard of living is measured by purchasing power based on real GNP per capita adjusted to the local cost of living or purchasing power parity. Country measurements on each component of the index are ordered from smallest to largest and then rescaled to range from 0 (lowest) to 1 (highest). The HDI is formed by averaging the component indices so that the HDI for a country will be a number between 0 and 1.

Table 2 shows the HDI ranking for countries in the region together with the technology achievement index (TAI) for 2001. The top five ranking of 174 participating countries for the HDI 2001 were Norway, Australia, Canada, Sweden and Belgium. The low human development countries are mainly African and

Asian countries such as Mali, Burundi, Pakistan, Lao PDR and India. Singapore and Brunei Darussalam are ranked high in human development; Malaysia, Thailand, the Philippines, Viet Nam and Indonesia are in the medium human development group while Cambodia and Lao PDR are considered to be low in human development.

In order to assess the technical and scientific capability of countries in the region, the Technology Achievement Index (TAI) produced by UNDP is a good indicator. This will provide a perspective of the capability of countries in handling the POPs issues. In the 2001 UNDP's annual report, the effects of biotechnology, information and communication technology on development were examined. The analysis of 72 countries showed that technology networks are transforming the traditional landscape of development, opening new avenues of growth and creating a potential for fast economic development. The TAI is designed to give a snapshot of the diffusion of bio- and information technologies within the nations of the world, to show which nations are investing most in these technologies, and to indicate how countries promote technological advancement through education. The index is derived from eight indicators in four dimensions including the creation of technologies, diffusion of old and new innovations, and human skills which assess various indicators such as the number of patents granted per capita, internet usage, telephones per capita and tertiary science enrolment ratios. The index is rendered by a simple average of the four dimension indices, each with a score between 0 and 1 and thus the TAI value is between 0 and 1.

The most developed country in the region, Singapore, is also high on the TAI index comparable to more advanced countries such as Japan and the United States. Malaysia, Thailand, and the Philippines are intermediately ranked in their correlation with the HDI ranking. Indonesia, which has a high population is ranked lower in term of the TAI index but is higher than some developing countries such as India and Pakistan.

Table 2: Human Development Index Ranking of countries in the region

Countries	HDI Ranking	TAI value and (world ranking)
Singapore	26	0.585 (10)
Brunei Darussalam	32	Not assessed.
Malaysia	56	0.396 (30)
Thailand	66	0.337 (40)
Philippines	70	0.300 (44)
Viet Nam	101	Not assessed.
Indonesia	102	0.211 (60)
Cambodia	121	Not assessed.
Lao PDR	131	Not assessed.

1.4 Overview of Case Study

The study involved participation from each of the countries in the region. A clinic/workshop was held in Kuala Lumpur, Malaysia from 7-10 June 2004 and it was attended by representatives from these countries. The three clinic/workshop sessions involved discussions on the regional delivery of technical assistance for compliance to the Stockholm Convention, presentations by experts on the three key areas of interest and site visits to domestic and chemical waste incineration plants. Four topics were presented as follows:

1. The status of POPs in the Southeast Asian Region by Dr. Md. Sani Ibrahim (Universiti Sains Malaysia)
2. The domestic waste incineration plant operation – controlled release of dioxins and furans, by Mrs. Indrani Rajaram (Pollution Control Department, National Environmental Agency, Singapore)
3. Scheduled waste incineration – disposal of stockpiled POPs by Dr. Ahyar Idris (Kualiti Alam Sdn. Bhd.)
4. Screening of dioxins in various sample matrices by Mr. Mark Richards (Agilent Asia Pacific)

The first day presentations were followed by site visits, first to the Tuas South Domestic Waste Incineration Plant in Singapore followed by a visit to the Schedule Waste Incineration Facilities at Bukit Pelanduk, Malaysia, on the following day. These visits are discussed in more detail in a later part of the report.

In between the site visits and presentations, several issues on POPs, technical assistance requirements and the delivery of the assistance were discussed. A questionnaire was given to each of the participants and their responses were presented on the last day of the clinic. Details of the questionnaire and the responses are discussed in the later part of the report.

2. The Questionnaire

The participants were each given a questionnaire at the beginning of the workshop/clinic to be filled at their convenience and returned to the organiser before the discussion session on the third day. The questionnaire is included in this report as Appendix A. Based on the responses, summaries and conclusions were presented to the participants for discussion. The following analyses were made.

2.1 Domestic Wastes

The domestic waste outputs for Southeast Asian (SEA) countries are shown in Table 3. The disposal method of domestic waste for most SEA countries is via landfills. Another method of disposal is incineration. Singapore has installed four incinerator plants with a total capacity of 8,200 tonnes/day, although the current incineration rate is between 6,500 – 7,000 tonnes/day. Other countries have smaller incinerator plant capacities, for example, Thailand (250 tonnes/day), Indonesia (3.5 – 4 m³/hr) and Malaysia (4 units of small capacity-island based incineration plants). These plants are primarily for medical waste incineration. The Philippines, Lao PDR, Brunei, Viet Nam and Cambodia do not have such facilities. The available information on the level of PCDD/PCDF releases from incinerator plants are as follows:

- Thailand: 1.71 ng I-TEQ/m³ (to air)
- Indonesia: 7.884 g TEQ (to air), 1.840 g TEQ (in residue/solid)

Table 3: The output of domestic waste in Southeast Asian countries.

Country	Domestic Waste Output
Thailand	39,000 tonnes/day
Philippines	294,000 tonnes/day 6,500 tonnes/day in Metro Manila
Singapore	6,500 – 7,000 tonnes/day
Lao PDR	125 tonnes/day in capital city
Brunei	300 tonnes/day
Indonesia	8,700 m ³ /day
Viet Nam	15,000 tonnes/day (estimated)

Other methods of domestic waste disposal in some of these countries are via recycling, composting, bio-treatment and open-dumping.

2.2 Chemical Wastes

The chemical waste output for Thailand is 4,931 tonnes/day (from industrial and domestic sources in the year 2003) and for the Philippines is 250,000 tonnes/year (from industrial sources in the year 1999) and 50,000 tonnes/year (from agricultural sources). The chemical waste outputs of Southeast Asian countries and their method of disposal are shown in Table 4. The methods of disposal of chemical waste for most countries are through landfills and incineration. Table 5 shows the capacity of chemical waste incinerator plants in SEA countries. Incineration is not allowed in the Philippines.

Table 4: The chemical waste outputs of SEA countries and methods of disposal

Country	Chemical Waste Output	Method of Disposal
Thailand	4,931 tonnes/day (industrial and domestic source, 2003)	Landfill*, incineration, export [⊖]
Philippines	250,000 tonnes/year (industrial, 1999) and 50,000 tonnes/year (agricultural)	Export [⊖] , temporary storage (after encapsulation), recycling.
Singapore		Landfill*, incineration
Lao PDR		Landfill
Brunei		Landfill, incineration, export [⊖]
Indonesia		Landfill*, incineration, recovery, reuse, recycling
Viet Nam		Landfill*, incineration
Malaysia		Landfill*, incineration
Cambodia		Landfill, temporary safe storage (after treatment)

Note: * = Landfill method after treatment and stabilisation.

[⊖] = Export: according to the Basel Convention.

Table 5: Chemical waste incinerator plants in SEA countries and their capacities

Country	Availability of chemical waste incinerator plants	Capacity
Malaysia	Yes	33,000 MT/year
Singapore	Yes, 5 toxic waste incinerators	
Viet Nam	Yes	1 ton/day
Indonesia	Yes	Not available
Philippines	Not acceptable	
Other countries (Thailand, Lao PDR, Brunei, Cambodia)	No	

Thailand, Brunei, Cambodia, Viet Nam, Malaysia, Singapore and Indonesia also use incineration as a method of disposal for medical/clinical wastes, while the Philippines uses the pyrolysis technique. Medical/clinical waste incineration is not available in Lao PDR. There are stockpiles of banned POPs in Indonesia, Viet Nam and Philippines. Thailand has a partial list. Singapore has no stockpiles of banned POPs. Other countries have not yet confirmed the status of their POPs stockpiles.

Viet Nam has completed its inventory of banned POPs. Indonesia has completed its inventory of banned POPs except for PCBs which is an on-going process. Other countries (Thailand, the Philippines, Cambodia, Brunei and Malaysia) have done a partial list of inventories of their banned POPs.

The activities of the National Implementation Plan (NIP) in Singapore, Malaysia, Philippines, Indonesia, Thailand, Viet Nam, Cambodia and Lao PDR are still in progress. These countries (except Singapore) are also the recipients of Global Environmental Facility (GEF) grants under enabling activities. Brunei has not yet developed its NIP plan.

The Philippines has its inventory on PCBs in place, while Indonesia, Malaysia, Viet Nam, Cambodia and Lao PDR are in progress of doing their inventories. Thailand has completed its initial inventory on PCBs. Brunei and Singapore have no stockpiles of PCBs. PCBs has been banned in Singapore since 1980.

2.3 *Inventory on contaminated oil containing PCBs*

Indonesia and Viet Nam have their inventories on contaminated oil containing PCBs. The Philippines, Lao PDR, Cambodia and Thailand have their initial inventories. Malaysia is in process of doing the inventory. Singapore and Brunei have no stockpiles of contaminated oils containing PCBs.

Malaysia, Philippines and Viet Nam have disposal plans for PCBs and PCB contaminated wastes. Brunei, Cambodia, Thailand and Indonesia are not sure about such plans. Lao PDR has no disposal plan for PCBs and PCBs contaminated wastes.

2.4 *Technical Expertise*

Viet Nam has the analytical capability to analyse all POPs except for PCDD/PCDF. Malaysia, Indonesia, Thailand, the Philippines and Singapore also have the analytical expertise and also instrumentations to analyse all POPs except PCDD/PCDF. However from other sources, it was reported that Singapore and Malaysia are building the capability to analyse for PCDD/PCDF.

Indonesia, Malaysia and Singapore have the monitoring protocols for all POPs (except PCDD/PCDF). There is comprehensive population monitoring being done by the countries in this region.

All these countries have technical expertise on domestic waste management. Viet Nam, Malaysia, Indonesia, the Philippines and Singapore also have technical expertise on chemical waste management.

2.5 *Analytical Capacity and Monitoring Programmes*

Some countries in this region are willing and/or capable of acting as a regional centre for dioxins and furans analysis. According to the survey, Malaysia, Thailand and Singapore have shown interest to be the regional centre for these analyses. The Philippines, Indonesia and Viet Nam are not willing or capable of becoming a centre for analysis and monitoring, while Lao PDR, Brunei and Cambodia are not sure about this matter. Malaysia and Singapore are also willing and capable of being a regional centre for other POPs analysis. The Philippines and Indonesia have also shown interest to be a centre for the analysis of some of the POPs chemicals. Other countries are not certain about their capability to act as a regional centre for the monitoring of POPs.

The Philippines, Viet Nam and Indonesia are willing and capable to host a regional centre for chemical waste management. Other countries are uncertain about this matter.

Malaysia, the Philippines and Viet Nam are also willing and capable of being a regional centre for POPs information and management. Other countries are not sure about the capability of being a regional centre.

2.6 *The Necessity for Technical Assistance*

The technical assistance needed by countries in this region varies from country to country. All countries except Singapore need technical assistance on:

- (a) Monitoring/analysis of PCDD/PCDF.
- (b) Monitoring/analysis of other POPs.

Malaysia, Thailand and Viet Nam need technical assistance on incinerator technology for domestic wastes. Indonesia, Brunei, Lao PDR and Cambodia need technical assistance on:

- (a) Landfills.
- (b) Incinerator for domestic wastes.
- (c) Incinerator for chemical wastes.
- (d) Disposal of POPs stockpiles.

Countries requiring assistance on capacity building for chemical wastes are Thailand and Viet Nam while other countries that need technical assistance on the disposal of POPs stockpiles are Malaysia, Thailand, Philippines and Viet Nam.

The technical assistance needed by Viet Nam is on the following:

- (a) Establishment of a laboratory for the analysis of PCDD/PCDF.
- (b) Monitoring/analysis of PCDD/PCDF in the incineration of medical/solid wastes.

Other technical assistance needed by Lao PDR are in the development and establishment of laboratory and sampling facilities for the analysis of POPs.

Other technical assistance needed by Indonesia are on:

- (a) Remediation of POPs contaminated sites.
- (b) Alternative of POPs chemical substitute.
- (c) Alternative of BAT (best available techniques) & BEP (best environmental practices).

3 Country Reports on POPs Management and Compliance to the Stockholm Convention

During the workshop, participants were asked to highlight issues related to the theme of the workshop regarding compliance to the Stockholm Convention. Each country identified problem areas that require external assistance and issues that may be dealt with internally. The main areas of focus were domestic and industrial waste treatments, technical capability on waste management, enforcement and regulation on POPs management and the monitoring of POPs as a means of compliance to the Stockholm Convention. Key issues highlighted by each country are described below.

3.1 *Brunei Darussalam*

Brunei Darussalam has been preparing a long-term waste management strategy that will resolve the issue of the disposal of identified wastes including domestic, industrial, oily, hazardous, clinical as well as sewage sludge wastes. Currently, Brunei does not have domestic or industrial waste incineration plants as the population is small and not many industries are found in the country except for the petroleum and gas. Most of the domestic wastes is handled by landfill treatment. There is an oily waste treatment and recycling facility operated by the Brunei Shell Petroleum Company. Lack of regulations and enforcement with regard to chemical wastes and POPs management is the main concern for Brunei. In Brunei, the use of chemicals in the form of fertilisers and pesticides is increasing in agriculture although the Poison Acts govern their import and distribution. However, there is no regulation on the management of chemical and hazardous wastes. Strong concern was raised on the lack of technical expertise in several areas such as waste management, chemical inventories as well as POPs management and monitoring. Brunei has limited capability to analyse and monitor the POPs listed in the Stockholm Convention.

3.2 *Cambodia*

Cambodia needs expertise and facilities for the management of its domestic and hazardous wastes. Currently, solid waste management is not regulated in accordance with international standards. The Ministry of Environment of Cambodia has been given the task of establishing guidelines on the management of all types of wastes. Currently, waste treatment facilities are government controlled landfills but open burning is quite widespread in the rural areas. Information on POPs chemicals is very minimal and there is no law or legislation on POPs management. It was highlighted that information dissemination on waste disposal and the handling of hazardous chemical wastes has been very poorly handled. Public awareness on the current POPs issues and the Stockholm Convention is almost nil. Cambodia has minimal capability on POPs monitoring and analyses and requires much assistance in this area. Regional cooperation will benefit the country.

3.3 *Indonesia*

Indonesia is working hard on handling the POPs issues in accordance with the requirement of the Stockholm Convention. It has started conducting inventories of POPs chemicals such as PCBs in its National Implementation Plan programme. Currently, the country is still facing problems in chemical and hazardous waste management even though an Integrated National Programme for the Sound Management of Chemicals have been initiated since 1997. Solid waste management is very poor due to lack of enforcement with open dumping remaining the most prevalent form of disposal. It was highlighted that DDT contaminated site remediation has been initiated as an effort to address the POPs issue. It was suggested that information exchange and cooperation on a regional basis is the best way to approach the

management of industrial chemicals such as PCBs, dioxins and furans.

3.4 *Lao PDR*

Lao PDR has encountered many problems in its solid waste management programme due to lack of funds and technical capabilities. Financial and technical assistance from developed countries such as Japan and Canada and also UNDP has improved the situation especially in the capital Vientiane and a few other towns. However, in other parts of the country, solid waste disposal has not been managed resulting in illegal dumping and open burning. Chemical and hazardous waste management is almost non-existent in Lao PDR. Regulations on POPs chemicals are not available even though it is realised that the dioxin problem is a pressing issue in the country. Technical and financial assistance is very much needed to put waste management programme in place. Expertise on the analytical and monitoring of POPs is very minimal.

3.5 *Malaysia*

Malaysia approaches the management of toxic chemicals and hazardous wastes in an integrated manner, involving various actors and agencies. These include the National Task Force on the Ozone Layer, various ministries, universities and research institutions, industry and NGOs. The privatization of solid waste management had been initiated in 1996, and together with recycling programmes, has resulted in the improved management of domestic wastes. Except for small incinerators in four of the islands, domestic waste disposal is by the landfill method. However, due to lack of confidence in local capability, the set-up of the first domestic waste incineration facility has met with strong objections from NGOs and local residents. Industrial and schedule wastes are treated at the privately operated chemical waste incineration facility in Bukit Nanas, south of Kuala Lumpur. It was highlighted that the status of POPs is still uncertain and lack an effective national coordinating mechanism. The Department of Environment has been entrusted to handle the National Implementation Plan with regard to the Stockholm Convention. At the end of the NIP exercise, a clearer picture on the status of POPs in Malaysia may be realised. Currently, some laboratories in Malaysia are capable of monitoring and analysing all 12 POPs chemicals under the Stockholm Convention including dioxins and furans.

3.6 *The Philippines*

The Philippines enforced the Clean Air Act of 1999 with two specific rules on POPs chemicals i.e., maintaining an inventory list of all sources of POPs in the country (Rule XLI) and a ban on the incineration of POPs chemicals (Rule XXVII). The ban on incineration created problems not only to chemical and medical waste disposals but also solid waste management. Currently, the Philippines practises open dumping in controlled disposal facilities (CDF) and attempts to minimise solid wastes through the Ecological Solid Waste Management Act which advocates non-burning solutions to waste disposal. Most POPs chemicals have been banned or are under restrictive use in the Philippines and a sound PCB management programme is in place. However technical and financial assistances is sought for regional centres for PCDD/PCDF releases and other POPs monitoring. It was suggested that a network of POPs analytical laboratories be set up in the region for close regional cooperation on POPs management. It was also suggested that a Central Information Facility for POPs should be set up regionally or globally as a one stop centre for POPs chemicals.

3.7 *Singapore*

Singapore is a small island city-state with a large population, warm climate and high humidity. The solid waste management in Singapore emphasises waste minimisation through reduction, reuse, and recycling with waste incineration as the most viable method of disposal. Hazardous industrial wastes are similarly handled by licensed private collectors who are strictly monitored by the National Environmental Agency of Singapore. Currently, Singapore has six large incinerators and several smaller ones which comply with the international emission standards particularly for dioxins and furans. With the newly built off-shore Semakau Landfill, waste management is among the best and the safest in the region. In term of POPs management, Singapore has banned the importation and use of organochlorine pesticides. It is in the process of developing an inventory list on the sources of dioxins and furans. It was requested that the standardisation of protocol on POPs management such as baseline data, monitoring reports, impact assessments and the tracking of sources be made accessible if such information is available. It was recommended that continuous POPs monitoring programmes should be put in place for the region.

3.8 *Thailand*

Thailand produced about 13.6 million metric tonnes of solid wastes in 1999. With a limited number of incinerators and landfills, open dumping and open burning particularly in the Bangkok Metropolitan Area has created acute environmental problems. The presence of hazardous wastes, which are increasing annually, poses a big problem for Thailand. With minimal available facilities, industrial waste disposal is costly and poorly managed particularly in remote areas of the country. However, efforts are being made to improve the situation with assistance from other countries. Most POPs chemicals have been banned in Thailand. Thailand has good inventories of most POPs chemicals except for PCBs, dioxins and furans but recent progress in the National Implementation Plan has provided much needed information. Thailand encourages and advocates the use of BAT and BEF in solving the POPs issues. It was recommended that more awareness programmes should be implemented in the country and the region particularly with regard to the ecotoxicity of dioxins and furans. It was suggested that a regional PCDD/PCDF monitoring centre be set up within the region to service the entire region.

3.9 *Viet Nam*

Viet Nam has strong waste management and environmental protection laws but the enforcement of these laws is extremely lax. With assistance from Canada and Sweden, the training of waste management officers as well as public awareness and education, significant improvement has been made. Viet Nam produces about 25,000 metric tonnes/day of solid wastes which are disposed of in open landfill sites. These landfills are not controlled for hazardous matters and leachate and often suffer from flooding during the rainy seasons causing a negative impact on the Mekong Delta region. Toxic and chemical wastes are generally disposed of into these landfills without prior treatment. There are a few small incinerators for the treatment of medical wastes. POPs pesticides have been used to boost productivity in agriculture. Although most of them have been banned, information on POPs usage is hardly available. Among others, UNDP is helping Viet Nam by providing technical assistance as well as help in capacity building in the management of POPs. Viet Nam has been considered a "hot spots" for PCDD/PCDF resulting from the spraying of defoliant agents contaminated with PCDD/PCDF during the Viet Nam War. Several reports have indicated high levels of PCDD/PCDF in the contaminated sites as well as in human samples. It was requested that assistance on the remediation of vast land areas in Viet Nam be initiated by the international agencies. Viet Nam is also in dire need of assistance in waste management facilities. It was also suggested that local and regional monitoring facilities for POPs chemicals particularly PCDD/PCDF be made available immediately.

4. Regional Issues on POPs

Through discussion and the responses from the questionnaires, several common issues had been highlighted for regional consideration with regard to POPs chemicals and efforts in compliance to the Stockholm Convention. First, the three issues under consideration were discussed and suggestions on possible solutions were made. Then other issues raised were also deliberated upon and solutions and recommendation were put forward.

4.1 *Waste Incineration Technology*

In general, environmentally sound waste incineration technologies with the control release of PCDD/PCDF are acceptable except for the Philippines which has legislation against the burning of wastes. However, other related issues should be carefully looked into particularly for long-term measures. It was highlighted that most of the countries in the region would not be able to afford the costly maintenance of facilities that are environmentally friendly. Financial and technical assistance is required for such projects to be implemented in these developing countries.

To implement plans that are acceptable to the general population, public awareness programmes should be emphasised. Information dissemination on waste incineration technology should reach the public and may be incorporated in education for sustainable development. It was suggested that lesson learned from developed countries that have used these technologies should be looked at particularly in handling NGO and getting positive public opinion on waste incineration technology.

4.2 *Chemical Waste Incineration*

Data on stockpiled POPs in the region are very limited. The disposal of stockpiled POPs should be considered in the bigger context of chemical waste disposal. This should also include the disposal of hazardous and medical wastes. Current viable technologies indicate incineration as the most cost effective and the safest method of disposal for chemical waste. Technical and financial assistance is required to provide chemical waste incinerators and/or chemical waste disposal facilities in each country in the region. There is no consensus, however, for the set-up of a central regional facility which would involve the transboundary movement of waste chemicals. For smaller countries and remote areas, mobile chemical waste incinerators may be made available. With proper training and technical assistance, stockpiled POPs can be easily destroyed but a bigger problem that exists is the collection of all unused POPs which would involve financial implications beyond the control of these countries.

Again, information awareness and education on chemical waste incineration and other disposal technologies should reach the masses. It was also suggested that more research should be done in areas of the non-combustion disposal of waste chemicals.

4.3 *Analytical and Monitoring Capacity for POPs*

The analytical and monitoring capacity for POPs in the region is not adequate. Most countries have laboratory facilities to analyse some of the twelve POPs chemicals. Only Singapore and Malaysia have the capability to analyse PCDD/PCDF but have yet to undergo interlaboratory calibration with other well established laboratories. It was suggested that a regional centre be set up to service the entire region for the analysis of PCDD/PCDF and facilitate training for the monitoring of POPs. The centre should also serve as a reference and resource centre for the local laboratories, undertaking interlaboratory calibration programmes and the collection of information on POPs. It was also suggested that screening and monitoring centres be set up in each country utilising local expertise. The monitoring and analysis project should be funded by international agencies such as UNEP and UNDP. Capacity building should also be emphasised for the monitoring of POPs and other chemical pollutants in these countries. It was also recommended that biomonitoring, which is less technical and cheaper, be encouraged alongside technical assistance and training.

4.4 *Other Common Issues*

The following issues were also raised with recommendations on how they can be resolved on a regional basis.

i) *Lack of regulations on POPs management*

Most countries have regulations and legislation in place for hazardous chemicals but not specifically for POPs. Some POPs pesticides are included but unintentionally produced POPs are seldom considered. This is probably due to lack of information on POPs and other threatening chemicals. It was suggested that a Regional Information Centre for POPs be set up and the National Poison Centre in University of Science, Malaysia, agreed to host and maintain a website for information on POPs. The website should contain regional and global information on POPs.

ii) *Lack of facilities for waste treatment*

Except for Singapore, the Southeast Asian countries are in dire need of assistance in waste management. Different problems are faced by each country with regard to waste disposal but if left unresolved, the problems will become regional as well as global issues as open dumping, opening burning and leachate from improper landfills increase. It was suggested that assistance be provided or continues to be provided to developing and underdeveloped countries to manage their wastes.

iii) *Expertise for POPs analysis and monitoring*

Capacity building should be emphasised in the area of analysis and monitoring of POPs in order for each country to comply with the Stockholm Convention requirements. Expertise for POPs monitoring and analysis should be developed within the region utilising local experts who would understand the situation better. Regional cooperation is an essence in developing expertise for the region.

iv) *PCDD/PCDF releases*

PCDD/PCDF are considered to be the major threat among the POPs chemicals particularly for the developing countries in the region. Sources of PCDD/PCDF are well known but efforts to reduce the releases of these chemicals are lacking. Assistance is required to help certain industries to control releases of PCDD/PCDF. Monitoring of concentration levels should be put in place to assess these releases into the environment.

v) Open burning and forest fires

Open burning is very rampant in the region; it seems to be one of the common methods of waste disposal particularly in the remote areas of the developing countries. The notorious practice of forest burning for land clearance activities contribute to the hazy atmosphere in the region. Both intentional and unintentional forest fires have caused environmental and health problems for the region. Studies have indicated releases of noxious gases and chemicals during the forest fires but little information is available on the impact from such activities. Assistance is required in assessing the health, environmental and economic impact of such extensive forest fires.

vi) Illegal movement of POPs within the region

It was suspected that such activities existed within the region. Studies on environmental levels indicated the recent input of POPs chemicals, such as DDT, into the environment even though these chemicals have been banned from import and no inventory of stockpiles is available. It was suggested that enforcement on the movement of POPs chemicals be intensified to curb such activities.

5. Domestic Waste Incineration – A visit to the Tuas South Incineration Plant in Singapore

5.1 The Plant Operation

The Singapore Government has taken a comprehensive approach to the solid wastes disposal issue. Due to its much limited land area, after more than 29 years use of landfill, in 1999 such use was completely stopped. The Tuas South Incineration Plant (TSIP) is the fourth incineration plant built in Singapore at the cost of S\$890 million. TSIP stands on an area of reclaimed land approximately 10.5 ha in the west of Singapore. The construction of the plant began in June 1996 and it was completed in June 2000. The plant was built with state-of-the-art technology, the capacity of 3,000 tonnes per day and six incineration units capable of producing power using two 40 MW turbine generators. The various processes are highly automated and controlled via a Digital Control System (DSC). Modern equipment incorporating advanced technology is used in the plant to ensure a higher level of efficiency and reliability. TSIP, together with the other three incineration plants and the off-shore Semakau Landfill, will meet the refuse disposal needs of Singapore, and help in achieving a clean living environment for its citizens.

Among the notable technologies incorporated into the TSIP are:

- Advanced combustion control systems regulating the refuse feeding and combustion rates to achieve the complete combustion of refuse.
- The furnace was designed to have at least two seconds residence time at 850 °C in the furnace for complete destruction of organic compounds including dioxins.
- Ash and slag from the incineration process is sent to the Tuas Marine transfer station for transfer to the Semakau Landfill for disposal.
- Ferrous scrap metal is picked up by overhead electro-magnetic separators and sold as such.

The issue of PCDD/PCDF releases has been given priority by the operators of TSIP who take into account the following possible sources/factors which may affect the formation of dioxins::

- Combustion efficiency
- The post-combustion flue gas temperature
- Residence time
- Availability of surface catalytic sites

Hence the optimum conditions to minimise the unwarranted production of PCDD/PCDF have been deployed, i.e., the combustion temperature at 850 °C and the residence time of least 2 seconds. Catalytic decomposition is the choice technology for the removal of dioxins and furans.

The technology uses the vanadium pentoxide and titanium dioxide catalyst in filter bags which will result in the oxidation of dioxins and furans into carbon dioxide, water and hydrochloric acid. This method ensures the 99 percent destruction of dioxins and furans. As the installation of the Dioxin Control System was retrofitted after the TSIP had been commissioned, it was noted that it did not incur much cost to the existing plant operations. The standards observed by the authorities are:

- § Air pollution in Singapore is regulated under the Environmental Pollution Control Act (EPCA) and its Regulations.
- § EPCA (Air Impurities) Regulations 2000 stipulates air emission standards for air pollutants emitted by industries.
- § Further Regulations came into force in January 2000, replacing the Clean Air (Standards) Regulations which had been in force since 1978.

As a bonus, the incinerator is also capable of producing power by utilising the hot flue gas from the incineration process to generate steam in the boilers while the superheated steam is expanded through two condensing turbines each of which drives a generator to produce electricity. The waste heat from six boilers is used for power generation in two steam turbine/generator sets each with a maximum output of 66.3 MW. Twenty percent of the power generated is used for internal consumption while the remaining 80 percent is exported to the Singapore Electricity Pool.

In the Government's effort to manage the solid waste disposal of the island state, numerous social/community programmes were initiated i.e., separation at source and recycling. Ironically as these programmes become more successful and acceptable, less waste is being sent to the incineration plants, hence presenting a financial limitation for the plant's operations. It is worth noting that in an effort to have a comprehensive waste disposal plan, the establishment of an off-shore landfill, i.e., the Semakau Landfill south of Singapore to cater for the slag and by-products of the incinerators including TSIP.

5.2 *Site visit to TSIP*

The site visit to the Singapore Tuas South Incineration Plant was conducted on 8 June 2004. It was a four-hour journey by bus from Kuala Lumpur International Airport, the venue of the workshop. The participants were welcomed by the General Manager of TSIP, Mr. Poh Soon Hoong with a briefing on the operations of the plant. The tour of the plant and facilities was hosted by Mr. Pang Fook Chong, the Manager of the mechanical division of the TSIP. Mrs. Indrani Rajaram, the expert on waste management in Singapore was present to answer questions on the plant operation and any technical queries. The visit lasted for about two hours during which the participants were shown the operation controls and live incineration of domestic wastes. The visit ended with tea/coffee hosted by TSIP. We would like to record our sincere gratitude for the hospitality of the TSIP management and the National Environmental Agency, Singapore. The participants found the visit to TSIP very informative and believed that the present technology on domestic waste incineration is capable of controlling the releases of PCDD/PCDF. Some participants agreed that waste incineration is cleaner than landfill for domestic waste disposal. However, the cost of setting up the incineration plant the size of TSIP is beyond the economic capability of their countries. Some pictures on the visit are shown in Appendix C.

5.3 *Technical Presentation by Expert on Domestic Waste Incineration Technology*

A presentation slide on the Domestic Waste Incineration Technology adopted by Singapore can be found in Appendix E. The presentation was made by Mrs. Indrani Rajaram, Chief Scientific Officer in the Pollution Control Department of the National Environmental Agency, Singapore. We would like to record our sincere gratitude to Mrs. Indrani Rajaram for presenting the talk on "Solid Waste Disposal in Singapore".

6. Chemical Waste Incineration – A visit to Kualiti Alam Chemical Waste Treatment Facilities in Malaysia

6.1 *The Plant Facilities and Operation*

As early as 1994 the Malaysian Government had taken the initiative to manage the disposal of chemical and industrial wastes following an amendment to the Environmental Quality Act to address the issue. The Malaysian Government then appointed United Engineering Malaysia Bhd. to undertake the project and with the technology cooperation of Denmark, Kualiti Alam Sdn. Bhd. was formed.

An example of a chemical/industrial wastes disposal plant in the region is located in Bukit Pelandok, Malaysia. The plant, which is an Integrated Scheduled Wastes Management Centre

(WMC), came into full operation in June 1998 and it handles all 107 categories of scheduled wastes listed under the Environmental Quality (Scheduled Wastes) Regulations 1989 with the exception of those that are radioactive, clinical and explosive wastes. It is operated under a concession programme by Kualiti Alam Sdn. Bhd. Kualiti Alam Sdn. Bhd. which is entrusted by the Government of Malaysia to provide an off-site facility for the treatment and disposal of scheduled wastes in Peninsular Malaysia.

Waste treatment at the plant includes incineration, physical/chemical treatment, solidification and waste disposal in a secure landfill. The plant has also been certified under OHSAS 18001, ISO/IEC 17025, ISO 14001 and ISO 9001.

The Kualiti Alam's Waste Management System consists of:

- w** A centralised Integrated Scheduled Waste Management Centre, located at Bukit Nanas, Negeri Sembilan, to treat and dispose of the different types of scheduled wastes.
- w** A waste collection and transportation network to service the entire country.

The Waste Management Centre (WMC)

The integrated Scheduled Waste Management Centre is one of the most comprehensive in the region and is fully licensed by the Department of Environment to provide the following services:

- w** Waste analysis
- w** Waste transportation
- w** Waste treatment which includes incineration, physical/chemical treatment and solidification (PCT). The PCT plant operates with one-shift and a capacity of 5,000 MT per year. It carries out chemical processes such as neutralisation, oxidation and reduction reactions.
- w** Waste disposal in secure landfills

The plant covers an area of 56 hectares and maintains the following facilities:

- w** Fly ash from the incineration plant is treated at the solidification plant and subsequently sent to the secure landfill.
- w** Residues from the PCT plant are treated at the solidification plant whereby the heavy metals are transformed into insoluble materials and combined with cement, lime and sand for the solidification process.
- w** Residues from the solidification plant are disposed off in the secure landfill, which can accommodate about 1.6 million tonnes of residual waste and is expected to be sufficient for at least 15 years of operation. The landfill is constructed with a one-meter compacted clay liner and two mm HDPE geomembrane to prevent leachate.

The incineration plant at the WMC operates a high temperature rotary kiln with an efficient flue gas cleaning system. This plant which has the capacity of 33,000 MT per year, also ensures almost total thermal destruction (99.99 percent) and meets the DOE licensing conditions on flue stack gas emissions including PCDD/PCDF at 0.1 ng/m³.

Similar to its counterparts in Singapore, Kualiti Alam Sdn. Bhd. Malaysia also foresees a need to evaluate its business plans as the industry turns more towards recycling and embarks on green technology for its processes. There are also occasions when the industry has deliberately reduced its wastes under dubious circumstances and stated that these wastes would be recycled.

6.2 The Site Visit to Kualiti Alam Sdn. Bhd.

The site visit to the Kualiti Alam Sdn. Bhd. Chemical Waste Treatment Facility was conducted on 9 June

2004. The plant is about 45 minutes' drive by bus from the workshop venue. The participants were welcomed by Dr. Ahyar Idris, General Manager for Laboratory Management Services. The tour started with a presentation on the site facilities and the operation of the plant from collection to various disposal technologies by the Senior General manager for Plant and Operations. The participants were treated to a tour of the main building where operational facilities and laboratories for testing of chemicals for classification purposes are located, followed by a bus tour of the surrounding facilities. The two-hours site visit ended with a local lunch hosted by Kualiti Alam Sdn.Bhd. Several countries in the region have similar facilities but on a smaller scale. The participants feel that such private chemical waste disposal facilities is viable in their countries and would look at the possibilities in the near future. However, small countries such as Brunei and underdeveloped countries such as LAO PDR found the set-up to be not economically viable.

We would like to record our sincere thanks and gratitude for the hospitality of Kualiti Alam Sdn. Bhd. and its staff. A few pictures on the visit can be found in Appendix D of this report.

6.3 *Technical Presentation by Expert on Chemical Waste Disposal*

Dr. Ahyah Idris gave the expert presentation on chemical waste disposal with emphasis on POPs disposal carried out at the Kualiti Alam Sdn.Bhd. facility. The powerpoint presentation can be found in Appendix F. We would like to record our sincere thanks to Dr. Ahyar Idris for his willingness to be our regional expert on hazardous waste disposal technology and for presenting his paper to the participants.

7. Appendices

Appendix A : Questionnaire for Clinic/Workshop



QUESTIONNAIRE

Name: _____

Designation: _____

Country: _____

A. Domestic Wastes

1. What is your country's daily output of domestic wastes?

2. What is/are the method(s) of disposal of domestic wastes in your country?

Landfill Incineration Others: _____

3. Do you have waste incinerators for domestic wastes?

- Yes No
- Under construction and will be operational in year _____
- Planning to have in year _____
- Not sure

4. If the answer to the above question is "yes", what is the capacity of each incinerator?

5. How long have these incinerators been operational?

_____ year(s).

6. What is the level of dioxins release by these incinerators?

air: _____

water: _____

Residue/solid: _____

7. Please tick (√) any technical assistance (technology transfer) needed by your country to overcome problems related domestic waste.

- Technical assistance related to monitoring/analysis of PCDD/PCDF
- Technical assistance related to monitoring/analysis of other POPs
- Technical assistance related to landfill
- Technical assistance related to incinerator
- Other technical assistance (please specify):

B. Chemical Waste

1. What is the output of chemical wastes per day? What are the sources?

_____ : Industrial Agricultural

Others (Please specify): _____

2. What is/are the method(s) of disposal of chemical waste in your country?

Landfills Incineration Export

Others (Please specify): _____

3. Do you have incinerators for chemical wastes?

- Yes No
- Under construction and will be operational in year _____
- Planning to have in year _____
- Not sure

4. If the answer to the above question is "yes", what is the capacity of the incinerators?

5. How long have the incinerators been operational?

_____ year(s).

6. Do you do medical waste incineration?

Yes No Not sure

7. Do you have stockpiles of banned POPs on the Stockholm Convention list?

Yes No Not sure

8. Do you have inventories of banned POPs on the Stockholm Convention list?

Yes (complete) Yes (partial list) No

9. Has your country carried out the National Implementation Plan (NIP) in compliance to the Stockholm Convention?

- Yes No Not sure

10. Do you have an inventory on PCBs?

- Yes No Not sure

11. Do you have an inventory on contaminated oil that containing PCBs?

- Yes No Not sure

12. Does your country have a disposal plan for PCBs and PCBs contaminated wastes?

- Yes No Not sure

13. What is your country's future plans in terms of POPs management (inventories, reduced used, elimination)?

14. Please tick (✓) any technical assistance needed by your country to overcome problems related to chemical wastes.

- Technical assistance related to the monitoring/analysis of PCDD/PCDFs
- Technical assistance related to the monitoring/analysis of other POPs
- Technical assistance related to landfills
- Technical assistance related to incinerators
- Technical assistance related to the disposal of POPs stockpiles
- Other technical assistance (please specify):

15. Please tick (✓) the regulatory status/control in your country for each chemical listed in the table below. Also state the year of implementation:

	Chemicals	Banned and year of implementation	Restricted usage	Allowed under authorisation	Others (please state)	Not Sure
1	Aldrin					
2	Chlordane					
3	DDT					

Monitoring/sampling stations: Government agency Private company University
 Research centres: Government agency Private company University

4. Do you send samples for analyses to other countries?

- Yes, (specify countries): _____
- No

5. Do you have monitoring programmes for POPs?

- Yes No Not sure

If “yes”, please elaborate.

6. Do you have technical expertise on:

- | | | | | |
|---|---|------------------------------|-----------------------------|-----------------------------------|
| Analytical Methodology | : | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> Not sure |
| Instrumentation | : | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> Not sure |
| Monitoring protocols | : | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> Not sure |
| Population monitoring
(blood/milk/tissues, etc.) | : | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> Not sure |
| Domestic waste management | : | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> Not sure |
| Chemical waste management | : | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> Not sure |

Others (Please specify):

7. Would your country be willing/capable of being a regional centre for:

PCDD/PCDF analysis : Yes No Not sure

Other POPs analysis : Yes No Not sure

Monitoring of POPs : Yes No Not sure

Chemical waste management : Yes No Not sure

POPs information : Yes No Not sure

Others related to Stockholm Convention (Please specify):

(End of Questionnaire)

Appendix B: List of Participants at Clinic/Workshop**Brunei Darussalam**

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Annex III

**South Pacific Regional Environmental Programme (SPREP)/
Basel Convention Regional Centre**

**Report of the Workshop on the Regional Delivery of Technical
Assistance to Pacific Island Countries
A Case Study**

**Wellington, New Zealand
14-17 June 2004**

Case Study for Regional Delivery of Technical Assistance

1. Introduction

1.1. Background

The Stockholm Convention on Persistent Organic Pollutants (POPs) was adopted on 22 May 2001 by the Conference of Plenipotentiaries and entered into force and became legally binding on the 17 May 2004, 90 days after France became the 50th state to ratify the agreement. In doing so, the Convention now paves the way for an ambitious global effort to greatly restrict or reduce and/or eliminate the production and use of an initial list of 12 POPs chemicals namely aldrin, chlordane, 1,1,1-trichloro-2,2-bis(4-chlorophenyl) ethane (DDT), dieldrin, dioxins, endrin, furans, hexachlorobenzene, heptachlor, mirex, polychlorinated biphenyls (PCBs) and toxaphene. This list undoubtedly will grow in future when more chemicals that fit the description or definition of persistent organic pollutant are identified and established.

The independent Small Island States of the Pacific region have shown a high level of support for the Stockholm Convention, with 10 of the 14 countries becoming Signatories by the deadline of 22 May 2002.² Since then 4 of the 10 Signatories have progressed on to ratify the Convention³ and the remaining four non-Signatories⁴ depositing their instruments of accession to the Convention to become Parties. These bring to 8, the number of Pacific Island countries who are Parties to the Convention. The remaining 6 Signatories are in the process of ratifying the Convention.

As stipulated under Article 7 of the Stockholm Convention all Parties are required to develop a National Implementation Plan (NIP) for the implementation of its obligations under this Convention. All developing countries that had signed up to or became Parties to the Convention are eligible for the funding through the Global Environment Facility (GEF) for enabling activities, such as the development of an NIP. All the Pacific Island countries, except for the Cook Islands, Solomon Islands and Tuvalu are all currently developing their respective NIPs and are at various stages of development.

Over the last four years, the South Pacific Regional Environmental Programme (SPREP) has been working very closely with the United Nation Environment Programme (UNEP) is assisting the countries in the development of such plans. SPREP has, in collaboration with UNEP has organized four Pacific regional workshops to assist the countries with various aspects of the development of the NIP. These include regional meetings in Apia, Samoa (2001), Pohnpei, FSM (2002), Nadi, Fiji (2003) and Port Vila, Vanuatu (2004). All these workshops have assisted the countries in the Pacific region to progress the development of their respective NIPs to different stages.

In addition to these collaborative efforts with UNEP in organizing the regional workshops, SPREP has voluntarily assisted countries in providing technical advice and information on POPs to countries that have directly requested the assistance and have also assisted a number of the countries in the region in either ratifying or acceding to the Convention.

Paragraph 4 of Article 12 of the Stockholm Convention states in part that as part of the arrangements for the purpose of providing technical assistance and promoting the transfer of technology to developing Parties and Parties with economies in transition relating to the implementation of the Convention, regional and sub-regional centers be set up to assist with such assistance. It is for this reason that SPREP was approached by UNEP to undertake a case study in the Pacific Islands region to assess the suitability and competence of SPREP to serve as a regional Center for the Stockholm Convention. The case study was also organized with the general objective that the implementation of the case study on technology transfer to selected countries within the region be part of a feasibility study on technical assistance to developing countries and countries with economies in transition under the Stockholm Convention.

² Fiji, Kiribati, Micronesia, Federated States of (FSM), Nauru, Niue, Palau, Papua New Guinea, Samoa, Tonga and Vanuatu.

³ Fiji, Nauru, Papua New Guinea and Samoa

⁴ Cook Islands, Marshall Islands, Solomon Islands and Tuvalu

1.2 Purpose and objectives of the workshops

A sub-regional workshop on dioxins and furans information collection and management training in the Pacific Island region was therefore organized by SPREP in collaboration with interim Secretariat of the Stockholm Convention, UNEP Chemicals to serve as part of the case study. The workshop was held in Wellington, New Zealand over the period 14-18 June 2004 and had the following aims and components:

- To provide general information and training on sampling and analytical techniques of dioxins and furans in environmental samples;
- To provide training on assessment and evaluation of public awareness techniques about dioxins and furans and looking at alternate ways of dealing with organic waste.
- To discuss Best Available Techniques and Best Environment Practices (BAT/BEP).
- To undertake a field trip to expose the participants to some best environment practices (BEPs) that are in place in New Zealand where green waste is dealt with in a manner, which is different from their systems.

1.3. Workshop Attendance

The workshop was intended for the people who are or have been designated as National Coordinators for the respective NIPs programme and/or members of the dioxins and furans task teams in the national coordinating committee. Due to the highly technical nature of the presentations and demonstrations, it was further intended for people who have a technical training background in chemistry or biology.

The countries that were represented at the workshop were Federated States of Micronesia (FSM), Fiji, Papua New Guinea (PNG), Tonga, Tuvalu, Samoa and Vanuatu. In addition three non-governmental organizations (NGOs) were also invited to join the training workshop and contribute their experiences on how their organizations could contribute to the awareness raising work that needs to be carried out as part of the management process.

Fiji and Vanuatu were represented by their respective National POPs Coordinators, while PNG and Samoa were represented by members of their dioxin and furans task teams. FSM was represented a member of their NIPs National Coordinating Committee (NCC) while Tonga and Tuvalu, who are yet to establish their respective National Coordinating Committees, were represented by officers from their respective Environment Departments. The three NGOs were represented by officers from their Environmental Education or Campaign sections.

All the delegates from the seven Pacific Island countries along with the SPREP representative and one NGO representative (Greenpeace) attended all three components of the workshop while the remaining two NGO representatives (PCRC and Live & Learn) and one consultant (Ms. Seema Deo) participated only in components 2 and 3 of the workshop. The second consultant (Dr. Bruce Graham) only participated in component 3 of the workshop.

A full list of workshop participants and presenters is given in Annex 1.

2.0 Workshop Programme

For the purpose of this report, a copy of the workshop programme is given in Annex 2. The workshop was conducted in three major and discreet parts as follows:

- The first component, which took up the first two days, involved exposing (and training) the participants to the art of sample preparation for dioxin and furan analysis as well as training on the availability of the different methodologies that are used for these analyses. It also involved a small section on experiences of carrying out surveys and national inventory preparation. This component of the training was conducted in collaboration with the internationally accredited AgriQuality Laboratories (Wellington, New Zealand) for dioxin and furan analysis.
- The second component of the workshop was where the participants had the opportunity to discuss issues of assessment and evaluation of public awareness-raising techniques about dioxins and furans and looking at alternate ways of dealing with organic waste. The NGO participation was part of the more elaborate attempt to get the country participant to understand their value and using them in some of their awareness-raising work as their networks especially at the community level is well established. The component also had an opportunity to discuss the Best Available Techniques and Best Environment Practices (BAT/BEP) concept and how it could be incorporated into the public awareness-raising material.

- The third and final component involved undertaking field trips to green waste treatment set ups to allow the participants to see how the similar initiatives can be easily established in their respective countries to deal with the green waste problem as part of the BEP process.

The sections on the first two components were based around formal presentations, group plenary discussions and a feedback and planning session. The first component was held at the Conference Room of the AgriQuality New Zealand Limited complex in Lower Hutt, Wellington while the second component was held in one of the Conference Rooms at the Portland Hotel in downtown Wellington city.

3.0 Opening Session

After all the participants were formally welcomed to the AgriQuality complex by Dr. Harry van Enckevort, International Laboratory Marketing Manager of the Wellington branch of AgriQuality NZ Limited, Dr. Frank Griffin, Pollution Prevention Coordinator with the South Pacific Regional Environmental Programme then officially welcomed all the participants to this important training workshop on behalf of UNEP and SPREP. In his opening presentation, Dr. Griffin gave a brief background of what the Stockholm Convention is about and touched on its entry into force. He then went on to talk about the Pacific regions involvement and participation in the Stockholm Convention and gave a brief update on upcoming events with regards to the Convention activities. He further gave an update on the progress of the NIP and closed up with a short summary of the workshop overview. He encourage participants to be on the look out during the presentations of what they can take home to assist in their NIP development, especially in the dioxins and furans work.

4.0 Component 1 – Technical Aspects of Dioxins and Furans Analysis Presentations

4.1. Introduction to dioxins, furans and PCBs

Dr. van Eckevort again welcomed the participants to the complex and after going through some house-keeping issues, he talked about how this component of the workshop programme was going to be implemented and encouraged the participants to be, as much as possible, participatory in the discussions by asking as many questions as they wanted about the issues and techniques that were being presented or discussed.

He then gave an introductory presentation on dioxins, furans and PCBs with a focus on AgriQuality's capabilities as well as its network laboratory system. He focused on the AgriQuality Laboratory capabilities and what it can generally do and achieve. He went on to state that the AgriQuality Laboratory setup in Wellington was only one of two laboratories in the Australasia region, which have the necessary International Accreditation to carry out dioxin and furan analysis. He spoke about the capabilities of the AgriQuality UltraTrace™ project and its capability as well as other related analytical work that they do with other players in this area of work. He then spoke about dioxins, furans and PCBs in the context of why they are persistent hazardous materials, their sources of generation and typical levels of background NZ levels, and their basic chemistry. He concluded by talking about the challenges of dioxins analysis and other chemicals compounds that have similar chemistry as the dioxins.

In the discussion that ensued, a major point that participants wanted to know was the cost of carrying out these analyses, given that all of them came from countries where the environment budget was very limited. They also asked if there would be situations if the samples from countries in the Pacific region would be analysed at a reduced or discounted price. Dr. van Eckevort in response said that due to the cumbersome nature and complexities involved in the sample preparation and the machinery used in the analytical process, the cost was quite high and the cost per sample was usually determined by the number of sampled that the clients wanted analyzing. As for the issue of analyses being carried out at a reduced price, he suggested that if there was a large amount of samples from the whole region then some discount mechanism could be put into place for the region.

4.2. Surveys and Preparation of a National Inventory

Dr. Simon Buckland, formerly from the dioxins and furans team within the Ministry for the Environment and now with the New Zealand Environmental Risk Management Authority gave an extended and quite comprehensive presentation on the New Zealand inventory of dioxin emissions. He started off by talking about the history of POPs in New Zealand and the concerns that came together with their existence. He then gave an overview of the Organochlorine Programme that operated under the Ministry for the

Environment before talking about relationship between estimating dioxins release into the atmosphere and how it related to the development of a national inventory. He then talked about the approaches and methodologies used in the inventory development work, looking at the processes involved, constrains and possible sources of dioxin generation before touching on the issue of emission factors and the Ministry's overall release estimates for 2000 using the emission factors. He then gave a breakdown of where the main dioxin releases to air were from and a summary of the sources of these contributions to air. In a similar manner, he gave main releases to land and water.

Dr. Buckland then went on to talk about reservoirs of dioxins that exists in the environment and briefly discussed the conclusions of all that work, which was followed by a short presentation of the statistical data. The statistical data presentation included graphs of where the mains release areas were in New Zealand and seasonal correlation graphs showing the release of these chemicals over time. He finally concluded with a short summary of the revision made to the New Zealand dioxin inventory carried out in 2004.

Again in the discussions, participants wanted to know the total cost of running a programme of that nature. In response, Dr. Buckland said that the cost involved in getting all the necessary results and compiling them into a concise report was quite substantial and would have to be sustained for a long period if a proper trend of the emission work is to be seen.

4.3. Sampling requirements and techniques

Mr. Scott Leathem, Business Manager for the Wellington Laboratory then gave a presentation on sampling where he talked about regulations that govern the sampling protocol and issues of sampling. He then touched on what the usual environmental background levels are and how it is so easy for contamination to occur given that the background levels of these chemicals are so low. He went on to talked about the methods used for sampling (sampling media), sample storage, sample integrity and sample preparation, all of which are crucial for getting a quality assured result. Personnel safety issues were also touched upon as well as the different types of samples that can be used for dioxins, furans and PCBs analysis.

When asked whether AgriQuality carried out their own sampling of environmental samples, the response was that for air sampling, the work was out sourced to experts such as K2 Environmental. For liquid and solid sample preparation, they had the necessary personnel and methodology to do that at the Wellington laboratory.

Mr. Stuart Keer-Keer from K2 Environmental Ltd based in Christchurch, New Zealand then gave a very practical orientated presentation on air discharge sampling for doxins. In his presentation, Mr. Keer-Keer took the participant through a range of equipments that are used nowadays to take air samples for dioxin analysis. He initially described what the different components of the air sampling equipment were and their uses in a power-point presentation and then proceeded to illustratively explaining these components using a dismantled air sampling equipment. In his power-point presentation he talked about the setting up of the sampling equipment, which he said was one of the crucial components of the whole sampling process. He also touched on the sampling itself and the handling and treatment of the sample for analysis. He also spoke about things to looks for before, during and after the sampling process.

The illustrative demonstration was a very interactive session where participants were allowed to examine the equipment and ask questions about matters such as cost of equipment, cost of sampling, training opportunities through K2 Environmental Ltd etc. In was quite evident from the discussions that the participants got a real insight into what is involved in getting quality results for determining levels of dioxin release into the air from potential emitters.

4.4. Test Methods and QA/QC

Mr. Leathem then returned to give a presentation on the Test Methods for dioxins, furans and PCBs analyses. He opened up by talking about the importance of choosing a test method that is fit for the purpose and that the reliability and dependability of the result obtained. He then went on to talk about the USEPA Test methods as well as other acceptable methodologies that are currently used in other parts of the world. He then gave a comparative analysis between using high resolution mass spectrometry (HRMS) and low resolution mass spectrometry (LRMS) and why AgriQuality uses HRMS for the analysis of dioxins, furans and PCBs. He concluded by talking about bio-immuno assays, how this compliments the HRMS method and an example of the bio-immuno assay methodology that they are using in their analytical work.

Following the presentation on Test Methods, Mr. Leathem then gave a presentation on Quality Assurance (QA) of the every step of the analysis process starting from the sampling to the test methodology used. He talked about the importance of having the appropriate technology for the analytical work as well as being involved in inter-laboratory or third party quality checks. He also spoke about the international accreditation system and making sure that the laboratory that is used has the necessary accreditation that is recognized by the various regulatory authorities. He then touched on basic safety and health issues with regards to good laboratory practices (GDP) and understanding the itinerary of the whole analytical process.

This was the end of the first day.

4.5. Introduction to AgriQuality

Dr. van Ekeevort began the second day proceedings by giving an Introduction to AgriQuality presentation where he talked about AgriQuality's wider range of services and its South Pacific operations. He opened by talking about AgriQuality's status as Australasia's top QA provider for the agricultural sector and demonstrated this by giving a structure that reflected the supply chain of what they are capable of doing. This included QA work that is carried out on the farms, while the product is in process, at the finished product stage, on protection and in market access. He then talked about the internationally recognized accreditation systems before elaborating on some of the stages of the supply chain. He also touched on the AgriQuality Laboratory network in Australia and New Zealand and how this network could be used for the analysis of environmental samples for various analytes and finished this section by talking about the capabilities and services provided by the Wellington laboratory.

Dr. van Ekeevort then went on to talk about the work of the dioxins team at the Wellington laboratory and how this team's work complimented the overall work that was done by the rest of the other teams at the same complex. These included the work of the general chemistry team, the veterinary team, the pesticides team, the Good Laboratory Practices and Research and Development (GLP and R&D) team and the forensics team. Given this combination of teams, he spoke about the importance of having or using recognized standard methods for the analytical work, which also had links to intellectual property rights on methodologies that were developed in-house. The importance of the use of appropriate instrumentation was again stressed here and again linked to the quality assurance of the results. He concluded this section by talking about the accreditation process and the proficiency programmes and the inter-laboratory collaboration programmes (ILCPs). He finally concluded his presentation by informing the participants of the services that AgriQuality can provide to the South Pacific customers.

4.6. Practical Demonstration of dioxins samples preparation and analysis

The rest of the morning was then used to expose the participants to the laboratory work that was carried out by AgriQuality at the Wellington complex. All the participants were advised to attire themselves appropriately with laboratory coats, safety glasses and shoes as required by the regulations of such an operation. The participants were taken through the whole laboratory's working system by Mr. Lawrence Porter, which started at the deposit desk when the sample is dropped off for analysis. This was followed by the sample recording system and the subsequent storing of the sample before the analytical work. The participants were then taken on a general walk through the laboratory where they were introduced to the different work areas ranging from actual analytical work to R&D work. The participants were also shown the different instrumentation that was present in the laboratory and their respective uses explained to them. The final stop of this laboratory tour was the HRMS laboratory where all the dioxins, furans and PCBs analysis took place. Mr. Porter went to great lengths to explain as clearly as possible the basic theory behind how the instruments worked, why they worked like that and how they were being used to analyse environmental samples for dioxins, furans and PCBs.

4.7 Understanding Test Results

The afternoon session saw a presentation on Understanding Test Reports by Mr. Mike Valentine with occasional inputs from Mr. Porter. They started off by talking about what constitutes an analytical test report and the difference between a Standard Report and a Full Data Packaged Report. In the section on the Standard Report, Mr. Valentine spoke about the format of the report, how the different components of the report should be displayed and what should be included in this type of report. He said that this report should contain the customer details, sample receipt details, a brief description of the method used and should be signed of by an accredited analyst.

In the Full Data Package report, as the name suggest, it should contain more detailed information about the complete analytical process that allows for full interpretation and for independent auditing of the report and is usually a large and complex report. He then went on to elaborated on what each of these sections meant and gave examples of a “used” report from their file. Unfortunately, due to the sensitive nature of the contents of the report, no copy of this example was given to the participants.

In the ensuing discussions, some of the participants commented on weather these highly technical and complex reports could be written in a more layman type of English that the non-technical people in decision-making positions could understand. Both Messrs. Porter and Valentine commented on the importance of having the capable technical people on the ground at the national level so that these complex analytical reports could be explained in person to the non-technical people. They added that the danger of writing it in a layman type of English is that it could be misinterpreted, which then makes the matter more complicated.

4.8. Contacts for assistance

Dr. van Ekevert then concluded this component of the workshop by talking about the key AgriQuality contact points for sample analysis and other services that may be on offer at AgriQuality. He went on to stress the point of making personal contacts with the various people the participants had met with during this workshop and to use them to acquire the necessary information for their work. He also spoke about the process that is usually followed for sending environmental samples from the Pacific to New Zealand for analysis.

4.9. Wrap up for Component of the workshop

In wrapping up this component of the workshop, Dr. Griffin thanked Dr. van Ekevert and AgriQuality for their excellent hospitality and more importantly the excellent presentations that no doubt had opened the eyes of the participants, especially on the technical aspects of analyzing of environmental samples for dioxins, furans and PCBs. He added that the information gather by the participants from this workshop was part of the “technology transfer process” as outlined under Article 12: Paragraphs 2 and 3 of the Stockholm Convention on Technical Assistance. He urged the participants to use this information in the development of their NIPs.

Mr. Michael Vari from Vanuatu then thanked Dr. van Ekevert on behalf of the participants for the excellent presentations and stated that while some of the presentation were far to technical to be properly grasp and comprehended, it at least gave them an idea of what is involved in the development of the dioxins and furans component of the respective NIPs.

5.0 Component 2 – Assessment and Evaluation of public awareness-raising techniques about dioxins and furans Presentations

5.1. Introduction to Component 2 of the workshop

As stated earlier, this component of the workshop was held in one of the Conference Rooms of the Portland Hotel in downtown Wellington city and the participants from component 1 of the workshop were joined by the remaining two NGO representatives (PCRC and Live & Learn) and one of the consultants (Ms. Seema Deo).

Dr. Griffin once again welcomed everyone to this component of the workshop, especially the new participants who were joining the workshop for this and the subsequent component. It was for the benefit of the new participants that he re-presented the presentation that he had given on the first day of component 1. In addition to what he had already talked about from component 1, Dr. Griffin spoke briefly about the objectives of the different components of the workshop and how the information gathered from this workshop should be used in the development of the dioxins and furans sections of the NIPs. Again he encouraged all participants to get engaged in the discussions that followed the various presentations and demonstrations.

5.2. BAT-BEP Issues

His presentation was directly followed by a presentation by Ms. Vandana Naidu on Best Available Techniques – Best Environmental Practices (BAT-BEP) issues. Ms. Naidu is the Pacific region’s representative on the BAT-BEP Experts Groups for the Stockholm Convention. In her presentation she

initially spoke about the possible dioxin sources in the Pacific Island countries and then went on to talk about Article 5 of the Stockholm Convention, which talks about Measures to reduce or eliminate releases from unintentional production. She then spoke about the measures that need to be taken when dealing with new and existing sources where there is a comparatively high potential for formation and release of dioxins, especially in the promotion of the use of BEP and BAT.

She then defined the term “best available technique” and elaborated on when to use such a measure and gave an example. She followed this up with the definition of the term “best environmental practice” and again elaborated on it and gave an example.

She then spoke about the establishment and purpose of the BAT & BET Experts Group. She stressed that the group should be used more frequently by the Parties in developing and implementing their national actions plans for the unintentionally produced POPs. She made mention of the composition of the expert group and talked briefly about the matters discussed at their first meeting held in March 2003, emphasizing on the different sources of dioxin production and release. She then spoke about the matters discussed in the expert group’s second meeting held in December 2003 and with emphasis being placed on the addition sources of possible dioxin sources. The regional issues for BEP-BAT in the Pacific regions was then discussed and the participants were then encouraged to actively contribute to the development of the BEP-BAT process by ensuring that their country specific issues were highlighted in the proposed BEP-BAT. She ended her presentation by directing the participants to the website under the POPs homepage http://www.pops.int/documents/meetings/bat_bep where all guiding documents relating to the BEP-BAT process could be found. Again the participants were encouraged to use the site frequently for the development and implementation of the national action plans for the dioxins and furans work.

In the discussion that ensued, some of the country delegates wanted to know how the regional information could be compiled into document for the regions use. They also wanted to know if there were any set measures that the individual countries should take if they were faced with a specific source. Ms. Naidu responded saying that to date there has been no compiled document and encouraged the delegates to send her the specific issues so she can start working on the region document. As for the measures to be taken, she encouraged them to visit the website so see if they could get some answers from that address or communicate amongst each other and share their individual experiences and solutions.

5.3. Awareness Raising Activities in New Zealand

Mr. Jonathan Coakley from the New Zealand Ministry for the Environment then gave quite an elaborate presentation on dioxin awareness-raising activities in New Zealand. Dioxins were discussed in the context that they are persistent, toxic and bioaccumulative, are known carcinogens and can cause adverse effects of the immuno and reproductive systems as well as the development process in animals. They were then discussed in the context of the Stockholm Convention on how the convention calls for reduction (and ultimate elimination) of dioxin emissions and the development of national action plans. He then proceeded on to talking about dioxin issues in public mind with emphasis on what New Zealand is aware of today with regard to the toxicity of dioxins. In the section he also touched on the brief history of the how the issues of dioxin (or its precursors) have come to the knowledge of the public especially in their manufacture and use. He then went on to talk briefly about the New Zealand organochlorine programme before giving an account of how the consultation and communication work of this programme was undertaken.

Mr. Coakley then moved on to give a technical presentation on the dioxin work in food and serum, giving data on New Zealand and compared this to the rest of the world. It was noted that the New Zealand daily intake of dioxins and PCBs was way below the WHO target daily intake. He also presented results of the New Zealand study on PCBs, dieldrin and dioxins in serum where the study tried to get a correlation between the different age groups and the areas they from in New Zealand. He noted in his presentation that a recent survey on breast milk showed that the current exposures are falling but the average lifetime exposures are higher than what they used to be. An overview of the research findings was then given and that led into the policy development component.

He then proceeded onto the New Zealand priorities for its national implementation plans (NIPs) work for the period 2004-2010. These priorities ranged from minimizing dioxin release to cleaning up contaminated site to collecting and disposing of stockpiles of other POPs and the final phasing out of PCB and their disposal. A strategy on dioxin risk reduction was then presented through mechanisms such as the having in place and enforcing air quality standards as well as applying BAT-BEP where applicable. Other activities

such as cleaning contaminated sites and recycling schemes for agricultural plastics was also discussed.

Mr. Coakley concluded his presentation by talking about the process that the New Zealand Government has followed in the drafting of legislation that was needed to comply with the Stockholm Convention. This included legislation that bans the production and use of POPs, permit scheme for the phasing out and disposal of the remaining PCBs, legislation and regulations that control and coordinate the import/export of POPs, PICs, and the Basel Conventions. They have also developed legislation that is pending for the environmentally sound storage of collected waste stocks of POPs and the ratification of the Convention once all the requirements have been put in place. He concluded by directing all the participants attention to the New Zealand Government website for all these work <www.mfe.govt.nz/publications/hazardous>.

The discussion following this presentation highlighted that in order to acquire all the necessary information and the required results, it was crucial that a set up that is appropriately and adequately resourced and supported is established. It was evident from the presentation that New Zealand was able to get this far after years of hard work from many personnel and supported by adequate funds. Many of the participants recognized that it was important that their respective NCCs had to be very methodical in acquiring the necessary information and initial analytical results from the limited money that has been provided for by the Stockholm Convention for the purpose of developing their respective NIPs. It was felt that their national Government budget allocation for their work area wasn't adequate to cater for such an elaborate working set up such as the one described for New Zealand.

5.4. Designing Effective Awareness Programmes

Ms. Seema Deo then gave a presentation on designing effective awareness raising programmes where she was able to take the participants through the necessary steps of developing an effective communication tool. The reasons for why awareness raising is necessary and important were outlined and then the characteristics of an effective campaign or communication programme were then touched upon. The presentation then focused on the different components of an effective awareness programme with the audience asked to interactive and participate in areas where they saw fit. The different areas for assessment were also looked at followed by a section on behavioral changes and the stages involved in this process. The presentation was concluded by talking about learning about the audience and how all these could be used in the development of an effective awareness-raising and communication tool.

The discussion that ensued highlighted that having an effective communication tool was imperative in understanding what the public knowledge is about dioxins and furans and the rest of the POPs. For an effective awareness-raising programme to be designed and put into place, it was crucial to understand what people knew about the issue of concern that was being addressed and at what level – i.e. learning about the audience. The NGO participants added that proper awareness-raising work needs to be properly coordinated and that the message that is being sent out is targeted.

Further discussion then focused on how the dioxins and furans information can be properly structured and communicated to the general public. In order for this to happen, an initial survey of what the public knows about dioxins and furans should be carried out first. There was a difference of opinion here on the method used and timing of communicating the dioxins information to the public but it was generally agreed that the public's level of understanding of dioxins and furans should be known before the initial information was communicated.

5.5. NGO Involvement in Awareness Raising

The three NGO representatives then made presentations about what their organizations stood for and how they would be able to assist the countries with the awareness-raising work at the respective national levels. Live & Learn made a power-point presentation while PCRC and Greenpeace gave verbal presentations. They all encouraged the participants to contact them and find out more discuss ways in which they could assist the respective NCCs in formulating and developing communication tools and articles for awareness-raising purposes.

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new and existing sources where there is a comparatively high potential for formation and release of dioxins, especially in the promotion of the use of BEP and BAT.

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The discussion following this presentation highlighted that in order to acquire all the necessary information and the required results, it was crucial that a set up that is appropriately and adequately resourced and supported is established. It was evident from the presentation that New Zealand was able to get this far after years of hard work from many personnel and supported by adequate funds. Many of the participants recognized that it was important that their respective NCCs had to be very methodical in acquiring the necessary information and initial analytical results from the limited money that has been provided for by the Stockholm Convention for the purpose of developing their respective NIPs. It was felt that their national Government budget allocation for their work area wasn't adequate to cater for such an elaborate working set up such as the one described for New Zealand.

5.4. Designing Effective Awareness Programmes

Ms. Seema Deo then gave a presentation on designing effective awareness raising programmes where she was able to take the participants through the necessary steps of developing an effective communication tool. The reasons for why awareness raising is necessary and important were outlined and then the characteristics of an effective campaign or communication programme were then touched upon. The presentation then focused on the different components of an effective awareness programme with the audience asked to interactive and participate in areas where they saw fit. The different areas for assessment were also looked at followed by a section on behavioral changes and the stages involved in this process. The presentation was concluded by talking about learning about the audience and how all these could be used in the development of an effective awareness-raising and communication tool.

The discussion that ensued highlighted that having an effective communication tool was imperative in understanding what the public knowledge is about dioxins and furans and the rest of the POPs. For an effective awareness-raising programme to be designed and put into place, it was crucial to understand what people knew about the issue of concern that was being addressed and at what level – i.e. learning about the audience. The NGO participants added that proper awareness-raising work needs to be properly coordinated and that the message that is being sent out is targeted.

Further discussion then focused on how the dioxins and furans information can be properly structured and communicated to the general public. In order for this to happen, an initial survey of what the public knows about dioxins and furans should be carried out first. There was a difference of opinion here on the method used and timing of communicating the dioxins information to the public but it was generally agreed that the public's level of understanding of dioxins and furans should be known before the initial information was communicated.

5.5. NGO Involvement in Awareness Raising

The three NGO representatives then made presentations about what their organizations stood for and how they would be able to assist the countries with the awareness-raising work at the respective national levels. Live & Learn made a power-point presentation while PCRC and Greenpeace gave verbal presentations. They all encouraged the participants to contact them and find out more discuss ways in which they could assist the respective NCCs in formulating and developing communication tools and articles for awareness-raising purposes.

5.6. Tools and tactics – Samoan Example

The participants from Samoa then made a short presentation on tools and tactics and showed what they were using in Samoa to get the message of dioxins and furans across to the public. Unfortunately the videotape containing the short 20-minutes movie about the dioxins story was not at hand but instead the participant got to see a series of TV-advertisements that they had produced about dioxins. These advertisements were produced in both the English and Samoan languages.

5.7. Country Reports

A series of country reports from all the country delegates were then given showing what each country had done to date with respect to dioxins and furans work. Both Tuvalu and Tonga who do not yet have NCCs in place advised the workshop that due to the non-existence of their NCCs, they did not have an update while PNG, Vanuatu, FSM and Fiji gave presentations ranging from quite advanced work (PNG, Vanuatu and Fiji) to work just started (FSM).

6.0 Workshop Conclusion

The days presentations for component 2 was then wrapped up by Dr. Griffin where he reminded the participants of what they had been through in the last three days and gave a brief summary of the objectives of the different components and what was talked about and discussed in these components. He then talked about where to go from here with the information that they had acquired and the technology that they had been exposed to. All the country participants were encouraged to apply and use the acquired information to the development of their respective NIPs. He further encouraged them to use the new contacts to get information about the technical aspects of dioxins analysis or about awareness raising work. He finally thanked all the people who had contributed in making the two component of the workshop a success.

In response to the encouragement, Mr. Michael Vari from Vanuatu again spoke on behalf of the participants stating that the general consensus and feeling amongst the participants was that the objectives and aims of the technical and awareness raising components of the workshop had been satisfactorily and successfully met. He thanked SPREP, UNEP and all the other presenters for making the meeting such a interactive one that they felt they had actually gained a lot in developing proper awareness raising tools and coupled with the presentations from the previous two days on the technical aspects of dioxin analysis, they felt that they had been enriched and better informed about what they can do to progress the development of their respective NIPs, especially the dioxins and furans component.

He added that the friendship and camaraderie that was being developed amongst the various Coordinators and NCC members from the different countries from attending such gatherings was beginning to bear fruit because not only were they getting the technical information provided to them through these meeting but they are beginning to discuss amongst themselves assist one another on the problems relating to the development of their NIPs. He thanked UNEP, in particular and SPREP for providing an atmosphere that is conducive enough for such professional relationships to be developed.

7.0. Component 3 - Field Trips to green waste treatments

This component was organized and arranged by our second consultant, Dr. Bruce Graham.

The morning session of this component was spent visiting sites at Porirua. The first site visited was the recycling center called Trash Palace. At this center, participants were shown how part of a small community's solid waste was brought to this set up and sorted into things that could be salvaged and what could not be. The recycled material was then resold at a very reduced priced or arranged and organized into art, a process that was partially supported by the local Council.

The next site visited was the Glenview School in Porirua where the participants were introduced to the concept of worm farming. At this set up, participant saw how the left over or uneaten foods from students' lunch were taken and fed to garden worms that were kept in a boxed structures. The digested material from the worms, which is very rich in nutrients, was then used to spread in the school garden where the students grew vegetables. This was very practical scheme and was very much applicable to the participants.

The afternoon session saw a site visit to a commercial composting plant in Happy Valley outside Wellington. At the Living Earth Composting plant the participants were shown how green waste, especially cut trees and lawn trimmings were put through a process that turned them into nutrient-rich compost that was then sold to councils for spreading on large areas for their various activities such as beautification programme.

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Annex 2: Workshop Programme

	Sub-regional Workshop on Dioxins and furans information collection and management training of in the Pacific Islands Region - A Case study	
Wellington, New Zealand, 14-17 June 2004		

Monday 14 June	Introduction Venue: AgriQuality Conference Room
0900 – 0930	Welcome, Official Opening, Introductions and housekeeping / safety / Objective of component 1 of this workshop (SPREP)
0930 – 1000	Introduction to dioxins, furans and PCBs (What, where and why) (AgriQuality)
1000 – 1030	Tea/coffee
1030 – 1130	Introduction to dioxins, furans and PCBs (What, where and why) continued (AgriQuality)
1130 – 1230	Surveys and Preparation of a National Inventory (The New Zealand experience and outcome) (Ministry of the Environment)
1230 – 1330	Lunch
1330 – 1500	Sampling requirements and techniques (Ambient Air, Emissions, waters and effluents, soil, contaminated sites, food) (AgriQuality/K2 Environmental)
1500 – 1530	Tea/coffee
1530 – 1550	Test Methods (Standard Methods - Instrumental (Low and high resolution Mass Spectrometry) and bioassay) (AgriQuality)
1550 – 1615	Technology and expertise, accreditations, QA/QC AgriQuality
Tuesday 15 June	Venue: AgriQuality Conference Room
0900 – 1000	An Introduction to AgriQuality, its wider services and South Pacific Operations - (Food safety, biosecurity, laboratory services (food, environmental, GMO, Proficiency, pest, seed, forestry, apiary, horticulture, on-farm services) AgriQuality)
1000 – 1015	Tea/Coffee
1015 – 1230	Dioxins / furans / PCBs - sample preparation and analysis practical demonstration – (AgriQuality)
1230 – 1330	Lunch
1330 – 1430	Understanding test reports (AgriQuality)
1430 – 1445	Contacts for assistance (AgriQuality)
1445 – 1500	Lunch
1500 – 1600	Wrap-up of the Component 1 (SPREP/AgriQuality)
Wednesday 16 June	Portland Hotel Conference Room, Wellington
0900 – 0915	Objectives for this component the workshop (UNEP/SPREP)
0915 – 1000	BAT-BEP issues and Fiji Country Presentation – Vandana Naidu
1000 – 1030	Tea/Coffee
1030 – 1100	Awareness Raising Activities in New Zealand (Jonathan Coakley – Ministry of Environment)
1100 – 1200	Designing Effective Awareness Programmes: <i>steps for a strategic approach</i> (Seema Deo)
1200 – 1300	Lunch

1300 – 1430	NGO involvement in awareness raising (Live and Learn/PCRC/Greenpeace)
1430 – 1500	Tools and tactics: innovative examples from the region; delivery mechanisms – Samoan Government Example Samoan Representative Tools and tactics: innovative examples from the region; delivery mechanisms – NGO (PCRC) Example PCRC Representative
1500 – 1515	Tea/coffee
1515 – 1615	Country presentations (Country representatives – FSM, PNG, Samoa, Tonga, Tuvalu & Vanuatu)
1600 – 1610	Wrap up of Component 2 of the workshop (SPREP)
Thursday 17 June	Venue
0800 – 1200	Site visits to Trash Palace and Glenview School at Porirua to see recycling and worm farming
1200 – 1300	Lunch
1300 – 1530	Site visit to the Living Earth Composting plant at Happy Valley outside Wellington.

Annex IV

**The Basel Convention Coordinating Centre for Training and Technology
Transfer for Latin America and the Caribbean-
Montevideo, Uruguay**

Case Study Report

OCTOBER 2004

I. EXECUTIVE SUMMARY

The Secretariat of the Stockholm Convention on Persistent Organic Pollutants is conducting several case studies on regional and sub regional centres for the purpose of delivering capacity-building and transfer of technology in accordance with article 12 of the Stockholm Convention and with a view to contributing to the feasibility study provided by the Convention's Intergovernmental Negotiating Committee in Decision INC-6/9.

The Basel Convention Coordinating Centre for Training and Technology Transfer for Latin America and the Caribbean, hosted by the Government of Uruguay, has carried out one of the above mentioned case studies on the regional delivery of technical assistance.

For this study, Obsolete Pesticides, a subject of interest for the region in the framework of the Stockholm Convention, was selected. The case study was aimed at transferring knowledge and exchanging experiences through a "Field Visit in Venezuela" and the elaboration of a "Practical Guidance for the Environmental Sound Management of Stockpiles Pesticides in Latin America and the Caribbean Countries".

Venezuela was the country selected for the field visit because of its concrete experience in the conditioning of 1,000 tons of obsolete pesticides, and because the whole process had been suitably documented. The activity, which lasted three days, was organized together with the Ministry of Environment and Natural Resources of Venezuela, and consisted of a workshop, a visit to a warehouse of already conditioned obsolete pesticides and an accident simulation.

There were participants of 10 countries related to the subject and they were selected by the Focal Point of Stockholm Convention or by the responsible authority of the National Implementation Plan.

The assessment of the participant on the activity was regarded as very good to excellent in all questions.

On the other hand, the guidance mentioned above was elaborated aimed at technicians who are somehow related to some of the aspects of the management of obsolete pesticides. Such document is based on the compilation of multiple sources, and it particularly responds to the concerns which arose during the workshop, taking into account its recommendations. The preparation of the guidance corresponds to one of the strategies of the Centre, which is to achieve a larger impact of the activities and projects in order to generate knowledge that is both harmonized and available for transfer.

One of the major challenges in the execution of the Case Study, was the implementation of the field visit in another country different from the Centre headquarter. This meant reaching agreements with the institution, coordinating the agenda and the logistic with technical team of an institution of another country, including funding transfer from the Centre to the Venezuelan Ministry of Environment. The result of all this procedure is considered as a complete success.

During this period the Centre went through a transition period which started with an agreement signed on 29th July 2004 with an institution which will act as host as for the premises and administrative related issues. Due to this, new operative procedures had to be adjusted and the change of premises was carried out to the new headquarter. These changes, which will turn out un-doubtedly positive for the future of the Centre, had a concomitant drawback generating some delays in the execution of the case study.

Another relevant and unforeseen issue to mentioned was the occurrence of Ivan Hurricane over the region, delaying some participants' arrivals and preventing others from arriving. Besides, due to the weather conditions, the simulation and the visit to the restocked obsolete pesticides warehouse had to be redesigned by the local collaborators, and was successfully solved.

Finally from the Centre point of view, the following overall evaluation can be concluded:

1. The Venezuela Field Trip was successfully undertaken both at the organization and technical level. This is also reflected at the participants evaluations.
2. The elaboration and following dissemination of the "Practical Guidance for the Environmental Sound Management of Stockpiles Pesticides in Latin America and the Caribbean Countries" very much increases the scope and the impact of training and exchange of experiences in relation to obsolete pesticides within the region.

II. COORDINATING CENTER PRESENTATION

LEGAL STATUS

The Coordinating Centre for Training and Technology Transfer for Latin America and Caribbean was established according to a Framework Agreement signed between the Uruguayan Government and the Secretariat of the Basel

Convention on behalf of the Conference of the Parties, on January 30th 2004 in Montevideo. It has been established as national institution with a regional role operating pursuant to the legislation and the regulations of the country.

The Centre shall coordinate the Basel Convention Regional Centres established in Argentina, El Salvador and Trinidad and Tobago.

HEADQUARTERS

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The Technological Laboratory of Uruguay is a relevant institution in the fields of science, technological development in different areas of production and in management systems. It has an important infrastructure which includes laboratories, conference rooms as well as it won ISO 9001:2001 Quality Management System certified by the Swiss Association for Quality (SQS) and more than 200 tests accredited by the United Kingdom Accreditation Service (UKAS).

HUMAN RESOURCES

Director: Mrs. Silvia Aguinaga, Chemical Engineer

Secretary: Mrs. Marsha Marroche

Collaborators: The Centre is related to a highly qualified group of experts who have contributed with their cooperation in the development of activities and projects and who are closely linked to the Centre's vision and are acquainted with the different aspects of the implementation of the Convention in the region.

- Ms. Jacqueline Alvarez, Chemist Pharmacist. She has participated in the Centre's activities since 1995 and is the Chief of the Hazardous Substance Department in the Ministry of Environment.
- Mr. Marcelo Cousillas, Lawyer, International Consultant in Environmental Legislation, Professor of Environmental Law, State University.
- Mr. Fernando Lugris, BA in International Relation, has a vast experience in the negotiation of multilateral agreements, especially chemicals.
- Mr. Javier Martínez, Chemical Engineer, MSc consultant in the environmental area, expert in hazardous waste and project direction.
- Ms. Marisol Mallo, Chemical Engineer, advisor, expert in hazardous waste and clean technologies.
- Ms. Rosario Lucas, Chemical Engineer, expert in environmental laboratories and PCB management.
- Ms. Ana Salvarrey, Chemical Engineer, expert in contaminated sites.
- Ms. Pablo Gristo, Chemical Engineer, expert in contaminated sites.
- Mr. Carlos Saizar, Chemical Engineer, MSc. Environmental technologies and cleaner production
- Ms. Liliana Borzacconi, Chemist, MSc-PhD, expert in waste and training programmes.
- Ms. Claudia Cabal, Engineer, project management and PCBs implementation plans.
- Mr. Diego Blanco, administration and bulletin edition.

FINANCIAL RESOURCES

Funding for the 2003-2004 period has been attained but not yet completely executed, there is a US\$ 250,000 plus a USD 76,600 contribution from the Basel Convention Trust Fund.

Funding for 2005-2006 is estimated in USD 929,600 of which USD 95,600 are a contribution of the Uruguayan Government to the operation of the Centre, apart from contributions in kind. These contributions are made by the Ministry of Environment and the Technological Laboratory of Uruguay.

CURRENT COOPERATION

The Centre is working together with the following partners:

Ministry of Housing, Land Planning and Environment

Technological Laboratory of Uruguay

International Development Research Centre (IDRC) and the Environmental Management Secretariat (in Spanish SEMA) of Canada

UNEP Chemicals,

Swiss Government

Ministry of Environment of Brazil

FAO

Secretariat of Basel Convention

Actually the Center is participating in activities related to the preparation of technical assistance under the Rotterdam Convention.

It is expected to receive technical and/or financial cooperation from other countries within the region, institutions, universities and multilateral agencies.

VISION

The vision of the Coordinating Centre is to consolidate, together with the Regional Centres, a reference institution which leads the Latin American and the Caribbean countries in the process of capacity building, strengthening and specialization, in the aim of minimizing health and environmental risks in the chemicals and hazardous waste integrated management, within the framework of sustainable development.

TARGET GROUPS

National and municipal authorities. Focal Points and Competent Authorities, public entities both at national and municipal level connected to environmental, port, customs and sea police issues.

Productive and service sectors. Industries, agricultural activity, mining, trade chambers, industrial associations, laboratories.

Sector linked to waste management. Companies related to the transportation, treatment, recycling, storage, final disposal and transboundary movement of hazardous waste.

Scientific community. Universities, technological institutes, research centres and laboratories.

Civil society. Non-governmental Organizations, teaching centres and general public.

ACTIVITIES UNDERTAKEN OR STILL BEING PERFORMED IN 2004

The following activities have been organized under the “development of synergies with chemicals and clean technologies” line of action:

Workshop: “*Coordinated Implementation of the Basel, Rotterdam and Stockholm Conventions*”, held in January 2004 in Montevideo, with the participation of 28 countries of Latin America and the Caribbean.

Pilot Project on the “Minimization of impacts generated by hazardous wastes”, activity related to clean technologies and it is starting together with the National Centre for Clean Technology of Brazil;

“Survey of capacity for destruction of obsolete pesticides and remediation of contaminated sites”, that shall be started shortly through the signature of an agreement with FAO.

Regarding the line of action “capacity building” the activities under “Training of municipal technicians in environmentally sound management of hazardous waste” project are being implemented with the cooperation of the International Development Research Centre (IDRC). This project will set the grounds for future training proposals which should consolidate sustainability in the region.

Another basic activity the center is dealing with, is related to keeping the state of art to those aspects of implementation and compliance of conventions, plans or development programmes and to the identification of needs and technology transfer. With this purpose, in addition to information obtained through regional workshops, the centre makes regular consultations about specific issues. For instance, in January 2004 a consultation was made through a questionnaire sent to 33 countries prior to the event and further information was gathered during the presentations made by the delegates and the discussions during the workshop.

The objectives of the questionnaire, which was based on the integrated management of chemical substances and waste, were:

- To assess the priorities and needs in chemicals and waste management;
- To identify advances, such as plans, strategies and co ordinations;
- To strengthen exchange and cooperation.

Answers were submitted by 20 countries and the analysis allowed the Centre to identify the “opportunities for improvement” at the different levels of action, assessing the strategies, the tools and the procedures used in chemicals and waste management.

Business Plan has been prepared for the 2005-2006 period

Within this period the strategies of the former plan shall be strengthened, aiming at a larger impact of the activities and projects in order to generate knowledge that is not only harmonized but available for transfer. Furthermore, mechanisms shall be explored to make some training activities, at least partly, sustainable in time.

III. CASE STUDY

This activity is the implementation of a case study on technology transfer to selected countries within the Latin America Region as part of a feasibility study on technical assistance that the Secretariat of the Stockholm Convention on Persistent Organic Pollutants is conducting on regional and sub regional centres for the purpose of facilitating capacity-building and transfer of technology in accordance with article 12 of the Stockholm Convention and with a view to contributing to the Convention's Intergovernmental Negotiating Committee in Decision INC-6/9.

For this study, Obsolete Pesticides, a subject of interest for the region in the framework of the Stockholm Convention, was selected. The case study was aimed at transferring knowledge and exchanging experiences through a "Field Visit in Venezuela" and the elaboration of a "Practical Guidance for the Environmental Sound Management of Stockpiles Pesticides in Latin America and the Caribbean Countries".

Venezuela was the country selected for the field visit because of its concrete experience in the conditioning of 1,000 tons of obsolete pesticides, and because the whole process had been suitably documented. The three day activity was organized together with the Ministry of Environment and Natural Resources of Venezuela, which has a qualify team of experts in obsolete pesticides. A workshop, a visit to a warehouse of already conditioned obsolete pesticides and an accident simulation were the three main activities undertaken from 8th to 10th September in Caracas City, Venezuela.

Experts related to the subject from Argentina, Brazil, Chile, Cuba, Ecuador, El Salvador, Mexico, Nicaragua, Uruguay and Venezuela participated in this training. They were selected by the Focal Point of Stockholm Convention or by the responsible Authority for the National Implementation Plan.

CASE STUDY SELECTION CRITERIA

To select the experience to transfer, the following things were taken into consideration:

- i. A common problem to the countries in the region was to be undertaken
- ii. A valuable regional experience has already been identified;
- iii. A opportunity to train and Transfer of Technology to enhance intra regional cooperation and promotion of conventions synergies
- iv. Most countries in the region are now undertaking their national implementation plans, and plans for the elimination of pesticides stockpiles under the Stockholm Convention are included.

Under these terms the Regional Coordinating Centre identify Venezuela's experience in developing and solving a problem related to the management and elimination of pesticides stockpiles in a way to minimize health and environmental impacts. Venezuela carried out a project entitled "Inventory, characterization and restocked of stockpiles" where they developed a methodology and procedures. Due to that experience, Venezuela has now a complete inventory and has conditioned, in an environmentally sound way, 1,000,000 kg of pesticides (composed of the following POPs 1,500 kg DDT, 29,000 kg toxaphene, 10,000 kg aldrin, 250 kg chlordane, 46,500 kg and 1,600 liters endrin and lindane among others). This experience is well documented, and as output it also has detailed procedures and knowledge that can be transferred.

PROPOSAL

The attached proposal was elaborated and accepted by the Secretariat of Stockholm Convention. The proposal includes a field trip and a preparation of a document containing guidelines. This goes along with the Centre's strategy and with the aim to contribute to larger and sustainable impacts in order to generate knowledge that is both harmonized and available for transfer.

Then, the proposal that put together experts and introduces them into discussion of a valuable experience has the aim to harmonize and disseminate knowledge.

A Memorandum of Understanding, to undertake this activity, was signed 10th August 2004.

OBJECTIVE

Train, transfer of technology and disseminate information for the environmental sound management of pesticides stockpiles taking as an example the Venezuela's experience and sharing it with the Latin America countries.

IMPLEMENTATION

Once the case study was selected, the Coordinating Centre did the following:

1. Agenda proposal and discussion with experts of the Ministry of Environment and Natural Resources of Venezuela.
2. Identification of countries to be chosen

The Centre chose 10 countries to participate in this case. The mentioned countries were selected because not only their expertise or advances in their inventories, knowledge but also taking into consideration that some of them were going to share their success and failures, others were going to show their methodologies or their concern in dealing with this issue but certainly all of them were going to learn from the problems faced.

3. Communications to appoint participants

After deciding which countries were going to be invited, the Centre started communication through initial contact letters of invitation with the criteria to help countries in the designation process. These letters were sent to the Stockholm Focal Points. The selected countries nominated two delegates.

Steps 2 and 3 meant that delegates from Argentina, Brazil, Chile, Cuba, Ecuador, El Salvador, Mexico, Nicaragua, Uruguay and Venezuela participated in the Workshop

4. Reservations

Every time a country nominated a delegate a reservation was made, the Centre sent to the travel agency and to the Venezuela's counterpart received the name and did the appropriate ticket or room reservation.

5. Experts preparation for the training

Immediately after the experts were appointed the hired consultant began to exchange views and send them some issues that were going to be dealt during the training week and got to know their field of expertise and experience. In this way he started work with each of all experts, giving them not only a concrete idea of what to expect but also what they were expected to present or share.

6. Activities in Venezuela

- i. A *workshop* where Venezuela's experience was shown analyzed and discussed among all participants using their own experiences.
- ii. A *visit to a warehouse* took place. There, experts from Venezuela shared their experience and showed the methodology they used, the security measures and the corresponding protocols, as well as the place conditioning for the obsolete pesticides.
- iii. An *accident simulation* at the warehouse was recreated jointly by Venezuela's experts and the enterprise that was initially hired to restock the place.

The report for these activities is attached in Appendix II, Activities report.

7. Participants evaluation

The evaluation of the Workshop was done through an anonymous questionnaire, and the results are shown in item 4 of Appendix II Workshop Report, and the individual evaluation forms are attached.

8. A guidance document was prepared

"Practical Guidance for the Environmental Sound Management of Stockpiles Pesticides in Latin America and the Caribbean Countries" is the name of the document prepared. The guidance contains practical ways to environmentally sound manage pesticides stockpiles among developing countries, taking into account their management as hazardous wastes, storage issues, local treatments, exportation processes, prevention and obligations under Basel, Stockholm and Rotterdam Convention. It is aimed at technicians who are somehow related to some of the aspects of the management of obsolete pesticides. This guidance was elaborated after the field trip, it tries to give answers to the concerns that arose during the workshop and it is based on the compilation of multiple sources, taking into account the workshop recommendations.

The preparation of the guidance corresponds to one of the strategies of the Centre, which is to achieve a larger impact of the activities and projects in order to generate knowledge that is both harmonized and available for transfer.

9. Final Report . It includes the technical and financial report.

CHALLENGES AND RELEVANT ISSUES

Even though the Centre tried to foresee things, some special situations, before and during the case study, arose and the Centre solved them in the way explained as follows. Only the most relevant ones are mentioned.

1. The most important challenge the Centre faced was that the Field Trip took place in a different country from the Centre's headquarter. This means:

- An agreement with Venezuela. The Centre together with the Ministry of Environment and Natural Resources of Venezuela decided to exchange letters showing the interest and commitment of both parts to this activity.

- Activities and logistics arrangements. The Centre supported by the hired Consultant and together with the Venezuela's experts coordinated the main issues and separated tasks. Venezuela's experts dealt with local aspects of coordination meanwhile the Centre put its efforts in the general aspects supervising the whole process.
- Financial issues: The Centre transferred to the Ministry of Environment the corresponding local funds to enable Venezuela's activities. The air tickets arrangements were done by the Centre, through a travel agency sited in Montevideo.

The Centre considers these activities were successfully achieved.

2. On the other hand, during this period the Centre went through a transition period which started with an agreement signed on 29th July 2004. This agreement was signed between the Ministry of Environment on behalf of the Uruguay Government and LATU, a national institution, which will act as host for the Centre as for the premises and administrative related issues. Due to this, new operative procedures needed to be adjusted and the change of premises was carried out to the new headquarter during the Case Study execution time. These changes, which will turn out undoubtedly positive for the future of the Centre, had a concomitant drawback generating some delays in the execution of the case study.

3. Finally another relevant and unforeseen issue mentioned was the occurrence of Ivan Hurricane over the region during of Venezuela's activities. Due to the fact that some flights were cancelled and delayed, and the airport was closed, some participants were late and some others could not arrive. For those participants arriving late a video was shown, explaining the Venezuela's experience and letting them to continue work with the rest of the team.

Also because of the Hurricane, heavy storms affected Venezuela, not only Caracas, but also Tucuyito where the warehouse is placed. Even more the simulation accident prepared by Venezuela, could not be done outside as expected, and it had to be redesigned by the local collaborators.

The Centre considers it was successfully solved.

IV. OVERALL EVALUATION

CAPACITY BUILDING MODALITY

The Centre sees that the proposal created a very participative atmosphere, with a useful and complete agenda which includes presentations, visits, accident simulations and generated a very rich and active discussion that kept the participants attention during the three days. This is reflected in the evaluation that the participants filled after the workshop and field trip.

DISSEMINATION

The Practical Guidance elaboration and distribution was elaborated according to the needs detected during the workshop. This document will be distributed to all participants and for now on at all related events the Coordinating and Regional Centres within the region will attend. It is also going to be distributed among all Spanish speaking countries Focal Points. In the future it might be considered a translation if the document is seen as a useful tool also for English speaking countries and the translation will also be subject to available funds.

The Case Study proposed by the Centre including the elaboration of a Practical Guidance and its dissemination significantly increases the scope of the training activities and the exchange of experiences in the region.

TECHNICAL POINT OF VIEW

All the delegates that participated were related to different aspects in the pesticides stockpiles management. Each of them were experts in different areas, in general none had a complete life cycle approach. This happened to be very useful because all of the participants found new knowledge and each of them shared their experiences that were new for somebody and they finally get a complete idea of all stages related to stockpiles management.

LOGISTIC ISSUES

Some difficulties were encountered during this case study, but all of them were just an opportunity for the Centre to make a new planning and finally helped to increase the experience and knowledge the Centre has not only of the region, but also in the organization of such kind of activities. The most important thing is that all the objectives were well fulfilled and the outputs reached.

PARTICIPANTS

In general terms, the opinion of the participants was quite even, with marks ranging from very good to excellent in all questions of evaluation.

CENTRE'S ROLE

The case study activities are within the framework of the Centre's vision, roles and lines of actions including the synergies strategy to the chemicals and wastes management.

From the Centre point of view its role was very important during the whole process adding value to the activity. The Centre showed its knowledge, experience in dealing with contingencies, and capacity to convocate and get countries into a useful discussion.

FINANCIAL REPORT

The financial report is attached to this document in Appendix I. The most significant differences appear in lines regarding air tickets and DSA, between the estimated and the executed budget. This is due to the fact that some invited experts were not able to attend because of the Ivan Hurricane.