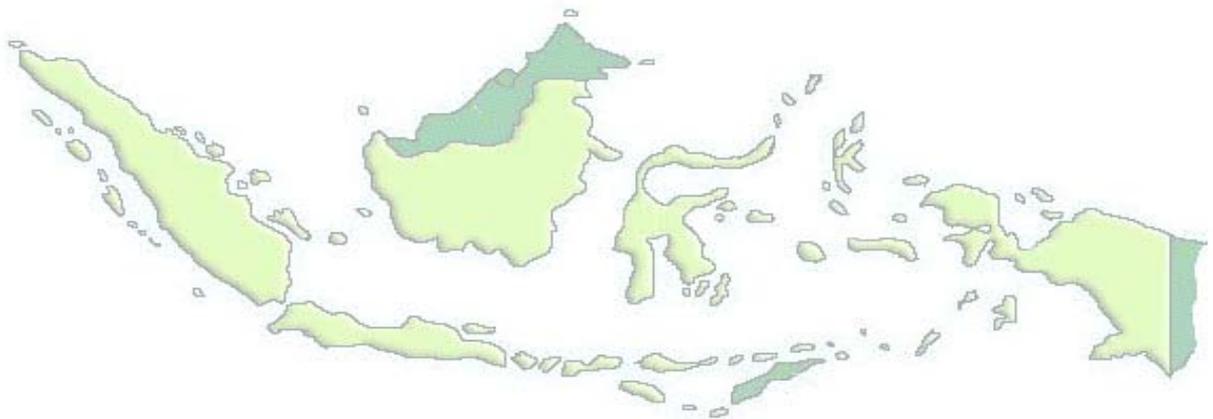


English Version



**National Implementation Plan on
Elimination and Reduction of Persistent
Organic Pollutants in Indonesia**



THE REPUBLIC OF INDONESIA

July 2008

EXECUTIVE SUMMARY

Stockholm Convention is a global environment agreement developed by the support of UNEP (The United Nations Environmental Program) and was opened for signature on 23 May 2001. Aims of the Convention¹ are to protect human health and environment from the adverse impact of POPs (persistent organic pollutants). Indonesia has signed the Convention, and is in a process for ratification and one of the requirement is the prepared a National Implementation Plan. The NIP will be delivered to the Conference of Party (COP) in two years after Indonesia binds to the Convention.

The Republic of Indonesia is committed to prepare its NIP as a work program in developing and implementing policies, regulations, institutional efforts, capacity building in institutional and human resources, investment program, strategy, and programs on actions to comply with Convention obligations in reducing or eliminating POPs releases in Indonesia. The NIP was prepared based on the priority setting agreed by the stakeholders (consisted of various sectors, universities, and non-government organizations) in March 2005. A number of meetings until November 2007 were held to consult the NIP with the stakeholders.

The government of Indonesia decided to implement the NIP after the Stockholm Convention has been ratified with a target to eliminate POPs by involving all stakeholders. Reasons behind the commitment are (1) POPs chemicals are still used in industries, namely PCBs (polychlorinated biphenyls) and POPs residues are still detected in the environment in Indonesia, (2) the negative impact caused by POPs exposure has not been widely known by the community, (3) and the capacity and capability in POPs management are still limited.

Stockholm Convention requires that Parties must

- 1 Endorse actions to reduce or eliminate releases from intentional production and use as chemicals (aldrin, chlordane, DDT, dieldrin, endrin, heptachlor, mirex, toxaphene, hexachlorobenzene, and PCBs);
- 2 Develop and implement action plans to identify sources and reduce unintentional POPs releases (PCDDs/polychlorinated dibenzo-*p*-dioxins, PCDFs/poly-chlorinated dibenzofurans, PCBs, and HCB);
- 3 Endeavor to reduce or eliminate UPOPs/unintentional POPs releases
- 4 Endeavor to reduce/eliminate POPs releases from chemical stockpiles and wastes;
- 5 Exchange information, raise awareness, and increase public education;
- 6 When appropriate, develop strategies to identify all types of POPs and product containing POPs;
- 7 Conduct research, development, and monitoring; and
- 8 Develop a plan – the NIP- within two years after it has ratified the Convention, which indicates how the country is to comply with the Convention

Indonesian Law No. 23/1997 regarding Environment Management gives authority to the Ministry of Environment (MoE) to manage the environment at the central and regional levels. The management of environment includes controlling and developing of policies in utilization of natural resources, controlling activities that cause social impact, including management and control of hazardous and toxic materials (B3) and the wastes. To implement the law, GR (Government Regulation) No. 74/2001 regarding the management B3 has been enacted. This regulates the prohibition of use of 10 POPs chemicals in Indonesia. In addition, decree of the Head of Bapedal No. Kep-03/Bapedal /09/1995 concerning technical requirements for B3 waste processing has regulated the regulatory limits in efficiency of destruction and removal of POPs in incinerators. Parameters under the regulation are POHC (principle organic hazard constituents), PCBs, PCDDs, and PCDFs.

An inventory carried out in 2003 revealed that there was no import, export, and stockpile of POPs pesticides. Sites heavily contaminated by DDT, HCB, and POPs pesticides have been

¹ It refers to Stockholm Convention, except that it is written specifically.

identified. A preliminary inventory on PCBs showed that approximately 6% of the electrical equipment contained PCBs and 17% of them are highly contaminated. From the preliminary survey, it was estimated that approximately 23108 tons of transformers oil were contaminated by PCBs. Releases of PCDDs/Fs using the Standardized Toolkit in the year 2000 reached 7.352 kg TEQ (Toxicity Equivalent). Four sources with high emission (in g TEQ and %) were (a) production and use of chemical products and consumption goods (60.4%); (b) uncontrolled burning (22.3%); (c) ferrous and non-ferrous industries (12.8%), and (d) power plant (2.1%). Most of the releases (48.2%) was to products, 24.1% to air, and 20.7% to residue.

Integrated monitoring of POPs releases and their effects on human health and the environment have not been regularly undertaken by the designated institutions. The status of POPs chemicals indicated that the data are scattered and incomplete.

A number of laboratories can be found all over the country, under various institutions. The Ministry of Agriculture manages 6 accredited laboratories for certain parameters in analyzing POPs residues.

The inventory of POPs revealed certain gaps which impede upon the successful implementation of the Convention. To overcome these gapes the following measures are to be taken:

- 1 Evaluate legislation and policies regarding POPs and decide the necessary instruments to make them effective,
- 2 Harmonized the GR No. 74/2001 concerning POPs management, which can be in the forms of ministerial decree of the corresponding ministries. GR related to marine and soil, marine, and air pollution and regulation at ministerial level in sectors of agriculture, health, and industries should be clear in order to comply with the Convention obligations. As the consequence, regulations at provincial and regency/municipal must be reviewed as well.
- 3 Organize the establishment of law instruments as necessary to comply with the Convention, *inter alia* the regulatory limits;
- 4 Complete inventory on POPs compounds (import/export, distribution, use, stockpile, and disposal);
- 5 Organize strengthening in infrastructure, capacity, and ability in (a) obtaining valid and reliable data, (b) integrating monitoring and risk assessment caused by POPs exposure, and (c) conducting communication and education about the harmful effects of POPs and the risks they pose on the ecosystem and human health,
- 6 Increase community awareness of the importance of reduction and elimination of POPs in accordance with ESM (environmentally sound management),
- 7 Coordinate research & development on the status and distribution of POPs in the tropics, alternative techniques or chemicals for POPs substitutes and alternatives, and for BAT and BEP,
- 8 Coordinate the national implementation among all stakeholders to comply with the Convention,
- 9 Coordinate the review every 5 years and report it to the Secretariat of POPs, and
- 10 Describe the task and authority of the NFP (national focal point) to ensure a clear mechanism in communication between the NFP, the Convention Secretariat, and between the NFP and other stakeholders.

Action plans to be implemented to comply with the Convention in Indonesia:

- 1 Starting in 2008, after the Stockholm Convention has been ratified by the government of the Republic of Indonesia, institutional strengthening shall be initiated by establishing B3 Committee that will give advices and consideration to the government concerning POPs management and the implementation of Stockholm Convention. Simultaneously, legislation shall be strengthened, particularly the GR No. 74/2001 regarding B3 management, followed by a review on other government regulations and ministerial decrees. Following the strong institutions and legislations, control on prohibition of production, export-import, distribution, and use of POPs can be carried out.
- 2 Reduce or eliminate release from production and use of POPs by preventing illegal distribution, extend the inventory, and seek alternatives for POPs chemicals.

- 3 Prevent and control illegal POPs pesticides distribution, apply integrated pest management (IPM) and integrated vector management (IVM) to reduce the dependency of the community on synthetic pesticides, and make inventory on contaminated sites that needs remediation. Since IPM and IVM are not directly related to POPs control, these two measures can be commenced not in the first years of NIP implementation.
- 4 Strengthen infrastructure capacity and capability (including accredited laboratories) and human resources to be able to conduct extensive inventory on PCBs and equipment and materials containing PCBs with a target to complete elimination by 2020. Simultaneously, registration and labeling of transformers and capacitors shall be immediately carried out in the second year of NIP implementation as well as developing of non combustion techniques to destroy PCBs according to ESM.
- 5 Control distribution and illegal trade of DDT, followed by inventory of ex-warehouses of DDT, and remediate the contaminated sites.
- 6 Not to register of exemption in using DDT as pesticide in agriculture and in combat of malaria.
- 7 Reduce and eliminate unintentional POPs (UPOPs) releases by
 - Preparing legislation on prevention, control, and reduction of UPOPs, including regulatory limits for PCDDs/Fs.
 - Determining PCDD/Fs releases in industrial zones and dense populated areas in addition to the establishment of accredited laboratories for UPOPs analysis. Therefore, PCDDs/Fs releases by public and private sectors can be reported annually.
 - Determining of BAT and BEP, initiated by preparation of guidelines and training on BAT/BEP for incinerator operators and cement kilns, including separation of materials that are PCDDs/Fs precursors,
 - Formulating research and education programs to prevent open burning and shifting current agricultural practices towards alternative waste management practices.
 - Establishing BAT/BEP pilot project for source categories of Part II Annex C of the text of Convention: (a) domestic waste processing in dense populated areas; (b) specific incinerators for medical waste; (c) cooperation with cement industries to use the kiln for destructing POPs; and (d) survey on additives used in paper manufacturers. UPOPs handling requires strengthening some designated laboratories, therefore, the implementation will be effective after the third year.
- 8 Identification of stockpiles and wastes containing POPs and subsequently manage them by ESM in terms of handling, disposal, and transboundary movements (related to Basel Convention), for example, by remediation in management of POPs contaminated sites. Strengthening of infrastructure and human resources related to laboratories to analyze POPs are needed to support identification process. Except for UPOPs, these action plans will be started in the second year. Identification of POPs chemical status must also be anticipated, as well as accumulation of POPs in human body. Hence, the impacts of POPs on human health can be assessed and monitored following the establishment of UPOPs laboratories.
- (9) Survey on HCB to identify stockpiles, used equipment, and wastes, will be carried out in the second year as the volumes and the distribution are not clearly known.
- (10) Manage the stockpiles in efficient and environmentally sound manner by preparing guidelines, search for techniques in accordance with ESM, provide facilities for destruction of equipment containing PCBs.
- (11) Identify contaminated sites (Annex A, B, C) and remediate them in environmentally sound manner.
- (12) Facilitate or exchange information and involve stakeholders, by establishing B3 Committee consisting of representatives from relevant institutions as stipulated in GR No. 74/2001. The Committee will be responsible for (i) coordinating various activities concerning POPs management, including exchange of information among stakeholders, (ii) increasing capability to control and to evaluate the programs on reduction and elimination of POPs, (iii) reviewing all regulations regarding POPs, and (iv) giving advise to the government concerning status of chemicals in POPs categories.
- (13) Increase public awareness and capability by disseminating information concerning POPs through the following steps:

- Gather and disseminate information on POPs.
 - Determine and educate target groups responsible for information delivery and provide relevant information for that purpose.
 - Incorporate awareness on POPs as material for public education and coordinate the implementation.
 - Give training for stakeholders
 - Provide incentives or awards for manufacturers or individuals in reducing or eliminating POPs releases in their respective work units.
 - Increase public participation in addressing POPs.
- (14) The NFP facilitates the evaluation of the effectiveness of the Convention by preparing progress reports on reducing and eliminating POPs in Indonesia. The evaluation shall be carried out by the COP.
- (15) The MoE as the NFP also provides report to the COP regarding improved legislation, updated statistical data on the quantity of imported POPs, efforts in improving human resources, evaluation on policies and recommendations to the government as well as results of inventories on POPs. The reports shall be submitted in the third year, and every 5 years afterwards (except for DDT) . Information in the country shall be gathered a year prior to the report submission.
- (16) Increase research, development, and monitoring activities by involving universities and other research institutions in the country, according to the following steps: establish a committee on research and development, determine criteria and mechanism for competitive-based research, implement research and development, and disseminate the results.
- (17) Activities to eliminate POPs are implemented after NIP has been agreed by all stakeholders. The total budget for the implementation in the first six years will be Rp1 158 679 803 000 (equivalent to USD 129 millions).

The NIP, which is a commitment of all stakeholders (Ministry of Environment, Ministry of Agriculture, Ministry of Health, Ministry of Industry, Ministry of Energy and Mining, Ministry of Transportation, Ministry of National Education, Ministry of Defense, Ministry of Communication and Information, Ministry of Forestry, Ministry of Trade, Ministry of Home Affairs, Directorate General for Customs, Agency for National Standards, Agency for Research and Technology Development, Agency for Drug and Food Control, Center for Impact Control and Environment Assessment), regional laboratories, research institutions, and universities), and the relevant institutions will be updated every two years as required by the COP to ensure the relevance of the action plans.

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ABBREVIATIONS

3R	Reduce, Reuse, Recycle
ADI	Allowable Daily Intake
ALS	Australian Laboratory Service
APBD	Local Government Budget
APBN	Central Government Budget
ASEAN	Association of South East Asian Nations
Aspembaya	Merchants & Users of Hazardous Substances Association
B3	Hazardous and Toxic Materials
Bappenas	Agency for National Development Planning
BAT	Best Available Techniques
BBTKL	Technical unit for environmental health
BEP	Best Environmental Practices
BOD ₅	Biochemical Oxygen Demand
BPLH	Research Institute for Environment
BADAN POM	Agency for Drugs and Food Control
BPPT	Agency for Research and Technology Development
BPS	Statistical Bureau
BSN	National Standardization Agency
BSN	Agency for National Standards
CAS	Chemical Abstracts Service
CFC	Chlorofluorocarbons
CH ₃ Br	Methyl bromide
CH ₄	Methane
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CLC	Capacity Limiting Constituents
ClO ₂	Chlorine dioxide
CMS	Convention on the Conservation of Migratory Species of Wild Animals
CNP	Chloronitrophenene
CO	Carbon monoxide
CO ₂	Carbon dioxide
COD	Chemical Oxygen Demand
COP	Conference of Parties
CTC	carbon tetrachloride
DBD	Defoamer agent promoting dioxins
DBF	Defoamer agent promoting furans
DDT	<i>p, p'</i> -DDT (4,4'-DDT) = 1,1,1-trichloro-2,2-bis(4-chlorophenyl)ethane
DGC	Directorate General for Customs
DRE	Destruction and Removal Efficiency
DRN	National Research Board
EIA	Environmental Impact Assessment
EMRL	Environmental Maximum Residue Limit
EP	Combustion Efficiency
EPE	Environment Performance Evaluation
ESM	Environmental-Sound Manner
FAO	Food and Agriculture Organization
GDP	Gross Domestic Product

GEF	Global Environmental Facility
GNI	Gross National Income
GNRLH	National Movement for Land and Forest Rehabilitation
GR	Government Regulation
HC	Hydrocarbons
HCB	Hexachlorobenzene
HCl	Hydrochloride acid
HS	Harmonized System
IPCS	International Program on Chemical Safety
IPG	Gender Parity Index
IPLP	Association of Indonesian Field Extension Workers
IPM	Integrated Pest Management
ISO	International Standardization Organization
I-TEQ	International Toxicity Equivalent
IUCN	The International Union for the Conservation of Nature and Natural Resources)
IVM	Integrated Vector Management
JICA	Japan International Cooperation Agency
KLH	MoE, The Ministry of Environment
LB3	Hazardous and Toxic Wastes
LFPR	Labour Force Participation Rate
LIPI	Indonesian Science Academy
MoA	Ministry of Agriculture
MoC&I	Ministry of Communication and Information
MoD	Ministry of Defense
MoE	Ministry of Environment
MoE&M	Ministry of Energy and Mining
MoF	Ministry of Forestry
MoH	Ministry of Health
MoHA	Ministry of Home Affairs
Mol	Ministry of Industry
MoNE	Ministry of National Education
MoT	Ministry of Trade
MoTransp	Ministry of Transportation
MRL	Maximum Residue Limit
MSDS	Material Safety Data Sheet
N ₂ O	Nitrite oxide
NGO	Non-Governmental Organisation
NIC	Newly Industrialized Country
NIP	National Implementation Plan
NO ₂	Nitrogen dioxide
O ₂	Oxygen
O ₃	Ozon
ODS	Ozone Depleting Substance
Pb	Lead
PCBs	Polychlorinated biphenyls
PCDDs	Polychlorinated dibenzo- <i>p</i> -dioxins
PCDFs	Polychlorinated dibenzofurans
PCP	Pentachlorophenol
Pertamina	State Enterprise for Oil and Natural Gas
PFC	Perfluorocarbons
PHT-PR	Integrated Pest Management for Small-Holder Plantation
PLN	State Electric Company
POHC	Principal Organic Hazard Constituents
POPs	Persistent Organic Pollutants
POPT	Extension worker for plant pest
PPL	Agriculture extension worker
PPLH	Environmental Research Centre
PPLI	PT Prasadha Pamunah Limbah Industri
PPM	Eradication of Infectious Diseases
PPNS	State-employed investigator
Pusarpedal	Center for Impact Control and Environment Assessment (Pusat Sarana Pengendalian Dampak Lingkungan)
QA	Quality Assurance

QC	Quality Control
SAICM	Strategic Approach to International Chemicals Management
SF ₆	Sulfur hexafluoride
SLPHT	Field School for Integrated Pest Management
SO ₂	Sulphur dioxide
SOP	Standard Operating Procedure
TCA	Trichloromethane
TCLP	Toxicity Characteristic Leaching Procedure
TDI	Tolerable Daily Intake
TDS	Total Dissolve Solids
TEQ	Toxic Equivalent
THC	Total Hydrocarbons
TPA	Final disposal site, final dump site
TPS	Temporary dump site
TSS	Total Suspended Solids
UKL-UPL	Environment Management Effort-Environment Monitoring Effort
UNEP	United Nations Environmental Programme
UNFCCC	United Nations Framework Convention on Climate Change
UNIDO	United Nations Industrial Development Organization
UPOPs	Unintentional Production of POPs
USAID	United States Agency for International Development
US-EPA	United States Environmental Protection Agency
WHO	World Health Organization
WJEMP	Western Java Environment Management Project

INTRODUCTION

1.1 Preparation of the National Implementation Plan (NIP)

The Global Environment Facility (GEF) through the United Nation Industrial Development Organization (UNIDO) agreed to allocate certain funds for the implementation of "Enabling Activities to Facilitate Early Action on the Implementation of the Stockholm Convention on Persistent Organic Pollutants (POPs) in Indonesia". The contract No. GEF/UNIDO No. GF/INS/02/008 has been signed between UNIDO and the Ministry of Environment (MoE) in June 2002.

1.2 Project Objectives

The primary objective of the Project is to assist the Government of Indonesia in meeting its obligations of the Stockholm Convention and endorse the National Implementation Plan (NIP). Other objective is to strengthen national capability and increase knowledge and experience among decision makers, managers, and public at large regarding POPs to develop and formulate the NIP.

The future Project activities fall into several aspects: managerial, technical, and social infrastructure in the preparation of NIP to eliminate POPs. The managerial aspect includes discussion on structure of the Project implementation and coordination as well as process on NIP preparation. Technical aspect includes three activities, namely POPs inventory and analysis on infrastructure and national capacity, priority setting and decision on objective of POPs management, and NIP formulation. Social aspect is related with stakeholder identification and participation as well as dissemination of information.

Mechanism in NIP Preparation

In the implementation, the NIP was developed from priorities that have been set (see The Third Interim Report) through series of meetings with stakeholders in the country. These stakeholders are the members of Steering Committee and Technical Team that have been designated in the MoE Decree No. 91/2002 concerning the Steering Committee and the Technical Committee for the Preparation of NIP to Facilitate the Implementation of Stockholm Convention on Elimination and Reduction of Persistent Organic Pollutants (POPs) in Indonesia. Five steps were performed by the Project. The first step includes activities to determine coordination mechanism and organizing the process. The second step was conducting inventory on POPs, namely inventory on production, use, import/export, stockpile, emission, source, and contaminated sites of PCBs, PCDDs (dioxins), PCDFs (furans), and hexachlorobenzene (HCB), and assessment on capacity and infrastructure. The third step was to determine criteria and to set priorities for the preparation of the draft of NIP. The fourth step was NIP preparation and specific action plans for POPs that has been agreed by the stakeholders in November 2006. The fifth or the last step will be the endorsement by the government, which also bears a consequence that the government will ratify the Stockholm Convention.

Output of the Project

Outputs of the Project are

- (1) Coordination mechanism (see the First Interim Report, December 2002). In this coordination step, a workshop was conducted and participated by members of the Technical Committee, representatives from the government ministries, and representatives of the community. An international expert was involved in this activity.
- (2) POPs Inventory and Assessment on National Capacity and Infrastructure (see the Second Interim Report, June 2003) and its supplement (November 2004). The inventory was initiated with training on inventory procedure. The preliminary inventory that was conducted by an expert team covered production, distribution, use, import & export. The expert on contamination conducted inventory on stockpiles and contaminated sites, and

assessed the possible stockpile elimination. The expert on emission assessed POPs releases to the environment. The expert on institutions analyzed some infrastructures in POPs management, including legislations, needs, and options to strengthen them. The health expert analyzed the implications on social-economic caused by the use and elimination of POPs and the impact of POPs to human health. An international expert was also involved in this activity. Results of the inventory were presented to and discussed with the members of the Technical Team, some external consultants, and some NGOs.

- (3) Priority setting in Elimination and Reduction of POPs has been documented in the Third Interim Report, May 2005. Criteria in setting the priority were determined in discussion with the Technical Committee; the detail of the main programs and the action plans were subsequently elaborated in pesticide working group, PCBs working group, and PCDDs/Fs working group. Priorities in POPs elimination have been approved in a meeting with the Steering Committee on 30 March 2005. Two international experts were involved.
- (4) Final draft of NIP is presented in this document. Draft I, II, III, and IV have been discussed in a serial meetings in May and June 2005, continued with a workshop with all stakeholders and international experts on 15 March 2006. The draft has been verified by the Technical Committee, by an external expert, and by MoE continuously until July 2008.
- (5) The NIP that has been endorsed by all stakeholders will be submitted as a NIP Document.

1.3 Summary of Stockholm Convention, Aims, and Obligations

To protect human health and environment caused by negative impact of POPs, a global environment agreement has been developed with the support from UNEP (The United Nations Environmental Program), hereinafter called Stockholm Convention. The Convention is an instrument that will legally bind to all Parties to put efforts in the reduction and elimination of POPs. The efforts include legislation concerning production, import, export, use, disposal, and POPs releases. The Convention also asks the governments to introduce BAT (best available techniques) and BEP (best environmental practices) to minimize the UPOPS releases, simultaneously prevent the development of new POPs.

Stockholm Convention also requires that the Parties must have POPs management in the future. Especially, every Party must *inter alia*

- (1) Endeavor actions to reduce or eliminate releases from intentional production and use;
- (2) Develop and implement action plans to identify sources and reduce unintentional POPs releases (PCDDs/Fs, PCBs, and HCB);
- (3) Reduce or eliminate POPs releases from chemical stockpile and wastes;
- (4) Exchange information, raise awareness, and increase public education;
- (5) When appropriate, develop strategy to identify all types of POPs and product containing POPs;
- (6) Conduct research, development, and monitoring; and
- (7) Develop plan to comply with the Convention in two years after it has been consented to be bound by the Convention.

1.4 Evaluation on POPs Issues in Indonesia

POPs are chemicals having high probability to be released to the environment due to anthropogenic activities. In this category are chlorinated pesticides, PCBs (polychlorinatedbiphenyls), PCDDs, PCDFs, and hexachlorobenzene (HCB). POPs are toxic and cause adverse effects to human and to the biological integration of the environment. POPs may stimulate cancer, allergies and hypersensitivities, damage on nerve system and reproductive system, and disturbance on immune system. Use of POPs pesticides has resulted in pest resistance in Indonesia and health problems in farmers that applied them in their land.

POPs pesticides include aldrin ($C_{12}H_8Cl_6$), dieldrin ($C_{12}H_8Cl_6O$), endrin ($C_{12}H_8Cl_6O$), heptachlor ($C_{10}H_5Cl_7$), chlordane ($C_{10}H_6Cl_8$), DDT ($C_{14}H_9Cl_5$), mirex ($C_{10}Cl_{12}$) and toxaphene ($C_{10}H_{10}Cl_8$).

The following are information regarding POPs pesticides in Indonesia²

- (1) Aldrin: not registered and not allowed to be distributed, stored, and used since the regulation of Government Regulation (GR) No. 7/1973;
- (2) Dieldrin: since 1992, in accordance with the Decree of Ministry of Agriculture No. 14/Kpts/TP.270/10 1992 prohibited to be used in Indonesia. This active compound used to be for termite control;
- (3) Endrin: not registered and not allowed to be distributed, stored, and used in accordance with GR No. 7/1973;
- (4) Heptachlor: never been registered;
- (5) Chlordane: since 1992, in accordance with the Decree of Ministry of Agriculture No. 14/Kpts/TP.270/10 1992 prohibited to be used in Indonesia. This active compound used to be for termite control;
- (6) DDT: never been registered³;
- (7) Mirex: never been registered;
- (8) Toxaphene: since 1980 has been banned. Toxaphene used to be applied for pest control in cotton plantation.

POPs, as industrial chemicals, include PCBs and HCB. PCBs are a class of chemicals used in industries as thermal medium, in transformers, additive in paints, carbonless paper, sealants, and plastics. However, PCBs is able to remain in the environment because it's chlorinated level and its half life of 10 days to 1.5 years. PCBs are toxic for fish and kills at high dose, causes birth failure at low dose, reproductive failure, and decrease immune system in wildlife. Man contaminated by PCB through food and causes nail pigmentation and mucous layer and inflammation at eye lids, fatigue, dizziness, and vomiting. PCB that remains in long period in women may cause slow developmental growth of the babies in the first seven years and hampers the immune system.

HCB is used as antifungal that damage the crop yield. It is a by-product as well in certain chemical production and released from the same processes that develop PCDDs/Fs. HCB is also

² Pesticide Committee

³ Limited used by the Minstry of Health until 1990 to protect the community toward malarial vector

used as an additive in pesticide formulation. Mothers convey HCB to their babies through placenta and breast milk.

POPs that are unintentionally produced due to anthropogenic activities are PCDDs, PCDFs, PCBs, and HCB. Collectively, they are listed in Annex C and are called UPOPs. UPOPs are unintentionally produced from incomplete combustion in pesticide production or other chemicals such as in pulp & paper manufactures, plastics, bleach, and may be released from car's exhaust, tobacco, wood, and coal, hence they are called UPOPs. UPOPs may be released from hospital waste, domestic waste, and waste of hazardous materials. UPOPs are carcinogenic to human, such as birth failure, disturbing immune system, enzymes, and skin. Man can be contaminated by UPOPs especially through food chain and inhalation.

To comply with Stockholm Convention, the government of Indonesia shall

- (1) Develop and implement its NIP concerning elimination of POPs;
- (2) Submit the implementation plan to the COP at least two years after it's status as a Party of the COP;
- (3) Review and update periodically, as necessary, the implementation plan;
- (4) As appropriate, work together and consult with the international, regional organizations, and stakeholders at national level to facilitate the development, and update the implementation plan; and
- (5) Integrate the activities in POPs elimination with the sustainable national development.

Funding for implementing the activities in POPs elimination shall be provided by the State Budget (APBN) and the Local Government Budget (APBD). In the mechanism of budgeting, the draft shall be submitted by the Directorate General of Budgeting (the Ministry of Finance), reviewed, and submitted to the House of Representative. In general, the draft of budget must be prepared after the Presidential Regulation is enacted and to be implemented in the subsequent fiscal year.

Plan for Ratification by the Government of Indonesia

In line with the preparation of the draft of NIP, a proposal to endorse the Stockholm Convention has been submitted by MoE as the proponent to the President of the Republic of Indonesia, and subsequently to be submitted to the House of Representative. The proposal is submitted according to procedure stipulated in the Presidential Decree No. 188/1998 regarding Procedure for Draft of Law juncto Law No. 24/2000 regarding International Law.

Plan to endorse the Convention has been registered in National Legislation Program in the year 2008, coordinated by the Ministry of Justice & Human Right and the National Legislation Agency at the House of Representative.

BASELINE INFORMATION OF INDONESIA REGARDING POPS

2.1 Country Profile⁴



Indonesia was colonized by the Dutch in the early 17th century; the archipelago was occupied by Japan from 1942 to 1945. Indonesia declared its independence in August 1945 after Japan's surrender.

2.1.1 Geography and Demography

2.1.1.1 Geographical Location

Geographical Location: Indonesia is located between 6°08' north and 11°15' south latitude, and from 94°45' to 141°05' east longitude. Along the equator, there are 17,508 islands, in which approximately 6,000 islands are inhabited. It is strategic location astride or along major sea lanes from Indian Ocean to Pacific Ocean.

Administrative Division: Since 2001, the Republic of Indonesia is divided administratively into 33 provinces, 2 special regions, and 1 greater capital city. Since 1999, East Timor was no longer part of Indonesia. In 2003, the provinces were further subdivided into 350 regencies, 90 municipalities, approximately 5,000 subdistricts, and 71,000 villages.

Land area: Indonesia is a maritime country with the coastline of 54,716 km. The total surface area is 1.96 million square kilometers, comprises land area of 0.09 million square kilometers (4.9%) and water area of about 1.8 million square kilometers (95.1%). It is a country with many volcanoes and rivers. Enormous earthquake and tsunami just happened in the north tip of Sumatra with approximately 200,000 casualties and large swept areas.

Swamp areas are mostly found in Kalimantan and Papua, which is a favorable breeding site for malarial vectors. In addition, the low level of knowledge and awareness on sanitation of the inhabitants, malaria outbreaks happen continually. Measures must be taken to address these issues through an integrated vector management.

Climate: Indonesia is tropical, hot, humid, but moderate in highlands. Dry season happens from June to September and rainy season from December to March. The variation in temperature is influenced by the altitude. In 2002 the temperature ranged between 28.2° C to 34.6° C during the day and from 12.8° C to 30.0° C during the night. The relative humidity is usually high, ranged from 50.2% to 85.5%. Rainfall is from 0.4 mm to 987.9 mm.

2.1.1.2 Population

Size and demographic distribution: Population growth rate had decreased sharply since 1980, from 1.97% per annum during the period of 1980-1990 to 1.30% during in 2004 (Fig. 1). Almost 60% of the population resides in Java Island; the second populated island is Sumatra (21%) (Fig. 2). Population density in Java Island is very high. Based on population distribution, action plan in monitoring community health in conjunction to POPs exposure should be focused in Java Island.

⁴ Sources: World Development Indicators Database, August 2004; CIA-World Factbook, 2005; World Bank 2005; <http://id.wikipedia.org/wiki/Geografi> Indonesia

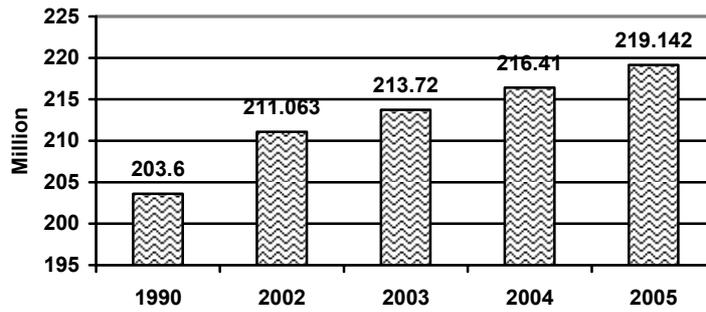


Figure 1 Total population in Indonesia⁵

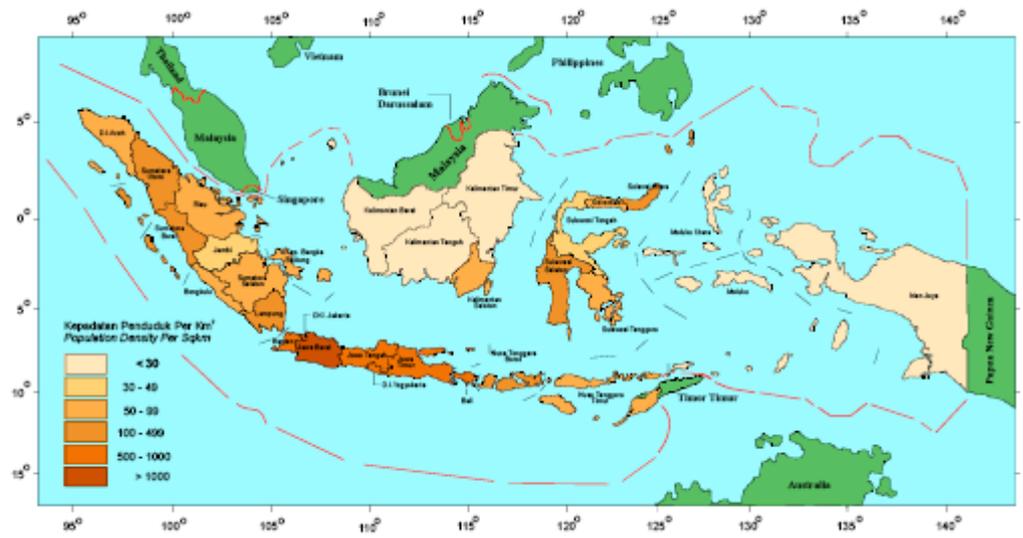


Figure 2 Population density in Indonesia

Age distribution and Gender: Indonesian population can be categorized as young population (Fig. 3). Total population of female is higher than male, with the ration of 100.6. According to Bappenas (National Development Planning Agency) women empowerment has shown an increase as indicated by the number of development programs which is increasingly responsive to gender and the increase of quality of life of women and children. The challenge lays in the increase of women role various development sectors, among others, marked by the low value of IPG (Gender Parity Index).

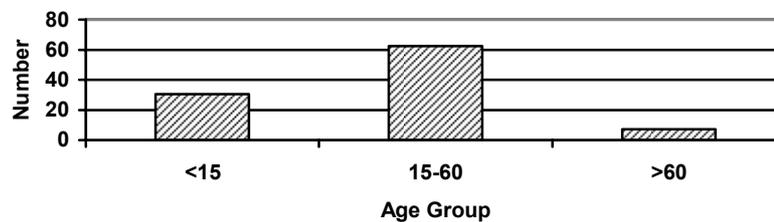


Figure 3 Age distribution³

Urban/rural distribution:³ The percentage of urban population increased in high rate, from 22.3% (Population Census 1980) to 35.9% (PC 1990), 42.0% (PC 2000), and estimated to be 45% in 2004.² Big cities, mainly Jakarta have been a main destination of migrants. The main reason

⁵ ASEAN Secretariat. 2005. Statistical Pocket Book 2005

was to gain economic benefit particularly in informal sector. Other distressing factors as impacts of city development are environment problems, particularly, water, soil, and air pollutions, traffic congestion, and social problems such as poverty, slums, and criminality. Decentralization policy potentially will change migration rate. Waste elimination/reduction is an important issue in implementing Stockholm Convention.

Education: School participation of population aged 5 years and over was 23.99% in 2005 and those who have ever attended school was 65.26%, while the percentage of population who have never attended school was around 10.75% (National Survey on Social-Economy). This condition will not be adequate to face global competition starting effectively in 2008.

Health: Government efforts in providing health facilities, such as hospitals, public health centers, and public health subcenters, were increasing. However, data in Table 2.2 shows that only 5 beds for 10,000 populations. Physicians are the most important human resources in health. Based on the data from the Ministry of Health, it seems that Indonesia still needs more physicians, particularly medical specialists, general physicians, and dentists. The number of physicians was decreasing from 1992 to 2002.

Life expectancy: Bappenas: Life expectancy increased from 61.5 years (1990) to 66.2 years (2002) and infant mortality rate decreased from 61.8 (1990) to 35 per 1000 live births.⁶ Children and women mortality rates are still considered high.

Employment: In 2003 there were 152.6 millions manpower, of which about 60.37% resided in Java Island. Labor force participation rate (number of population classified as labor force for every 100 manpower, LFPR) in 2003 was 65.72%, which is lower as compared to that in 2002. The majority (76.78%) of workers was low educated (under senior high school level) and only 4.6% are university graduates. The total unemployed reached 9.5 millions, around 59.68% of them were low educated. Around 46.26% worked at agricultural sector. Other sectors which have sufficiently significant role in employment were trade (18.56%), manufacturing industry (12.04%), and services (10.74%).

Income: Level of wage varies among sectors (sub sectors) and regions. As many as 36.1 million people (16.6% of the population) are categorized as poor in 2004. There are 36.1 thousand people (16.6% from total population) categorized as poor in 2004. The current average gross national product (GNP) is about US\$ 710/capita while before the economy crises reached around US\$ 1000/capita.

2.1.2 Political & Economic Profile

Political Overview: Current issues include: alleviating widespread poverty, preventing terrorism, continuing the transition to popularly-elected governments, implementing reforms of the banking sector, and implementing good governance in country management.

Overall National Economy

Indonesia experienced a major economic setback due to financial crisis triggered by rupiah deep depreciation starting in the second half of 1997 from Rp2,400 for 1 US\$ in early 1997 to only a half of its original value. Rupiah continued nose-diving in 1998 reaching its lowest value i.e. Rp14,900 for 1 US\$. The country's rupiah value has been improving but still fluctuating since then, and remained unstable until 2006. Up to 1997 country's foreign debt owned by government and private sector amounting to over US\$ 100 billions.

The country maintained a stable economic growth before 1997's financial crisis at +/- 7% that sustained for around two decades. In 1998 the economic growth fall to a minus 13% mainly due to plummeted export and stagnant economy, a positive economic growth took place since 1999 (Fig. 4). For the last few years the country economic growth has been increasing although it has not equalized those of economic boom era (in the period of 1980 until early 1990). According to the World Bank's projection, the country's economic growth will not achieve 6% annually until 2007.

⁶ Bappenas. 2005. *Rancangan Awal Rencana Pembangunan Jangka Panjang Nasional Tahun 2005-2025*. Preliminary Planning on Long Term Development, 2005-2025.

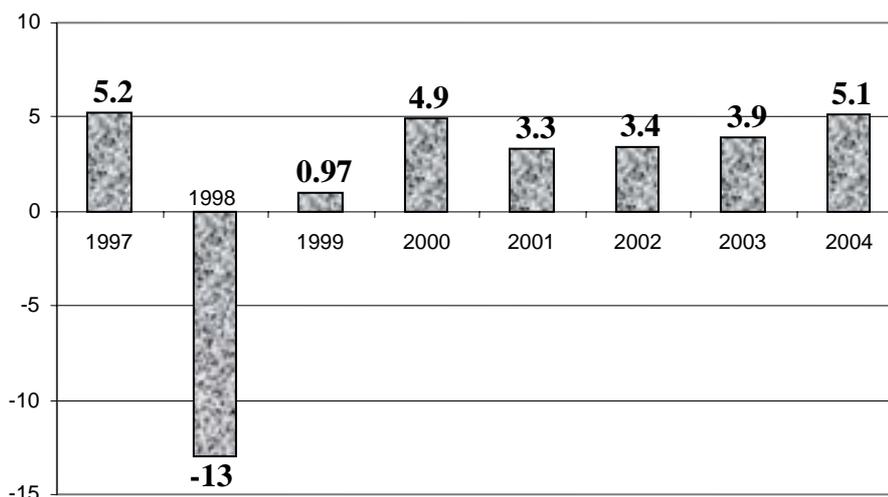


Figure 4 Indonesia's economic growth (%)

Indonesia has experienced surpluses in trade values since 1999, right after economic crisis peaked in 1998. Export gained ground and its value exceeded US\$ 60 billions in 2000 (Table 1). Rupiah value with respect to US Dollar was considered one of important factors influencing export performance post economic crisis.

Table 1 Development of export and import values, and balance of trade (million USD)

	1999	2000	2001	2002	2003	2004
Export	48 665	62 124	56 321	57 159	60 898	72 164
Import	24 003	33 515	30 962	31 289	32 362	55 008
Balance	24 662	28 609	25 359	25 870	28 536	17 158

Source: Bank Indonesia (2005)

The country GDP value was constantly increasing since 1999 although at lower rate as compared to years before economic crisis (Table 2). Contribution of industry and service sectors to the GDP was constantly higher than the agriculture sector for several years (Fig. 5). One important phenomenon drawn from the figures is the trend of transformation from an agriculture country into an industrialized country. With few other Asian countries, Indonesia has been categorized as newly industrialized country (NIC) in early 1990s. However, the economic crisis had slowed down the industrialization process particularly in high technology and heavy industry.

Table 2 Economy development in Indonesia

Parameter	1999	2002	2003
GNI, Atlas method (current US\$, billion)	119.7	149.9	172.7
GNI per capita, Atlas method (current US\$)	590.0	710.0	810.0
GDP (current \$, billion)	140.0	173.0	208.3
GDP growth (annual %)	0.8	3.7	4.1
GDP implicit price deflator (annual % growth)	14.2	7.2	6.5
Value added agriculture (% of GDP)	19.6	17.1	16.6
Value added industry (% of GDP)	43.4	44.2	43.6
Value added services (% of GDP)	37.0	38.7	39.9
Exports of goods and services (% of GDP)	35.5	35.8	31.2
Imports of goods and services (% of GDP)	27.4	29.3	25.7
Gross capital formation (% of GDP)	11.4	15.7	16.0
Current revenue, excluding grant (% of GDP)	18.1
Overall budget balance, including grant (% of GDP)	-1.1

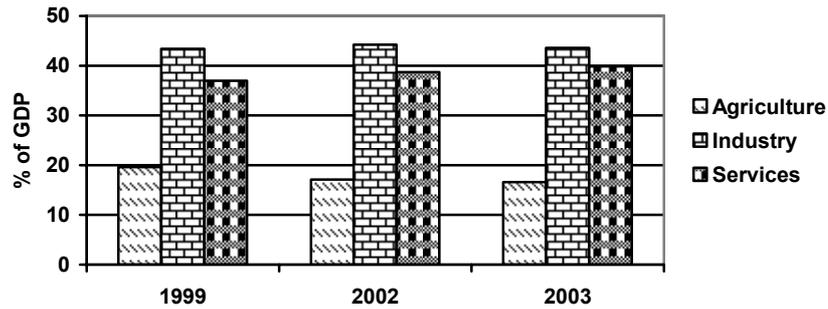


Figure 5 Contribution of sectors in GDP

Growth of export and import: Up to 1986, the growth of Indonesian export was still dominated by oil and gas. Since 1987, it has changed due to some new deregulation and policies issued by the Indonesian government. These deregulation and policies have enabled the producers and exporters of non-oil commodities to improve and increase their production and export as well. In 1998, the value of non-oil and gas export reached 83.88% of the total Indonesian exports (Fig. 6).

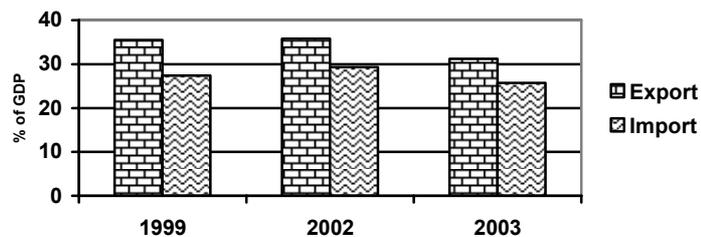


Figure 6 Exports-imports in percentage of GDP of Indonesia

The increasing of import were respectively conditioned by oil and gas import. Imported consumption goods tend to increase but imported capital goods tend to decline. The role of foreign investment in exportation is very significant. However, foreign investment was dramatically decreased until 2002. The government has continued reducing subsidy in energy sector (fuel and electricity) by increasing domestic prices of oil and gas to equal international price that shows government effort in overcoming the debt as well as allocating more budgets for the environment.

2.1.3 Profile of Economic Sectors

Agriculture: Indonesia is an agricultural country. In 2002, agricultural area covers 74.68% of the total area (excluding Maluku and Papua). The utilization of land for agriculture can be distinguished into land for arable dry land/garden/bareland/shifting land (21.29%); brackish (0.91%); fresh water pond (0.76%); woods (13.27%); estates (6.10%); and wet land (12.35%). Other utilizations are for temporarily fallow land (13.60%); house compound and surrounding (8.46%), and grassland (3.25%). From these data, the use of pesticide to support agricultural activities is relative high. The effectiveness of pesticide usage should be emphasized, i.e. through integrated pest control program.

Manufacturing industries: Manufacturing sector has become the main contributor to gross domestic product (GDP) for the last ten years. In 2002, the share of manufacturing sector in GDP was predicted 25.01%, while that from agriculture sector contributed only about 17.5%. Large and medium manufacturing industries contribute about 89% of the total value added even

though the number of establishment is only 0.9% of the total number. Large and medium manufacturing industries used energy such as fuel, electricity, and gas since 2001. The highest energy consumption was textile subsector. The statistics indicates that industrial structure in Indonesia was dominated by household industries (about 91.3%). Considering the industrial growth, gas emission need be given attention in relation to the release of PCDDs/Fs. Therefore, BAT/BEP should be applied to minimize the release of PCDDs/Fs.

Mining: Natural resources comprises petroleum, tin, natural gas, nickel, timber, bauxite, copper, coal, gold, and silver. Mining sector has an important role in Indonesian economic recovery in 2003. This sector is expected to serve as one important source of national income, especially due to the contribution of export of oil and gas. In 2003 the share of this sector in GDP was estimated to increase by 10.7%. Out of 12 types of mining commodities, two of them, oil and gas, have central role in Indonesian economy (Fig. 7). Indonesia is also potential coal producer. Coal production was about 103.1 million metric tones (2002) and increased to 106.8 million metric tones (2003). Besides coal production, other mineral production such as nickel ores and copper concentrate production also showed an increasing growth.

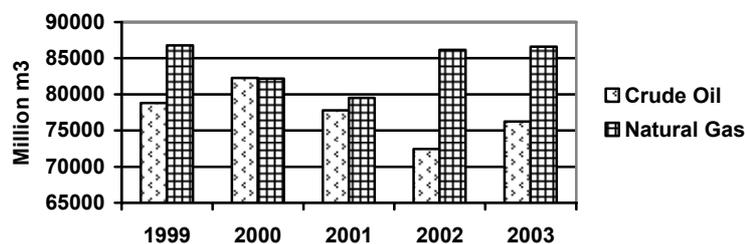


Figure 7 Production of crude oil and natural gas

Marine: The contribution of marine sector (consisting of sea transport, fishing, tourism, mining, maritime industry, marine construction, and sea service) to national economy was quite significant, namely, 23.1% in 2003, which is in second place compared with other sectors. This indicates that industrial development has shifted to marine based industry with multi-sectoral character.

Service: Most electricity used in Indonesia is supplied by the State Electricity Company (PLN), while the rest is produced by private companies. The construction industry generally contributes a significant share of the total economic activity in the country, with corresponding demands of materials, services, and labor inputs. It is sensitive to the movements in the general level of business activity. Construction works have still been concentrating in Java-Bali (51.2%) but it tends to decrease from year to year and increase in other islands.

2.1.4 Environmental Overview (KLH 2004)

Air Pollution and Atmospheric Damage: Air pollution (dust, SO₂, NO_x, CO, HC, and Pb) has become a serious problem in Indonesia especially in several big cities, such as Jakarta, Surabaya, Semarang, Bandung, and Medan, also in growing industrial zones. Transportation sector is the biggest contributor to air pollution. About 80% of total air pollution is caused by motor vehicles waste gas emission. The rest is attributed by industries, forest burning, and household activities. With regard to global environmental issue, Indonesia, as the fourth most populated country, also releases greenhouse gases, which cause global warming. However, with a large area of tropical forest, these gases are reabsorbed. Besides, Indonesia actively participates in reducing ozone depleting substance activities through prohibition of the circulation and usage of aerosol gas such as chlorofluorocarbons (CFC).

Water Demand and Water Pollution: Population increase and rapid development growth bring additional demand for water for households, agriculture, and industry. Various factors that may attribute to the declining quality of water sources including deforestation on upper catchment

areas, the shifting function of catchments areas, converted forests to non-forested agriculture land, drained lakes, swamps, ponds, have reduced the soil's capacity in absorbing and restrain rain water. Currently, almost all catchments areas are degraded. To cope this damage, the government has carried out National Movement on Land and Forest Rehabilitation (*Gerakan Nasional Rehabilitasi Lahan dan Hutan*, GNRLH). During 2003, Java, Bali, and Nusa Tenggara experienced water deficiency as much as 13.4 billion m³. River pollution due to industrial and household activities has caused the declining quality of river water in several regions.

Coastal and Marine Degradation and Pollution: Coastal and marine damages are spreading due to conversion and deforestation of mangrove areas, fishing using explosives and poisons, coral reefs removal, and excessive quarries of sand. Besides the spreading damage, sea and coastal areas are also polluted by various wastes, such as organic wastes, inorganic wastes, surfactant, pesticides, toxic chemicals, and sedimentation. Numbers and types of pollution tend to increase. Highly damaged coastal and marine areas are industrial, harbors, and tourism areas.

Biodiversity Degradation: Indonesia is known for its richness in biodiversity. According to IUCN (The International Union for the Conservation of Nature and Natural Resources) data, Indonesia is endowed with 17% of the world wildlife (300,000 species), 1539 bird species, 600 reptile species, 515 mammal species, and 8500 fish species, as announced in the commemoration of Flora and Fauna Day (Hari Cinta Puspa dan Satwa) in 2003. This country is also well-known for commercial industrial plantations such as pepper, clove, and sugar cane. Ecosystem damage, illegal logging, and endangered species hunting, are several causes for rapid declining of biodiversity. Data of *Red List* reported that there are seven species of Indonesian flora and fauna have been vanished. Two other plant species have not been found in the original habitat. *The Red List* includes 160 organisms of Indonesian endemic to be critically endangered. As many as 175 species are considered endangered, 465 species vulnerable, 20 species of low threatened but they will depend on the conservation efforts.⁷

Energy Demand and Diversification: Fossil fuel is the type of energy mostly used. In 2000, the use of fuel as the final energy reached 57.32 million kiloliters; refineries in-country could only supply 43.86 million kiloliters (76.5%). According to the statistical data of PT PLN in 2004, the total demand of fuel was about 8.5 million kiloliters. In 2010, the demand for fuel will reach 85.02 million kiloliters, much higher than the production capacity at present, which is only about 80 million kiloliter per year. To cope with energy deficit, the government initiate energy diversification program. In addition to addressing energy deficit, this effort is also aimed to lessen environment impact caused by emission of burned fuel that is harmful to human health and environment. At this time, several alternative potential source of energy have been developed in Indonesia, for example, energy from biomass (biofuel), geothermal, solar, hydroenergy, wind, and ocean.

Domestic Waste: Population growth will increase the volume of domestic solid and liquid wastes from household activities. The volume of waste in the year 2020 is projected to be five times of those in 1995. The increase of waste quantity increased the need for dump sites, both for temporary collection (TPS) and for final dump sites (TPA). On the other hand, availability of land in municipal areas is decreasing so that the costs for TPS and TPA provisions are increasingly prohibitive. Another constraint is increasing resistance from the community toward the development of new site for TPS and TPA due to its environmental impact. In addition, domestic liquid waste has been a problem, especially in big cities. Pollution control by conventional combustions needs to give more attention in the national implementation plan related to UPOPs formation caused by incomplete combustion. To comply with Stockholm Convention, development and restructuring of B3 and LB3 management must be improved to prevent UPOPs releases.

Hazardous and Toxic Materials (B3) and Waste (LB3): B3 materials are mostly used by manufacturing industries, miners and power plants, agricultural industries, and timber industries, including household activities. The risks of using B3 include accidents during transportation, applications that are not recommended, leakage, and personnel careless or wrong procedure in storage. Several accidents happened, such as when ammonia leaked out of containers of PT

⁷ Bappenas. 2004. Indonesian Biodiversity Action Plan.

Petrokimia Gresik in 2006 and there was explosion of tanks of PT Petro Widada in 2004. In general, B3 waste is also produced by hospitals and households. B3 waste pollutes the soil, water, and air. An example is a pipe leakage by PT Teksturindo Megah (Bandung) in 2002 that accidentally discharged caustic soda to Citarik River. Several environment program related to Stockholm Convention are (1) Blue Sky program and lead-free gasoline (in conjunction with air pollution and atmospheric degradation); (2) Superkasih program which is related to pollution in water pollution and Proper which is related to waste of hazardous and toxic waste, and (3) Pantai Lestari (Sustainable Beach) and Bandar Indah (Beautiful Harbor) (for preventing degradation of beaches and marine ecosystem). Western Java Environment Management Project (WJEMP⁸) has introduced composting of municipal waste, management of hospital waste, emergency response, and public awareness.

Natural and Environment Disasters: Environment and natural disasters mostly happened in Java, Sumatra, and Kalimantan. Environmental disasters that frequently happened in these islands are flood, landslides, and draught. While natural disasters that often took place are earthquake, volcano eruption, hurricane, and tsunami.

2.2 Institutional, Policy, and Regulatory Framework

2.2.1 Environmental/Sustainable Development Policy and General Legislative Framework

The guiding philosophy and government arrangement as stipulated in the 1945 constitution ensure that every citizen is entitled to have proper living environment. In the Act No. 23/1997 regarding living environment, policies on environment are formulated and implemented. For example, industries must prepare Environment Assessment and UKL-UPL,

Indonesia participates and believes in the global vision regarding sustainable development and committed to and declares its political will to integrate environment consideration to development planning such as that stipulated in Agenda 21 and medium term of development plan. In Indonesia, policies on the management and utilization of commodities extracted from natural resources must be carried out by sectoral ministry; meanwhile living environment at national level is managed by non-ministry institution, i.e. the Ministry of Environment (KLH, MoE). Since the implementation of Law No 22/1999 concerning regional government, there is a split in the management of environment in provincial and regency/municipal levels. .

It has been widely known that the quality of environment in Indonesia, in general, is determined by spatial terms, right assurance on natural resources, management on protective areas, and law enforcement. Those four aspects are very much depending on the role of both central government and the regional governments, as both parties have their own controlling functions, rights and responsibilities.

In implementing the national policies on environment, several measures and program that are quite comprehensive have been carried out, encompassing policies at various levels from project/management unit, ecosystem, district/national, to international level, as seen in Fig. 8. At project level, some programmers have been known and implemented for several years, i.e. clean production programmed, environment audit, ISO 14001, Ecolabel, EIA and EPE. At ecosystem level, there are implemented programmers such as Watershed Management, Clean Water, Blue Sky, Coastal and Marine, and Biodiversity. At district/national/community levels, several programmers have been developed, for example environment policies, consumer/community awareness, environment law enforcement, development of environment-friendly technology, development of market instruments and municipal development programmers. Nevertheless, performance and conditions of environment at national level have not yet improved; rather, the trend shows declining environmental conditions.

⁸ "Program Subsidi Kompos", Subsidy Program for Composting, Grant from World Bank, starting October 2005 to June 2006

As a consequence of the ratification of Stockholm Convention in the form of laws, all programs in the NIP should be implemented in harmony with Basel and Rotterdam Conventions. This is in line with the government commitment to Strategic Approach to International Chemical Management (SAICM), which was signed in February 2006. In addition, policies and regulations that can be affected by this NIP is that concerning agriculture (plant protection), energy (operational policy), utilization of natural resources (water management), health and occupational health, public health, customs, industrial development, trade, science and technology development. The Integration will be seen in the national policies and programs, so there is no gaps and overlaps due to the involvement of many stakeholders.

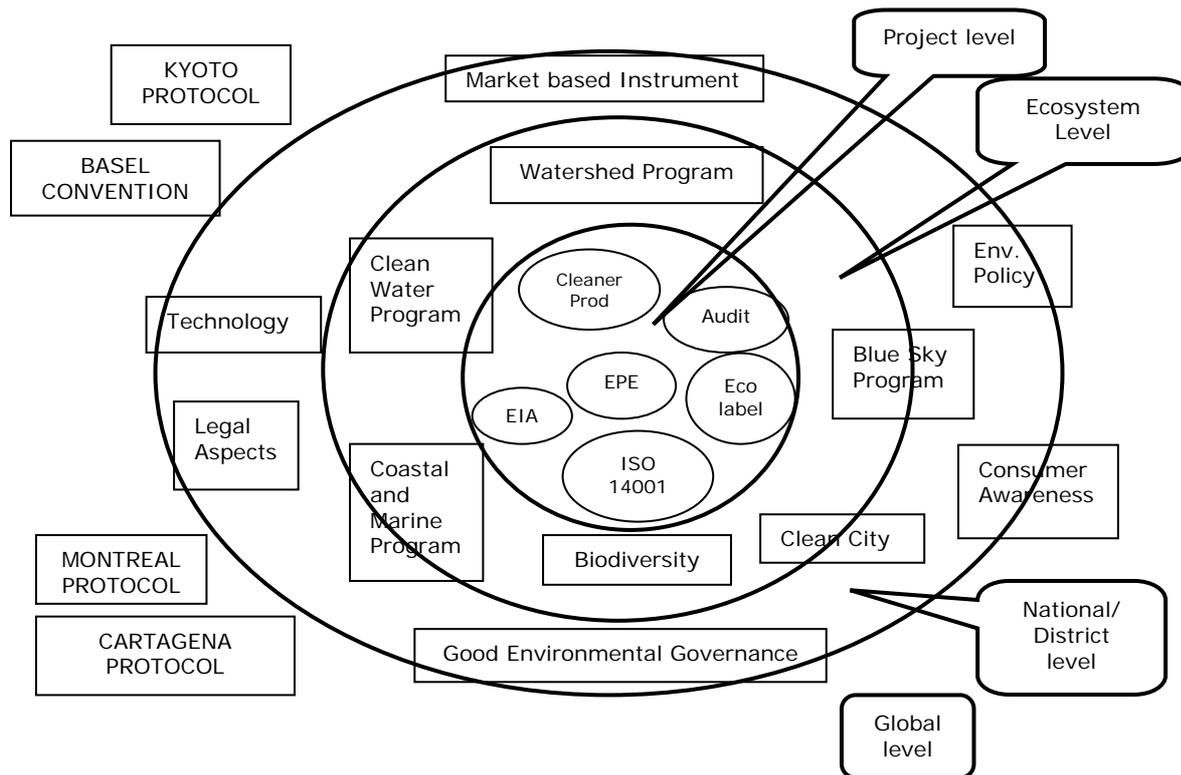


Figure 8 Means and environmental programmers/policies that have been implement-ed at international level (outermost circle) to project level (innermost circle)

2.2.2 Roles and Responsibilities of Ministries, Agencies and Other Governmental Institutions Involved in POPs Life Cycles (From Source to Disposal, Environmental Fate, and Health Monitoring)

Sectors related to elimination and reduction of POPs:

- (1) MoE: responsible in determining POPs industrial chemicals prohibited to be imported or exported and provide recommendation to the Ministry of Trade to issue the regulation. Therefore, MoE formulates the national policy in the aspects of environment and impact to the environment and coordinate the implementation of the regulation. MoE also monitor the environment. Deputy Assistant for Hazardous and Toxic Management and the Waste will be responsible for POPs management, especially the Division of Administration on Control of LB3.
- (2) The Ministry of Agriculture decides which POPs pesticides to be banned for export and import and provide recommendation to the Ministry of Trade to issue the regulation. The relevant unit for controlling POPs will be (the Center for Registration and Investment (*Pusat Perizinan dan Investasi*)). Pesticide Committee (Ministerial Decree No. 319/Kpts/OT.160/5/2006) has a role as advising body in technical evaluation upon application for pesticide registration. The Committee also gives advices for other policies concerning pesticides.
- (3) The Ministry of Health prohibits POPs that will cause adverse impact to human health and conduct the monitoring. In the implementation, the relevant unit will be the Directorate Environment Sanitation, especially the Subdirectorate for Environment Sanitation Assessment.
- (4) Agency for Drug and Food Control will control chemicals that harm human through drugs and food. The Deputy on Food Safety Control and Hazardous Materials, especially the Subdirectorate for Product Standardization and Hazardous Material, will be responsible for POPs issues.
- (5) The Directorate General for Customs (the Ministry of Finance) will control the prohibited imported/exported goods. The responsible working unit for controlling POPs will be the Subdirectorate for Prohibited and Restricted Goods Control, the Directorate for Prevention and Investigation.
- (6) The Ministry of Home Affair; the relevant unit concerning POPs control will be the Subdirectorate for Environment Analysis and Audit.
- (7) From the Ministry of Foreign Affairs, the relevant working unit will be the Subdirectorate of Environment, within the Directorate Economic Development and UN Environment.
- (8) Law enforcement units, comprising Police, Attorney General, Ministry of Justice, state-employed investigator (PPNS), and Environmental Research Centre (PPLH).

In fulfilling Article 3 paragraph (1) of the Convention, so far, all the above sectors do not have (1) plan, (2) goal, (3) strategic direction, (4) risk assessment, (5) institutional structure, and (6) clear performance indicator. Also, (1) the allocated resources have not been adjusted to the management plan, and (2) the operational management has not been equipped with efficient operational procedure, clear operational target, and smooth information path.

MoE as the focal point for Stockholm Convention should undertake coordination with related institutions and regional government in implementing, monitoring, and inspecting activities concerning POPs, e.g. in determining policies and regulations, increasing institutional capacity and human resource. Organization of MoE consists of 4 deputies; one of them is Deputy Assistant for B3 and LB3 Management, who is responsible to undertake task in formulating policies and coordinating the implementation of policies in the field of B3 and LB3 management. In undertaking the tasks, this particular Deputy has the functions of

- (1) formulating policies in the field of B3 and LB3 management;

- (2) coordinating and develop linkage with other ministries, government institutions, non-government organizations, and others in the field of B3 and LB3 management;
- (3) organizing, monitoring, and evaluating control in the implementation of B3 and LB3 management;
- (4) giving technical considerations regarding permits for storing, collecting, transporting, processing, utilizing, and stockpiling and/or destroying LB3;
- (5) giving technical consideration on recommendation for transporting LB3 interregions;
- (6) giving technical consideration on notification regarding transboundary movements of LB3 ;
- (7) undertaking other tasks in the field of B3 and LB3 management given by the Minister of Environment.

Deputy for B3 and LB3 Management consists of 4 assistant deputies, including the Assistant Deputy for Administration of LB3 Control, with the tasks as the following: preparing policy formulation, giving advice and technical aspect of controlling, registration that include effort to store, collect, process, utilize, and stockpiling, as well as giving recommendation for transporting concerning the administration of B3 and LB3 management, and B3 management, as well as the implementation of international agreement and convention. In undertaking the tasks, the Assistant Deputy has the functions as the following:

- (1) preparing policy formulation in the aspect of B3 and LB3 control;
- (2) monitoring, analyzing, and evaluating the implementation of policies in the aspects of B3 and LB3 control;
- (3) inspecting the organization in technical control of B3 and LB3;
- (4) preparing technical advices regarding permits for LB3 management;
- (5) preparing technical advices for recommendation for transporting and processing business and/or LB3 management;
- (6) preparing technical consideration for notification of transboundary movement of B3 , in accordance with international agreement and convention;
- (7) preparing rendering technical consideration for notification of transboundary movements in accordance with international agreement and convention;
- (8) preparing report on performance of organizing work in the aspects of B3 and LB3 control.

2.2.3 Relevant International Commitments and Obligations

Commitment of Indonesia as a part of the international community is seen in its activities in international agreement such as Biodiversity, Climate Change, Desertification, Endangered Species, Hazardous Waste, Law of the Sea, Ozone Layer Protection, Marine Pollution (Marpol) Annex I and II, Tropical Timber 83, Tropical Timber 94, Wetlands, and Montreal Protocol-Kyoto Protocol. The international agreements that have been signed are but not yet ratified are London Dumping Convention, Marpol Annex III, IV, and V, Rotterdam, and Stockholm Convention. Some agreements have been adopted (see also Fig. 8):

- 1 Agenda 21, blue print of agreement on direction, forms, and pattern of sustainable development that was declared by the Earth Summit in 1992. This is carried out by a preparation of Indonesian Agenda 21 in 1997, followed by an evaluation on the implementation in 2002. In addition, Indonesia stated its commitment to implement Johannesburg Plan of Action, as an output of the World Summit on Sustainable Development, a commemoration of 10th years of Earth Summit.
- 2 In controlling pollution that affect on the increasing of global temperature, Indonesia has ratified Climate Change Convention and the Kyoto Protocol, Vienna Convention, Montreal Convention and its amendment. Kyoto Protocol has been signed on 19 October 2004 and ratified by the Law 17/2004 regarding Kyoto Protocol Ratification. By GR No. 23/1992 and

GR No. 92/1998, Indonesia also ratified Montreal Protocol and its amendment, i.e. amendment of London and Copenhagen Convention. The aims were to protect ozone layers, reschedule gradual elimination of production and resting the consumption of chemicals in the category of ozone depleting substance [ODS, chlorofluorocarbon (CFC), methyl bromide (CH₃Br), carbon tetrachloride (CTC), trichloromethane (TCA), and halon] at national level in accordance with the global agreement. In Indonesia, the use of CFC and methyl bromide is still high. Imported CFC and methyl bromide are permitted until 31 December 2007, however, imported methyl bromide for quarantine and pre-shipment purposes are still permitted after 31 December 2007.

- 3 In August 1994, Indonesia ratified the United Nations Framework Convention on Climate Change (UNFCCC) (Act No. 6/1994). The main goal of this convention is to stabilize the concentrations of carbon dioxide (CO₂) (green house effect), methane (CH₄), nitrite oxide (N₂O), hydrocarbon (HC), perfluorocarbon (PFC), and sulfur hexafluoride (SF₆) in the atmosphere to the level at which the anthropogenic disturbance to the global climate change can be prevented. Indonesia plays an important role in the structure of global geographical climate because it has the second largest tropical rain forest and the widest ocean to absorb the green house gases that affected the global climate.
- 4 In the aspect of biodiversity conservation, Indonesia has ratified a convention regarding the biodiversity and the Cartagena Protocol for Biosafety.⁹
- 5 In terms of human health protection and pollution prevention caused by hazardous and toxic materials, Indonesia has ratified Basel Conventions through the Presidential Decree No. 61/1993.
- 6 The Stockholm Convention that has been signed on 23 May 2001 is now in the process of ratification.

With various commitments and international obligations and environmental development programmers, the basic policies of the Ministry of Environment are to implement 3 strategic programs to achieve the following:¹⁰

- 1 Goal in quality improvement of environment, with the targets of (1) decreasing pollution burden in the environment: water, air, atmosphere, marine, and soil (2) decreasing rate of environment degradation [water resources, forest and land, biodiversity, energy, atmosphere, and coastal & marine ecosystem], (3) integrating and considering conservation of environmental functions in development planning and implementation and controlling spatial utilization and environment, and (4) increasing compliance of development actors to maintain the environment quality.
- 2 Good environmental governance with the goal of mainstreaming the principles of good governance in the management of natural resources at the central and regional levels.
- 3 Goals of increasing the capacity of MoE to reliable and proactive in managing the natural resources and environment, with the target of the increasing MoE capacity in undertaking its tasks and functions.

2.2.4 Description of Existing Legislation and Regulations Addressing POPs (Manufactured Chemicals and Unintentionally Produced POPs)

Ten of the twelve POPs chemicals determined by the Convention have already listed in Indonesian regulation. The Ministry of Agriculture banned the distribution of toxaphene in 1980,

⁹ Biodiversity Convention has been ratified through the Act No. 5/1994, the Cartagena Protocol for Biosafety has been ratified through the Act No. 21/2004 regarding Cartagena Protocol Ratification

¹⁰ KLH. 2005. *Peraturan Menteri Negara Lingkungan Hidup Nomor 04/2005 tentang Rencana Strategis Kementerian Lingkungan Hidup Tahun 2005-2009*. Regulation of the Ministry of Environment No. 04/2005 regarding Strategic Plan of the Ministry of Environment Year 2005-2009

dieldrin and chlordane in 1992, and DDT in 1993. Regulations and other legislative means based on hierarchy, from law to ministerial decree are as follow.

- 1 Act No. 5/1984 concerning industry;
- 2 Act No. 23/1997 regarding environmental management stated that every enterprise and/or activity is responsible for the management of LB3, including production, transportation, distribution, storing, usage, and/or disposing;
- 3 Act No. 12/1992 regarding crop cultivation emphasize to use pesticides only as necessary;
- 4 Act No. 14/1992 concerning land traffic and transportation;
- 5 Act No. 23/1992 regarding human health protection and environment;
- 6 GR No. 74/2001 regarding B3 management explicitly prohibited nine types of POPs pesticides stated and PCBs listed in Annex A of the Convention text;
- 7 GR No. 82/2001 stated regulatory limits for POPs pesticides (aldrin, dieldrin, chlordane, DDT, heptachlor, hepox, endrin, and toxaphene) in water. No regulation regarding mirex, HCB, and PCBs;
- 8 Decree of Ministry of Health No. 472/MenKes/PER/V/1996 regarding safety against B3 toward health;
- 9 Decree of Minister of Transportation Kepmen 69/1993. regarding implementation of transporting goods on road;
- 10 Decree of Minister of Industry and Trade No. 230/MPP/Kep/X/1997 regarding imported goods that are regulated; No. 254/MPP/Kep/VII/2000 regarding importation of certain hazardous substances; and KepMenperin No. 148/1985 regarding management of hazardous substances in industrial environment.
- 11 Decree of Minister of Agriculture (No. 517/Kpts/TP.270/9/2002 regarding control of pesticides; Kepmen No. 319/Kpts/OT.160/5/2006 regarding Pesticide Committee; Kepmentan No. 7/2007 regarding requirement and procedure for pesticide registration);
- 12 Kep-04/Bapedal/09/1995 regarding procedure and requirement for LB3 disposal facility and Kep-03/Bapedal/09/1995 regarding technical requirement for LB3 processing have regulated PCDDs and PCDFs, under code number of D5420 and D5421, respectively

Act No. 22/1999 regarding regional autonomy is a law that gives a foundation for the local governments to manage budgeting and activities in the respective jurisdiction. However, unfortunately there are some gaps and disharmony between regulations at the central level and the local level.

Table 3 Regulations regarding B3 and LB3

Obligations of the Stockholm Convention	Regulations	Content of the Regulation
Ban 9 types of POPs used (Annex A and B)	GR No. 74/2001	List of B3 that are prohibited to be used
Restriction of DDT	GR No. 74/2001	List of B3 that are prohibited to be used
Reducing level of UPOPs	GR No. 18/1999 jo GR No. 85/1999	PCDDs/Fs are included in B3 category, hence, they have to be controlled
Reduction or elimination of releases from stockpiles and wastes	Kep-68/Bapedal/05/1994; Kep-01/Bapedal /09/1995; Kep-02/Bapedal /09/1995; Kep-03/Bapedal /09/1995; Kep-04/Bapedal /09/1995; Kep-05/Bapedal /09/1995; Kep-02/Bapedal /01/1998; Kep-03/Bape-dal/01/1998;	Guidelines for establishment to be permitted to store, collect, operate, stockpiling, and process LB3; collect and store LB3; documenting LB3 handling; technical requirements to process LB3 in the right way; location and requirement to stockpile LB3 and handling of

Obligations of the Stockholm Convention	Regulations	Content of the Regulation
	Kep-04/Bapedal /01/1998	waste processing; proper use of symbol and labels for LB3; guidelines for local government officers to manage and monitor LB3; partnership program for national coordination in LB3 handling effort, i.e. between local Bapedal officers and local businessman; determine 9 priority provinces as pilot for partnership program in LB3 processing and management

Policies that would affect the National Implementation Plan of Stockholm Convention are regulations concerning water quality regulation and water quality standard, regulations on solid waste and B3 (Table 3), as well as regulations regarding pesticides in the Ministry of Agriculture (Table 4). At least, there are 13 regulations on water quality, but no regulation explicitly stated the regulatory limits for POPs. This must be reviewed in the near future.

Table 4 Regulation regarding pesticides in the Ministry of Agriculture

Obligations of the Stockholm Convention	Regulations	Content of the Regulation
Prohibit 9 types of POPs used (Annex A and B)	Law 12/1992; GR No. 6/1995; Joint Agreement Minister of Agriculture and Minister of Health No. 881/Menkes/SKB/VII/ 1996; 711/Kpts/TP.270/8/ 96; Decree of Minister of Agriculture No. 7/2007; Decree of Minister of Agriculture No. 319/Kpts/OT.160/5/2006	Crop protection should be carried out by IPM system; use of pesticides is the least alternative, and adverse effects must be minimized by using effective use and by considering health requirement and safety ; maximum limits for all pesticides in Annex A and B of the Convention text, except HCB, in various agricultural products; types of pesticides that contain prohibited active compounds . All POPs pesticides in Annex A and B of the Convention text, except Mirex. HCB, and PCBs are included; task of Pesticide Committee and Technical Team for Pesticide Registration

Handling of domestic waste varies from local government to local government. One example is waste management in the Special Region of Jakarta (Governor decree No. 1281/1988). The regulation was obstacle in the implementation due to some conflicting rules, obligations, and authorities. Therefore, this particular regulation must be revised to ensure the effective implementation in the field.

Compare to obligation to comply Stockholm Convention, the following regulations and policies are still needed:

- 1 Policies on investment, tax, and custom to encourage the use of imported alternative safe technology ;
- 2 Policy to put code/label on equipment free of PCBs and those containing PCBs. This can be integrated with campaign for public awareness;
- 3 Policies for inspecting and monitor POPs elimination;
- 4 Policies to restrict expansion of industries not implementing BAT/BEP in reducing release of POPs;
- 5 Policies for minimizing use of substitute compounds that need more than one replacements;
- 6 Policies to give compensation for closed-down industries due to inability in implementing BAT/BEP to reduce release of POPs in due time;

To achieve the target in reducing POPs, it is necessary to control the consumption of chemicals that are potential to form POPs. Control must be carried out on substitute chemicals, on substitute technology or processes, recycling of materials and equipment.

2.2.5 Key Approaches and Procedures for POPs Chemical and Pesticide Management Including Enforcement and Monitoring Requirements

To implement the Convention, Indonesia has banned 10 POPs chemicals through GR No. 74/2001. However, many suspects have been found that DDT is still traded in packages labeled with DDT although the content is not DDT at all.

Releases of PCDDs/Fs have been regulated through Ministerial regulation (Kepmen No 13/1995), pertaining to rotary kilns when they are used as incinerator. Regulatory limits for incinerators are 0.005 mg/L for PCBs, 10 mg/l for PCDDs, and 10 mg/l for PCDFs. Bottom ash from the incinerators must be determined using Toxicity Characteristic Leaching Procedure (TCLP) Test, which is according to USEPA SW-846 Method 1310. If the value falls beyond the limits, the ashes must be stabilized prior to disposal to landfill. In the reality, however, not all incinerators are monitored due to the high cost for monitoring and analysis. Ideal requirements for the monitoring includes

- 1 Measure and record PCDDs/Fs levels regularly;
- 2 Measure and record effluents from incinerators and equipment for air pollution control
- 3 Report the results every months in the first 3-months of the incinerator's performance and additional tests every 3-years thereon
- 4 Data on the maximum levels of the release and the minimum of destruction and removal efficiency (DRE) must be reported to the MoE every 3 months.

Gaps between law enforcement and monitoring efforts are

- 1 Unavailability of laboratories capable to determine and monitor all types of POPs;
- 2 Weak capability in analyzing and monitoring POPs;
- 3 Unavailability of program and network in monitoring POPs;
- 4 Scattered information regarding status and movement of POPs in the environment;
- 5 Unavailability of release factors for the national "toolkit" as a revision for the existing "Standardized Toolkit" by UNEP;
- 6 Unavailability of inventory methods for POPs releases from the sources and analysis methods for measuring the release levels.

Plans to be implemented by the MoE in POPs and chemical management in general:

- 1 Establishment of the National B3 Committee (Komisi B3 Nasional).
- 2 Capacity building for good and proper handling of B3 and LB3 at the central government, local government, and businesses levels, through training in technical and managerial aspects.
- 3 Increase management capacity for LB3 in ASEAN region through optimizing Basel Convention Regional Center (BCRC SEA).
- 4 Develop control system on illegal transboundary of B3 and LB3 through harbors.
- 5 Prepare B3 and LB3 maps of disaster.
- 6 Raise awareness at industrial and at community levels, especially vulnerable group (women and children) regarding B3 and LB3.
- 7 Increase control system, management, and uses of B3 and LB3.
- 8 Develop legislation and policies regarding B3 and LB3 management, especially pertaining to POPs.
- 9 Develop GR No. 74/2001 regarding B3 management.

2.3 Assessment on POPs Issues

2.3.1 Assessment with Respect to Annex A, Part I Chemicals (POPs Pesticides): Historical, Current and Projected Future Production, Use, Import and Export; Existing Policy and Regulatory Framework; Summary of Available Monitoring Data (Environment, Food, Humans) and Health Impacts

2.3.1.1 Introduction

Only 4 POPs pesticides that have ever been registered and permitted to be used in Indonesia, i.e. DDT for malaria vector eradication, dieldrin, chlordane, and toxaphene for termite control. Although the use of POPs chemicals have been restricted, the residues are still exist in the environment, especially on the agricultural land. Description regarding DDT can be seen in Subchapter 2.3.3.

2.3.1.2 Institutional and Regulatory Framework (see also 2.2.4)

Four types of POPs pesticide that have ever been permitted to be used in Indonesia have been banned: toxaphene since 1980, chlordane and dieldrin since 1992, and DDT since 1993. All POPs pesticides have been banned according to GR No. 74/2001 and every pesticide to be used in Indonesia has to be registered in the Ministry of Agriculture (Permentan No. 7/2007).

The role of Pesticide Committee has been very important in the policy making pertaining to pesticide in Indonesia. The Committee has been restructured according to the Ministry of Agriculture Decree No. 319/Kpts/OT.160/5/2006. The Committee undertakes 4 tasks:

- 1 To give advice and consideration to the Minister of Agriculture in taking decision/policy regarding pesticides;
- 2 To coordinate relevant institutions within the Ministry and other institutions in formulating advice and consideration in the field of pesticides;
- 3 To evaluate data or information in relation to registration of pesticide;
- 4 To evaluate the registered pesticides those have been permitted by the Minister of Agriculture.

In addition, a Technical Team on Pesticide Registration has also been appointed, with the following tasks: (1) to prepare evaluation related to technical data/information for pesticide registration and (2) to undertake technical evaluation on application for pesticide and or pesticides those have been registered and have been permitted. The Committee comprises of 9 institutions: (1) the Ministry of Agriculture, (2) the Ministry of Health, (3) MoE, (4) Badan POM, (5) the Ministry of Forestry, (6) the Ministry of Manpower and Transmigration, (7) the Ministry of Trade, (8) the Ministry of Industry, and (9) the Ministry of Marine and Fisheries. Eight members of the Technical Team for Pesticide Registration come from 4 universities and the Agency for Health Research and Development.

Relevant regulations:

- (1) The Ministry of Agriculture Decree (Permentan No. 7/2007 regarding Requirements for Pesticide Registration Procedure and prohibition of aldrin, DDT, dieldrin, endrin, heptachlor, chlordane, lindane, toxaphene;
- (2) Decree of SK Mentan No. 517/Kpts/TP.270/9/2002 concerning control on pesticides;
- (3) GR No. 7/1973 regarding Control on Distribution, Storage, and Use of Pesticides;
- (4) GR No. 6/1995 regarding Plant Protection;
- (5) Act No. 12/1992 regarding Cultivation System

The distributed pesticides are controlled by pesticide control officers comprises of the Central Pesticide Control officers under the responsibility of the Minister of Agriculture, Provincial Pesticide Control officers under the responsibility of the Governor, and Municipal/Regency

Pesticide Control under the responsibility of the Mayor/Regent. The task of the pesticide control officer includes.

- 1 To control business permits, registration numbers, and other administrative documents at the level of production and distribution,
- 2 To control quality of technical materials and pesticide formulations by considering tolerable limits as permitted for active compound concentrations stipulated in the List of Tolerable Limits for Active Compounds at the levels of production, distribution, and uses,
- 3 To control types and number of pesticides, containers, packagings, labels, and publications,
- 4 To control safety ,
- 5 To control negative impact on public health and environment as the results of pesticide management,
- 6 To control the implementation of policies on facilities and equipment used in pesticide management,
- 7 To control pesticide residues on agricultural products and other products as well as environment media,
- 8 To control the implementation of pesticide destruction, and
- 9 To prepare report on results of control.

2.3.1.3 Production and Uses

There is information on POPs pesticide production other than DDT in Indonesia. No data can be found regarding HCB production in Indonesia. Monitoring showed that HCB was detected in agricultural lands. HCB was suspected to be used as auxiliary agents in textile factories, and thus should be verified because textile and garments are important commodities for Indonesia.

In the past, dieldrin and chlordane were used for termite control (nonsystemic insecticide). Other pesticides were generally used in agriculture, on the paddy fields, horticulture, and plantations.

2.3.1.4 Import and Export of POPs Pesticides

Data on import and export of POPs pesticides cannot be traced from BPS publications, particularly before the ban of pesticide listed in the GR No. 24/2001. On the other hand, HCB importation was recorded from 1994 to 2002, up to 92 569 kg (Fig. 9).

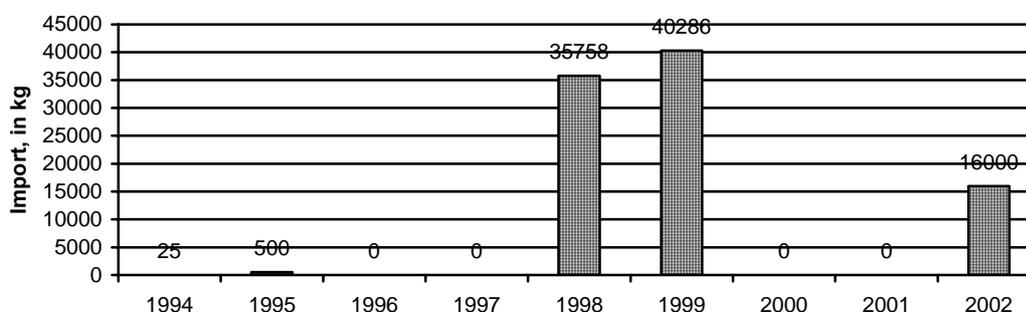


Figure 9 Imported HCB in 1994-2002, in kg

2.3.1.5 Identified Stockpiles of POPs Pesticides and POPs Pesticides Waste

An inventory carried out in 2003 revealed that there were no stockpile of POP pesticides (DDT, aldrin, dieldrin, chlordane, endrin, hexachlorobenzene, heptachlor, mirex, and toxaphene) in ex-warehouses in nine sampled cities, six districts, and two subdistricts, i.e. Karo District, the city of Medan, Kerinci District, the city of Cilegon, the Greater Jakarta, Bogor District, Bandung District, Cianjur District, Lembang District, Pengalengan Subdistrict, Brebes District, the city of Semarang, the city of Surabaya, the city of Batu, the city of Malang, Gianyar District, and the city of Denpasar¹¹. Data were gathered based on questionnaires and interviews with relevant officials in the Agriculture Service, Health Service, Environment Service/Bapelda, farmers, and pesticide retailers. In general, the farmers were aware of the ban of several pesticides such as DDT and endrin. POP pesticides are no longer marketed in Indonesia and no import-export of these commodities recorded by the Statistics Bureau (BPS), except HCB until the year 2002.

2.3.1.6 Present Management (Production, Use, Stockpiles, and Waste) of POPs Pesticides and Empty Containers

Production and use of POPs pesticides have been banned according to regulation. Stockpiles, waste of POPs pesticides, and empty POPs pesticide containers were not found. If, someday, production, uses, stockpiles, and waste of POPs pesticides were found, the person(s) will be sanctioned in accordance with GR No. 18/1999 concerning LB3 management and GR No. 74/2001 regarding B3 management. Up to now, there is no specific management on HCB since the existence is not known yet.

2.3.1.7 Current Capacity and Experience in the Field of POPs Pesticides

The following is SWOT analysis (strength, weakness, opportunities, and threat) pertaining to the plan to eliminate and to reduce POPs releases.

Strength:

- There is prohibition to produce, use, and store POPs pesticides
- There is mechanism to control export & import
- There is several laboratories potential to test POPs pesticides
- Available of potential researchers in the field of pesticides
- Available of facilities capable to destroy POPs.

Weakness:

- Data on release of POPs pesticides to water, soil, air, sediment, and products are scattered
- Information concerning negative impacts of POPs pesticides on human health and environment are not widely disseminated
- Regular monitoring program is not available
- Cost of research, monitoring, and inventory are limited
- Education level of the general public is considered low so that awareness on POPs threats is considered low
- Law is not appropriately enforced.

Opportunities:

- Government will to eliminate POPs pesticides
- Intellectual capacity can be increased

¹¹ KLH-UNIDO. 2003. The Second Interim Report. Enabling Activities to Facilitate Early Action on the Implementation of the Stockholm Convention on POPs in Indonesia

- BAT/BEP technologies are available
- Assistance from developing countries to eliminate POPs pesticides is available
- NGOs in the field of agriculture are available and capable.

Threat:

- There is indication of DDT newly enter the environment
- Economic situation is not stable
- Financial difficulties faced by the government and industries.

One aspect in the process of determining POPs monitoring and the environment quality is laboratories capable to measure parameters of environment quality and compatibility with the prevailing regulations. In general, the concentration of POPs in the environment is low, therefore, equipment (such as gas chromatograph-mass spectrometer, glassware, and laboratory space that fulfill technical and safety requirements), materials (*certified reference material*, CRM and standard reference material, SRM), and specific techniques (Standard Operating Procedure for analyzing POPs pesticides, PCBs, and PCDDs/Fs), and human resource that capable to detect them.

In conjunction with environmental analysis, there are 2 different groups of laboratory i.e. laboratories under MoE supervision and laboratories not under MoE supervision. There are 59 environmental laboratories under MoE supervision, scattered in 14 provinces and in various ministries (Balai Laboratorium Kesehatan and Balai Teknik Kesehatan Environment under the Ministry of Health, Balai Besar Selulosa and Balai Penelitian dan Pengembangan Industri under the Ministry of Industry, and laboratories under the Ministry of Public Works). Funding for laboratory procurement, education, and training came from the government and donors (AusAid-Australia and OECF-Japan). Maintenance cost is a constraint in the sustainability of the laboratory performance.

In accordance with decentralization policy (SK Bapedal No. 664/Bapedal/03/2001), MoE delegates the management and ownership of the environmental laboratories to the provincial government (provincial Bapedalda or the authority of environment in the provinces). The implementation of the Bapedal/MoE laboratories is integrated with some other local relevant agencies.

The decentralization policy brings about various types of environmental management, which is different from one region to another. The faced problems are (1) no definite institution to undertake the management and the development of environmental laboratories in the regions, (2) the environmental laboratories are under-utilized, (3) the human resource for laboratory management is not sufficient because the decentralization policy has moved the existing trained human resources moved or promoted to other institutions, (4) mandate for the regional laboratories to carry out environment quality analysis is limited, (5) role, task, and function of relevant institutions in the management of regional laboratories are not explicitly described.

The condition of laboratories are different from region to region; some are very simple and some are advanced, in terms of building, laboratory equipment for analyzing organochlorines (organochlorine pesticides and PCBs), and the supporting human resources. Several facilities that have relatively good facilities are Laboratorium Pengendalian Dampak Environment (Laboratory for Environment Control) in Serpong, Laboratorium Pestisida (Pesticide Laboratory) in Bandung, Balai Besar Selulosa (Central Agency for Cellulose) in Bandung, Laboratorium Tanaman Pangan dan Hortikultura (Crop and Horticulture Laboratory) in Jakarta, and Laboratorium Pusat Penelitian dan Pengembangan Isotop dan Radiasi Badan Tenaga Atom (Laboratory of Research and Development Center for Isotope and Radiation – National Atomic Energy Agency) in Jakarta. The Directorate General of Crop under the Ministry of Agriculture has an accredited pesticide laboratory for certain parameters to analyze POPs, i.e. (1) Balai Pengujian Mutu Produk Tanaman [Ditjen Tanaman Pangan], accredited since 2001, (2) Lab Pestisida medan [Dinas Pertanian Provinsi Sumatera Utara], accredited since 2007, (3) Lab Pestisida Padang [Dinas Pertanian tanaman Pangan & Perkebunan Sumatera Barat], accredited since 2002, (4) Lab Pengujian Mutu dan Sertifikasi Hasil Pertanian dan hasil Hutan

[DKI Jakarta], accredited since 2007, (5) Lab Pestisida Maros [Dinas pertanian Tanaman Pangan dan Hortikultura Provinsi Sulawesi Selatan], accredited since 2005. However, there is no laboratory capable to analyze PCDDs/Fs.

Generally, funding for laboratory management comes from the government (central and regional) Survey in 2003 showed that only 75% of the laboratories had researchers and chemical analysts; approximately 22% only had chemical analysts. Among 193 researchers working in 36 sampled laboratories, 55% held bachelor degrees, 38% masters, and only 7% doctors. Most of the chemical analysts and staff are high school graduates. Only 36% of the workers in the laboratories took short courses provided by Bapedal, private companies, and overseas providers.

As a consequence of the ASEAN Free Trade Area (AFTA) determined in 2003, products or laboratory test results must be issued by accredited laboratories. The laboratories must meet the National Standards (SNI 19/17025/2000) concerning general requirements for laboratory competence and laboratory calibration, adopted from ISO/IEC 17025:1999 by the National Standardization Agency (BSN). In implementing the guideline, some technical factors to emphasized are (1) qualified and experienced human resource, (2) calibration and proper laboratory maintenance, (3) appropriate quality assurance system, (4) valid sampling techniques and testing methods, (5) traceable measurement and calibration system to national or international standards, (6) documentation and reporting system of the test results, and (7) testing facilities and environment. Accredited environment laboratory for certain parameters in handling POPs so far is limited to laboratories belong to Sarpedal, Central Agency for Cellulose, Regional Health Laboratory - Bandung, Crop and Horticulture Laboratory - Jakarta.

Experience in POPs pesticides. Government effort in banning the use of POPs pesticides has been described. Some NGOs shows their activities in plant protection, including FIELD. Negative impact of POPs pesticides, for example DDT, has long been disseminated to the farmers through field extension workers. Farmers in some provinces have been trained to identify natural predators for plant pests and diseases they are facing.

2.3.1.8 Assignment of Responsibility and Liability

Act No. 23/1997 regarding environment management stipulates that (1) every responsible person in business and/or activity must carry out B3 management, (2) B3 management includes the production, transportation, distribution, storage, utilization, and/or disposal, and (3) other regulations concerning B3 management are stipulated in GRs. The relevant GRs are (1) GR No. 18/1999 regarding LB3 management that had been amended by GR No. 85/1999 and GR No. 74/2001. The GR No. 74/2001 includes 43 articles and 2 lists of B3 that are used and B3 that are prohibited to be used, respectively. In the listed of prohibited B3 are aldrin, chlordane, DDT, dieldrin, endrin, heptachlor, mirex, toxaphene, HCB, and PCBs.

Two procedures are required in the management of B3, i.e. registration procedure and notification procedure. Registration for B3 requires responsibility of producers and consumers regarding protection on human health and environment as the impact of hazardous properties of B3. Registration procedure is expected to help the relevant institutions to exchange information so that all institutions can make use of the matters pertaining to hazardous properties of chemicals produced and imported for the first time so that the decision makers can restrict or prohibit the distribution of the corresponding B3. Information regarding the prohibited B3 and B3 that has been registered to certain institution must be regularly informed to other relevant institutions such as importers, producers, and consumers of B3. Notification system is prior notification by the authority of the exporting country to the institution in the receiving country and the country for transit if B3 transboundary movement is concerned (regulated in the PIC – Prior Informed Consent of Rotterdam Convention).

Article 21 in GR No. 74/2001 mentions the B3 Committee. For type of B3 that is not listed in Annex (new B3), there is an obligation to follow the notification procedure upon an advise from the B3 Committee that the corresponding B3 falls into chemical having hazard and toxic properties.

The task of B3 Committee is to give advise and consideration to the government about B3 that will be distributed as chemicals potential to be hazardous and toxic that will pollute and harmful to the environment and human health. The Committee comprises several subcommittees with the members come from relevant institutions, university representatives, environmental organizations, and associations. Membership, tasks, functions, and the management of B3 Committee will be stipulated in a Presidential Regulation.

Authority to control the activity in B3 management is carried out by the responsible institutions and the authorized institutions, in accordance with the respective tasks. Authority to control can be delegated to the provincial/district/municipal government. The delegation of authority to control is determined by the responsible institution and or the authority in the respective field. .

One institution related to B3 (pesticides) management is the Ministry of Agriculture. Scope of the regulation includes object to be control, requirement, procedure in appointing and terminating pesticide control, tasks, authority and implementation of control, reporting, coordination in control, follow-up of control results, and nurturing & training on pesticides. Since the implementation of regional decentralization, production and control arrangement, distribution, utilization, and disposal of pesticides are still under the authority of the central government.

Authority of the pesticide controller includes (1) enter the location that produces, stores, distributes, and uses pesticides, (2) examine permit document and supporting administrative document belong to producers, distributors, certificate to use restricted pesticides, (3) take samples for testing, (4) take sample of packaging, containers, labels, and other publications, (5) take samples of agricultural products and environmental media suspected to contain residues or mix of pesticide to be tested, and (6) propose the cancellation of registration number, termination and or withdrawal of unsuitable pesticides.

Waste of POPs pesticides falls into LB3, therefore, the responsible party for its containment and disposal should refer to GR No. 18/1999 jo GR No. 85/1999. In addition, handling in emergency case should also refer to GR No. 18/1999 jo GR No. 85/1999 and GR No. 74/2001.

BPOM also concerns with handling of hazardous materials for health (Ministry of Health Regulation No. 472/Menkes/PER/V/1996), which is toxic, carcinogenic, teratogenic, mutagenic, corrosive, and irritant. BPOM monitors and control all these chemicals. Use of pesticides for disease vector eradication is stipulated in Kepmen 1350/Menkes/SK/XII/2001. Every business dealing with pest control should have operational permit issued by District/Municipal Health Service.

In relation to POPs, the Ministry of Trade arranges and control importation of goods. The Ministry of Transportation, through Kepmen Perhubungan KM 69/1993, stipulates that transportation of hazardous materials should have permit prior to the transportation of the corresponding goods.

Joint decree (SKB) between the Ministry of Home Affairs and the Ministry of Health-the Ministry of Agriculture arranges the control of DDT and provides guidance on the use of it. SKB between the Ministry of Health and the Central Police Office arranges the collaboration on controlling and investigating crimes regarding hazardous materials for health. In addition, SKB between the Ministry of Health and the Ministry of Agriculture arranges maximum limit of pesticide residues in agricultural products.

Some laboratories assigned for pesticide testing according to KepMentan 434.1/Kpts/TP.270/2001 are (1) Lab Ditjen Bina Produksi Tanaman Pangan, The Ministry of Agriculture, (2) Lab Pusat Aplikasi Isotop dan Radiasi, Atomic Energy Agency, (3) Lab Balai Besar Industri Kimia, the Ministry of Industry, (4) Lab Pusat Pengujian Mutu Barang, the Ministry of Trade, (5) Lab Balai Besar Industri Agro, the Ministry of Industry, and (6) BPOM Laboratory.

2.3.2 Assessment with Respect to Annex A, Part II Chemicals (PCBs)

2.3.2.1 Present Regulations Pertaining to PCBs

PCBs are categorized as B3 that have been prohibited (GR No. 74/2001). PLN and Pertamina also prohibited the use of PCB. However, there was no information recorded by BPS regarding PCB content in the imported transformers. PCBs in the transformer or capacitor are generally used as additive in lubricants to increase heat transfer efficiency.

2.3.2.2 Closed and Semi-Closed Applications of PCBs

PCBs are used in closed application, for instance in capacitor and *balast* of fluorescent lamps. One example of semi-closed application is in transformer having certain construction. PCBs can also be used in open application, e.g. in hydraulic pump, paints, inks, and in carbonless-paper.

Method used in inventory. Inventory in the early 2004¹² was focused on the existing transformers and capacitors. As many as 1500 respondents were selected to represent several source categories, i.e. manufacturers & minings, power plants & electrical services, hospitals, harbors & airports, hotels, government offices, commercial buildings, military facilities, and university laboratories (Table 5). From the manufacturer & mining category, establishments employed more than 500 workers were selected. From other categories, enterprises or business unit established before 1985 were selected, the time when Pertamina prohibited the use PCBs. Questionnaires were distributed by considering intensity of activities under geographical aspects, i.e. mostly in Java Island (Greater Jakarta, West Java, East Java), followed by Sumatra (Medan and vicinity), and the least was in eastern Indonesia (Makassar and vicinity) (Table 6).

The questionnaires were sent to all respondents. The information asked were the number of transformer and capacitor owned, type of liquid contained in the equipment, year of purchase, and when the equipment were no longer in use. The filled questionnaires were analyzed, and 54 respondents (22.1% from the respondents giving response on transformers) that were assumed to have PCBs-containing equipment were visited (Table 7). The visited respondents were manufacturers operated long before 1985 with the assumption that they might still use old transformers. In general, such old manufacturers in Indonesia are in the field textile, metalurgy, power plants, sugar, and pulp & paper businesses. Other consideration in selecting the visited respondents was geographical distribution.

In the visit, the received data was verified and 106 samples of liquid were drawn from the transformers. The samples were then analyzed qualitatively for the PCBs content (density test and existence of chlorine). When there is an indication of PCBs by the qualitative analysis, 35 samples were sent for quantitative test in the laboratory, using ASTM D 4059-96 method.¹³

¹² KLH. 2004. Second Phase Inventory: Additional Preliminary Inventory on PCB, PCDDs/Fs, HCB & Monitoring on POPs in Indonesia

¹³ Detail procedure: using gas chromatograph, capillary column HP-5 60 cm × 320 μm × 0.25 μm, nitrogen gas as the carrier 1.7 ml/minute, temperature 140 to 240°C with the rate of 8°/minute and from 240 to 280°C with the rate of 5°C/minute. Detector: micro-ECD (300°C). Reference compound: Arochlor 1016, 1221, 1232, 1242, 1248, 1254, 1260, and 1268. Samples injected 3 μl on the 300°C port.

Table 5. Mailed questionnaires and responses from the respondents

Source Category	Mailed Questionnaire	Response	%*
Manufacturers & Mining	1227	291	23.7
Power Plants & Electrical Services	93	53	57.0
Hospitals	37	6	16.2
Harbors & Airports	10	5	50.0
Hotels	32	5	15.6
Government Offices	9	2	22.2
Commercial Buildings	45	10	22.2
Military Facilities	2	1	50.0
Others (university laboratories, printing house)	6	6	100
Total	1461	379	25.9

Table 6. Distribution of questionnaires and number of responses by province

No.	Province	Mailed	Failed	Data		No Data	
				#	%*	#	%*
1	Aceh	3		2	0.7	1	1.2
2	North Sumatra	88		14	4.7	8	10.7
3	West Sumatra	8		1	0.3	2	2.4
4	Riau	85		5	1.7	4	4.8
5	Jambi	12		1	0.3	0	0
6	South Sumatra	20		3	1.0	1	1.2
7	Lampung	20	1	3	1.0	0	0
8	Banten	101	1	12	4.1	1	1.2
9	Jakarta	275	7	70	23.7	22	26.2
10	West Java	252	9	67	22.7	7	8.3
11	Central Java	94	1	35	11.9	7	8.3
12	Yogyakarta	17		6	2.0	2	2.4
13	East Java	286	4	55	18.6	11	13.1
14	Bali	29	2	1	0.3	6	7.1
15	West Kalimantan	21		4	1.4	0	0
16	Central Kalimantan	6		4	1.4	0	0
17	South Kalimantan	22		5	1.7	7	8.3
18	East Kalimantan	61		2	0.7	3	3.6
19	North Sulawesi	8		2	0.7	0	0
20	South East Sulawesi	2		0	0	0	0
21	South Sulawesi	38		3	1.0	1	1.2
22	Maluku	2		0	0	0	0
23	Papua	11		0	0	1	1.2
TOTAL		1461	25	295	100	84	100

* with respect to the mailed questionnaire in the same category or no-data

Table 7. Distribution of visited respondents by source category

No.	Source Category	Number	%
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No.	Source Category	Number	%
1	Sugar mill	6	11.1
2	Power plant	6	11.1
3	Textile & yarn	5	9.2
4	Mining	4	7.4
5	Electric/electronics	4	7.4
6	Rubber/tires	4	7.4
7	Food	4	7.4
8	Metallurgy	3	5.6
9	Hotel	3	5.6
10	Automotive	2	3.7
11	Pulp & paper	2	3.7
12	Airport	2	3.7
13	Chemicals	2	3.7
14	Wood working	2	3.7
15	Cement	2	3.7
16	Hospital	1	1.8
17	Commercial building	1	1.8
18	Military facility	1	1.8
Total		54	100

Results of inventory. Only about 26% respondents gave responses. Among these responses, 22.2% stated that they did not own any transformer or capacitor. Responses came from 244 transformer owners, 120 capacitor owners, and 33 hydraulic pump owners. In the inventory, the data was self-reported by the respondents and these were not considered satisfaction because most of the owners were not fully understand the type of chemicals contained in the transformers and capacitor within their premises. The report may contain inaccurate data because some time it was not easy to trace back the specification of old equipment. Another reason is that they might lose track of the information from the fade-away or torn label. The number of reported capacitor was much less compared to the number of transformer may be because they have so many pieces of such small equipment (Table 8). This is the reason why further inventory should be carried out and extended by giving understanding about PCBs to the equipment owners prior to the inventory.

Table 8. Results of inventory on PCBs-containing equipment by year of purchase

Electrical Equipment	Number of Response	≤1985*		>1985*		Total
		Number	%**	Number	%**	
Transformer	244	1838***	44.1	2333	55.9	4171
Capacitor	120	277	6.2	4219	93.8	4496
Hydraulic Pump	33	39	11.7	295	88.3	334

* year of purchase

** with respect to the total

*** average weight of the equipment: 7 385 kg

Transformer. Owner with the highest number of transformer was PLN. The number of transformer owned by the respondents varied from 1 to more than 600 pieces (Table 9). Mining businesses, such as Pertamina and copper miners, and car factories seem to correlate with high number of transformer. Many mining activities in remote areas were in fact still used old pieces of electrical equipment those are suspected to contain PCBs.

Table 9. Number of transformer owned by source category

Number of Transformer	Number of Company	Source Category
< 50	221	Common
50-99	10	Mining, cigarette, textile, pulp & paper, power plant, cement
100-199	6	Textile, cement, pulp & paper, large scale mining, Pertamina, power plant
>200	7	Large scale mining (Pertamina, Freeport), automotive (car assembly)

Some respondents were still using PCBs-containing equipment, i.e. Clophen (17 pieces), Askarel (29 pieces), Pyranol (2 pieces), Terminol (1 piece), PCB (1 piece). It is clear that 1.2% of the total transformers were reported as PCBs-containing equipment. There were also 3 transformers reported as PCBs-free. So far, the inventory just covered PCBs content $\geq 0.05\%$ and volume of > 5 liters in closed system (Table 12). Therefore, it is necessary to carry out inventory for PCBs used in semi-closed system, open-system, and for equipment containing PCBs $>0.005\%$ and volume ≥ 5 liters. Method for the inventory must be improved by including mining sector and transportation. The future wide-coverage inventory should consider these findings to determine the priority targets.

According to the statement by the owners, the producing country is presented in Fig. 10. 'Others' include unknown country, as much as 23.0%. The highest number of transformer being reported is made of (23.3%). Other countries, such as Japan, France, Germany, and USA contribute only less than 10% each.

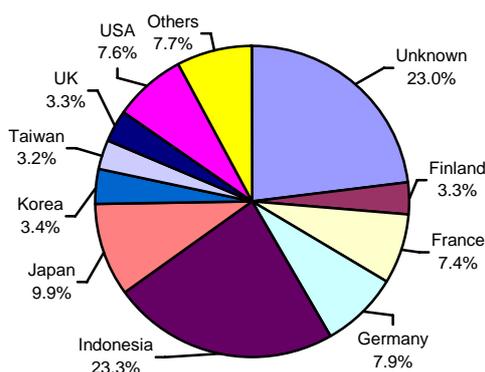


Figure 10. Producing countries of transformer used by respondents

The most used oil type in the transformers was Diala (non-PCBs) (Fig. 11).

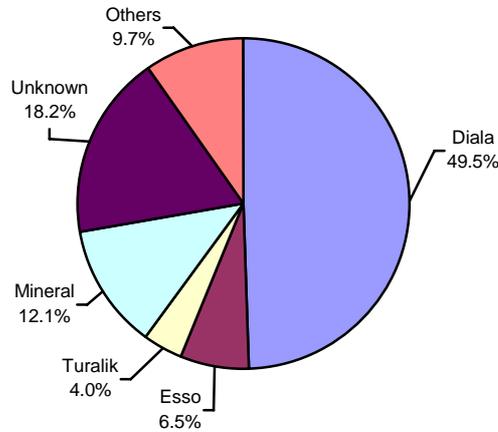


Figure 11. Oil type used in the transformers

Capacitor. Number of establishment participated in the inventory was 120. The number of capacitor reported by the respondents varied from 1 piece to 1678 pieces (textile manufacture). The total number of reported capacitor was 4496 pieces, including 34 broken pieces.

Producing countries for capacitor (Fig. 12) reveals that most of the capacitors were made in France (43%) and only 2% was local made. The Netherlands contributed 15.7% and Germany 13.7% of the capacitors being used Indonesia.

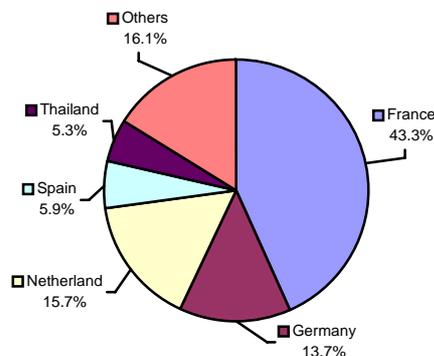


Figure 12. Producing countries of capacitor used by respondents

Only 5.2% of the total number of capacitors contained Diala and only 3 pieces reported as “PCBs-free”. There were 12 pieces contained PCBs (Askarel). More than 60% respondents mentioned that information pertaining to content was obtained from the nameplate. However, the rest of them did not give any statement about the content of of the capacitor.

Results of PCBs level. By using analytical means, quantitative information can be obtained. From the tested oil, 5.7% samples were contaminated by PCBs and 17.1% were heavily contaminated (Table 10). As previously guessed, the samples were associated with establishments operated before the year 1985. the PCBs were from the type Arochlor 1016 (2 samples), Arochlor 1254 (3 samples), and Arochlor 1260 (13 samples).

Table 10. Summary of the quantitative test for PCBs

Category	Sample		Concentration	Source Category*
	Number	%		
Non-PCBs	27	77.2	<50 ppb-2.0 ppm	Varies
PCBs-contaminated	2	5.7	70-400 ppm	Textile, airport, mining (1), chemical (2), ceramics (1)
'Highly contaminated with' PCBs	6	17.1	0.13-0.32%	Automotive (1), metal working (1), power plant (1)
	35	100		

* Numbers in bracket indicate the number of sample in the respective type of business.

Awareness of the hazard of PCBs. Large companies that complied with ISO 14000 were generally aware of PCB and they take effort to comply with the obligation about PCBs-free. Equipment containing PCBs were reported and disposed by the designated institutions to destroy the PCBs, i.e. PPLI (Prasadh Pamunah Limbah Industri) a private company, specializing in hazardous material disposal, located 45 km south of Jakarta city). Cost for disposal was considered costly by the owners, particularly when the materials must be transported to such a long distance. It is necessary to increase the capacity/number of PCBs disposal facility representing the geographical sites and study on noncombustion methods for PCBs.

In 1998, PLN, with the assistance from a designated consultant have formulated PCBs management.¹⁴ The Ministry of Energy and Mining, particularly PLN, was recommended to undertake the necessary steps for a self-imposed safety management system based on the self-reported from the transformer's owners. The suggested program consisted of fully identification and, if found, safe handling and reliable disposal of PCBs-containing equipment. Concerning transformers, since 1970s PT PLN was no longer use PCBs, but the transformer's oil must be regularly displaced. The PLN's proposal is a good base for BAT/BEP in complying with the Stockholm Convention.

Regarding to Pertamina, essentially all transformers have been registered; those using PCBs and non-PCBs. A policy for using "non-PCBs transformer" has been enacted before the year 1990. However, there is no specific guideline for PCB destruction, so that PCBs-containing equipment is still kept in special storage.

Role of local transformer producers and transformer service in Indonesia. At least 14 transformer manufacturers in Indonesia are members of APPI (the Indonesian Electric Equipment Producers). PT Unindo, the oldest transformer manufacture, is a subsidiary of PLN so that all of the produced transformers are assured to be PCBs-free. PT Unindo also complies with ISO 9000, which is also requires that all transformers must be PCBs-free. A relatively new transformer's manufacture (PT Trafindo), start operating in 1981, always uses imported mineral oil, i.e. Shell Diala B. This particular company complies with ISO 9000, 14001, and OSHAS 18001. In the future, transformers made in Indonesia will not contain PCBs. Transformer containing PCBs are likely from the importation. Companies dealing with transformer service may still handle transformers containing PCBs.

Handling of used PCBs-containing equipment. PT PPLI has been in operation since 1994 initially providing disposal services for B3. This company has experience in destruction of equipment containing PCBs. Transformer oil is drawn from the carcass and destroyed in cement kiln, in collaboration with a cement mill. The carcasses are disposed in landfill. The owners of the used PCBs-containing equipment sent the whole transformers or capacitors; transportation cost and disposal cost are paid by the owners. All transformers' owners stated that the disposal costs are very high. For treatment of PCBs transformers, PT PPLI uses Standard Operating

¹⁴ Lahmeyer International & PT Jaya CM Manggala Pratama. 1998. Final Executive Summary and Final Report Volume III. Consulting Services for Strengthening PLN's Environmental Management Capabilities. World Bank Loan No. 3761-IND

Procedure derived from the US EPA. Before granted the license, the company performed a trial test to evaluate PCDDs/Fs content. It was reported that the method was 99.999% effective.

Estimation on PCBs to be eliminated. Based on the number of transformer containing PCBs and the volume of oil containing in them (estimated to be 1/3 of the transformer's weight), and only 20% transformers were identified in the previous inventory, the estimated volume of PCBs to be eliminated is approximately 23108 tons. This estimation does not include PCBs in the capacitor.

2.3.2.3 Open Applications of PCBs

In inventory carried out in 2004, some questionnaires were distributed to assess the existence of PCBs in open application, i.e. as oil used in hydraulic pump. The number of respondents giving response were 379. But they who stated about the hydraulic pump was only 33, including a state company involved in ship docking business (PT PAL) and power plant (Cirata). The majority of equipment was made in Japan (53.9%), UK (7.5%), Germany (6.3%), and local-made (2.7%). The oil types used for the reported hydraulic pump were Turalik (28.7%), Shell Tellus (13.8%), SAE (11.4%), and Esso (6.6%). The highest oil volume oli was 2500 liters. Oil of hydraulic pumps is regularly and frequently changed.

Results of laboratory tests revealed that no PCBs were found in all samples drawn from hydraulic liquid from manufacture industry and hydraulic pumps used in university laboratories. No survey was carried out for PCBs application in paints, carbonless paper, and inks.

2.3.2.4 PCBs-Containing Wastes

Survey in 2004 revealed a number of electrical equipment containing PCBs that were no longer in used, e.g. transformers and capacitors. Large companies were usually aware of the potential danger of PCBs so that they put the used equipment in B3 shed await to be transported and destroyed by PT PPLI. Things to worry about are that disposal of equipment such as used capacitors by the owners because they are not aware of the potential danger of PCBs contained in the equipment. Some used transformers were put in open space and the oil was vanished. The workers were not aware that the oil was used by the surrounding inhabitants as cooking fuel. The workers were not aware whether the oil was contaminated with PCBs or not.

Survey has been carried out in places suspected to be polluted by PCBs, e.g. a facility for used oil processing owned by Pertamina, transformer warehouse owned by PLN, and transformer workshops in Jakarta, Bogor, Bandung, Surabaya, and Malang. The workers mentioned that PCBs are no longer used long time ago. Today, the common oil used in the equipment is PCBs-free oil. Regulatory limits for PCBs in soil and sediment in Indonesia is not yet available, however, if the test results of these sites are to be compared with regulatory limits in developing countries (4 ppb), then PCBs residues in these sites are far below the limits (0.5-1.1 ppb).

2.3.3 Assessment with Respect to Annex B, Chemicals (DDT)

2.3.3.1 Institutional and Regulatory Framework

DDT has been prohibited since 1993 and stipulated by GR No. 74/2001 as B3. The Ministry of Health also emphasized that DDT must not be used to eradicate malarial vector.

2.3.3.2 Production and Use of DDT

DDT has been produced in Indonesia until 1991. Survey in 2002 attempted to identify stockpiles, contaminated sites, assessment on stockpiles of DDT waste. The survey was carried out together with the survey on POPs pesticides (see Subchapter 2.3.1) by distributing questionnaires to shops selling fertilizers & pesticides. According to respondents from the Agriculture and Plantation Service, DDT was no longer used. Nonetheless, there were farmers/farmer groups in Brebes stated that they still used DDT (5.8% of 13 respondents) and

endrin (11.7%). Result of laboratory verification on the samples showed that the materials were not DDT and endrin at all.

Questionnaires sent to Health Service and general hospitals in the regions (11 respondents) showed that 2 respondents (22.2%) have used DDT in 1990-1995, but they did not use it since 1996. They stated that DDT was stored in warehouse owned by the Health Service which they believe unsuitable but the stockpiles was n longer found.

Table 11. Production of DDT in 1986-1991 (in tons)

Description	Year					
	1986	1987	1988	1989	1990	1991
Production	4082	3662	2693	4634	4516	2920
Market						
- Indonesia	831	271	379	763	521	544
- Export	2852	3109	2187	3995	6237	3884
Inventory check at year end	339	681	788	664	1578	71

Source: Sumatra 1985

DDT was formulated by PT Montroze Indonesia with the label of DDT using 75% imported technical grade DDT. Most of the product was exported, approximately 70 to 86% (Table 11). Factory capacity for formulation was 7000 tons/year. The factory was closed in 1992 by the government of Indonesia.

Use of DDT was very extensive in the past. In average, 2565.4 tons DDT was used in Indonesia every year between 1974 and 1982. The lowest consumption was in 1974/1975 (1347.5 tons) and the highest was in (3867.6 tons) in 1977/1978 (Table 12). The striking fact that the highest volume of DDT in Indonesia was distributed in Java Island, varied from 67% to 91% of the use in the country.

Table 12. Use of DDT in Indonesia (in tons)

Year	Provinces in Java Island					Other Islands	Total
	West	Central	Yogya	East	Total		
1974/75	151.7	383.6	46.9	444.7	1026.9 = 76.2%	320.6	1347.5
1975/76	143.6	264.4	171.9	874.1	1454.0 = 83.2%	294.1	1748.1
1976/77	181.2	1334.3	161.3	1583.6	3260.4 = 91.1%	318.3	3578.7
1977/78	260.9	1518.8	130.7	1547.1	3457.5 = 69.4%	410.1	3867.6
1978/79	260.5	1467.2	154.8	1409.8	3292.3 = 88.0%	449.3	3741.6
1979/80	121.8	1114.5	45.0	768.5	2049.8 = 80.4%	499.5	2549.3
1980/81	116.8	515.4	43.3	522.7	1198.2 = 68.4%	553.9	1752.1
1980/82	118.4	693.2	100.2	356.0	1267.8 = 67.1%	620.8	1888.6

Source: Sumatra 1985

2.3.3.3 Import and Export of DDT

Importation was no longer recorded by BPS after the ban of DDT. Exportation was carried out by PT Montroze Indonesia as the only producer of DDT until 1991.

2.3.3.4 Identified Stockpiles of DDT and DDT Wastes

Data regarding stockpile of DDT and DDT waste was collected together with survey on organochlorine pesticide at sampled sites (see Subchapter 2.3.1.5). No DDT was found in warehouses used to be the storage for DDT, and DDT was no longer allowed to be traded in Indonesia. Although stockpile of DDT and DDT waste were not found, there were indication that new DDT entered the environment based on the existence of a number of DDT derivatives such as DDD and DDE.

Samples of soil and sediment were taken using composite sampling method from 5 points on agricultural lands, pesticide warehouse, and rivers. Water samples were taken from 3 points in

the rivers. Residues of DDT were analyzed using a method developed by the United Nation University with some modification. The main instrument used was gas chromatograph. For water samples, the resulted data were compared to the GR No. 82/2001, whole for soil there was no regulatory limit available yet. The results of residual DDT were listed in Table 13.

Table 13. Total DDT concentration in soil/sediment and water samples taken from various regions

Sites	Residue in Soil (ng/g)	Residue in Water (ng/ml)
District of Karo		
Agricultural land at Kabanjahe	138.58	0.010
Lau Udah River	711.95	0.005
Pesticide shops	71.30-210.50	0.009
Warehouse of Agriculture Subservice	952.45	
Yard of Balai Penyuluhan Pertanian	146.82	
Greater DKI		
Warehouse of PT Pertani at Duren Tiga	2259.00	0.015
Ciliwung River at Bidara Cina	8.02-96.42	0.008
Muara Angke	46.21	0.008
District of Bogor		
Warehouse of PT Montroze	498,489.00	0.073-1.168
Paddy field at Sirnagalih	3,378.00	0.004
District of Bandung		
Ciputri River	954.40	
Village of Langensari, Lembang	89.01	0.018
Farmer's warehouse at Lembang	919.67	
Pengalengan	347.87	
Pesticide warehouse at Pengalengan	1,394.40	
District of Brebes		
Village of Pulosari I	342.72	
Village of Jaga Lempeni	454.90	
Cities of Batu, Malang, and Surabaya		
Village of Bulu Kerto, Bumi Aji	3,513.00	0.033
Brantas River, Batu	510.90	0.028
Pesticide shops, Batu	2,964.00	23.509
Warehouse of Health Service	2,531,241.00	
District of Gianyar		
Cengceng River	4.35	0.010
Subak Kulidan	6.52	0.036
Warehouse of Health Service	1,116.30	0.007
Cooperative at Village Unit Gianyar	690.50	0.007
Bedugul	2,213.90	

Source: KLH-UNIDO. 2003.

Many farmers were apt to use DDT as a pesticide for their crop, so they were easily deceived by the adulterate DDT. Therefore, they must understand about persistent pesticides, for instance through IPM and IVM activities.

2.3.3.5 Present Management (Production, Use, Stockpiles, and Waste) of DDT and Empty Containers

Because of no production, export, import, and no stockpiles, waste, and DDT empty containers wer found, there is no specific management on DDT. However, environment monitoring showed that the high DDT concentration was detected. DDT has been used for malarial vector eradication (mosquito control) before the year 1993; therefore, by considering the chemical half-life, to some extent DDT and its derivatives were detected in river sediments and river banks in some populated areas. Residues of DDT in soil can enter the river and finally stream down to coastal areas.

2.3.3.6 Current Capacity and Experience in the Field of DDT

The main concern should be on residual level in the environment. From all monitored POPs pesticides and organochlorine, DDT and its derivatives predominated in the environment. Data on POPs residues in various environment compartment showed that DDT residues were detected in air (above Java Sea), in water surface (Java Sea, Sulawesi Sea, and Malacca Strait), and accumulated in breast milk. High level of DDT residues in the water surface of Malacca Strait and Java Sea is sufficient to indicate pollution by DDT in Java and Sumatra islands.¹⁵

Compared to levels in water, sediment samples contained more types of POPs pesticides and organochlorines such as mirex, lindane, and HCB. DDT and its derivatives were also the main constituents in the sediments. In general, the concentration of POPs pesticides and organochlorines in river sediments were higher than those in water and coastal water. The highest total concentration of POPs pesticides was found in the soil of horticulture land.

2.3.3.7 Assignment of Responsibility and Liability

In accordance with the limited inventory in 2003, sites contaminated by DDT have been identified, namely on the land surrounding DDT ex-factory in Bogor (246 µg/g) and ex-warehouse of Health Service in Malang (1585 µg/g). Effort to be done related to DDT residues are implementation of remediation technology and inventory on DDT ex-warehouses throughout the country.

Monitoring on DDT residues in endemic malaria in Yogyakarta that had been sprayed with DDT showed that the half-life of DDT in the soil was 4.7 years, which is shorter as compared to that in the temperate regions, which is 10 years in average.¹⁶ Bioaccumulation has been detected in gold fish (*Cyprinus carpio*), chicken, and marine organisms. DDT bioaccumulation in marine organisms must be further investigated because Indonesia is endowed with substantial water surface and fish is an important food constituent for the population. *Tolerable daily intake* for human health protection has been determined by WHO.

The existence of DDT and others in the populated areas indicates a continuing threat by these compounds. The government of Indonesia has not yet developed regulatory limits related to POPs pesticide contaminants in sediment and soil.

2.3.4 Assessment of Releases from Unintentional Production of Annex C Chemicals (PCDDs/Fs, HCB, and PCBs)

2.3.4.1 Introduction

PCDDs/Fs are B3, as stipulated in GR No. 85/1999 as amendment of GR No. 18/1999 regarding LB3 management, with the code number of D5420 and D54221. PCDDs/Fs are also stipulated in the Decree of the Head of Bapedal No. Kep-04/Bapedal/09/1995 concerning stockpile of processing product, requirement for ex-processing site, and site for free-LB3 stockpile. The regulation states several requirements of LB3 that can be disposed in landfill. One of the requirements is that the waste must not contain PCDDs/Fs and PCBs.

Bapedal also issued SK Kep-03/Bapedal/09/1995 regarding technical requirements for LB3 management. In the annex, some regulatory limits of DRE (destruction and removal efficiency) are mentioned. The regulatory DRE is 99.99% for POHCs, and 99.9999% for PCBs and PCDDs/Fs.

2.3.4.2 Releases of PCDDs/Fs by Source Categories

¹⁵ KLH. 2004. Academic Draft for Ratification of Stockholm Convention.

¹⁶ Noegrohati S, Sardjoko, Untung K, Hammers WE. 1992. Impact of DDT spraying on the residue levels in soil, chicken, fishpond water, carp, and human milk samples from malaria-infested villages in Jawa Tengah. *Toxicol Environ Chem* 34:237-251

Estimated UPOPs. According to the Standardized Toolkit (UNEP 2001), PCDDs/Fs releases per year are calculated as activity rate \times emission factor. Activity rate is the amount of feed material or product produced, predicted from statistics data gathered by the National Statistics Bureau or the District/Provincial Statistics Office. The release factors, stated in μg I-TEQ per unit feed material processed or product produced, were determined by expert judgment based on technology applied by respondents in the study.

Identification of main sources and questionnaire design. Main source categories as has been identified, but only 7 types of questionnaires were designed. For categories Miscellaneous and Disposal/Landfill, no questionnaire was specially prepared because the data were collected via interviews. Hot Spots category also was not considered due to the assumption that the amount of release sources was predicted very few and quantitative data would be difficult to find. The questionnaires were sent to the identified respondents by mail. Some respondents were gathered in official meetings. The meetings were held in 7 locations, which are at District of Bogor the Province of West Java, the Province of Bali, the Province of East Java, the Province of North Sumatra, the City of East Jakarta, and the Province of Banten. Data from government offices were also collected through the meeting. Some respondents were visited at their respective locations.

A list of industries that were considered as relevant for this study was derived from the Directory of Manufacture Industries (BPS 2001). Selection is based by category and subcategory which are relevant and province or district being studied. PCDDs/Fs releases by small holder industries were considered low because these are categorized as downstream industries, besides that the expected data might not be easy to be collected. Respondents in the survey are listed in Table 14. Not all questionnaires reached the intended respondents.

From the main category waste incineration, the highest release of PCDDs/Fs was estimated came from municipal waste incineration (62 g TEQ), followed by medical waste incineration (7 g TEQ) and hazardous waste incineration (5 g TEQ). Shredder waste incineration, sewage sludge incineration, and wood waste incineration were not significant because these activities were not commonly practiced. The highest release was in fly ash (58 g TEQ).

Incineration of Medical Waste. Total number of hospital in Indonesia is 1178, including about 49% having incinerator but only 77% of which declared that the incinerators are working. However, there is no report whether they are working properly in terms of PCDDs/Fs releases. Survey on incinerators operated by hospital in Jakarta revealed the existence of 11 incinerators, 7 actively operated, and 4 not active, usually small capacities of $0.15 \text{ m}^3/\text{day}$, installed in 1997 to 2001, and mostly using kerosene as fuel. The incinerators operate at temperature $900\text{--}1200^\circ\text{C}$, 5 to 9 m high for stack, and mostly are located at less than 50 m distance from the residential areas.

Table 14. Questionnaire distribution and respondents for release of PCDDs/Fs

Questionnaires or Interview Type	Via Meetings			By Mail		
	Handed	Returned	%	Handed	Returned	%
Waste incineration	34	23	67.6	7	0	0
Ferrous & non-ferrous metal production	13	9	69.2	42	7	9.3
Power generation & heating	13	5	38.5	0	0	0
Mineral production	15	9	60.0	62	5	5.4
Transport	24	10	41.7	2	0	0
Uncontrolled combustion processes	26	13	50.0	14	2	5.9
Production & use of chemicals & consumer goods	40	24	60.0	67	15	12.2

Miscellaneous	7	0	0	18	1	5
Disposal/Landfill	0	0	0	0	0	0
Hot Spots	0	0	0	7	0	0
Total/Average	172	93	54.1	225	30	13.3
Grand Total	$123/397 = 31.0\%$					

From the main category of ferrous & non-ferrous production, the release was estimated to be 940 g TEQ. Subcategory of iron & steel was the highest contributor (504 g TEQ), followed by aluminum (255 g TEQ), and zinc production (93 g TEQ), and others for 88 TEQ. The release is mainly to residue of the production process (560 g TEQ), followed by release to air (380 g TEQ).

From the category of power generation & heating, biomass burning for household heating and cooking was the largest contributor (135 g TEQ) and generally released to residue. From the main category mineral production, cement production was the largest contributor (46 g TEQ), followed by lime production (5 g TEQ). The largest release was to air (46 g TEQ) and to residues (6 g TEQ). In the transport main category: 4-stroke engine subcategory released PCDDs/Fs 15 g TEQ, followed by diesel engines subcategory 9 g TEQ, and 2-stroke engine subcategory of 6 g TEQ. PCDDs/Fs were estimated entirely to air. Of the uncontrolled burning main category: the subcategory agricultural residue released PCDDs/Fs 1508 g TEQ, consisted of 1204 g TEQ to air and 435 g TEQ to land.

From the main category of chemical production & consumption goods, the contribution from textile industries was 3415 g TEQ, followed by pulp and paper industries 838 g TEQ, and from chemicals and leather industries of 104 and 90 g TEQ, respectively. The release was to products (3543 g TEQ) and to residues (814 g TEQ), and the rest went to water and air. The contribution from Miscellaneous main category was not significant, i.e. from the crematoria subcategory 12 g TEQ and from drying of biomass 4 g TEQ. Releases were to air (14 g TEQ) and to products (3 g TEQ). The main category disposal/landfill could not be considered important because the practiced waste disposal is open dumping, instead of landfilling.

Overall, release of PCDDs/Fs from 10 categories in the year 2000 was estimated to as high as 7.352 g TEQ (Fig. 13). Categorical analysis shows that the release in 2000 from the highest to the lowest (in g TEQ and %) are as the following: production of chemicals and consumer goods (4,442 g, 60.4%), uncontrolled burning (1640 g, 22.3%), iron and non-iron industries (939 g, 12.8%), and power generating units (153 g, 2.1%). Meanwhile, 5 other categories contributed about 2.4% (Fig. 14).

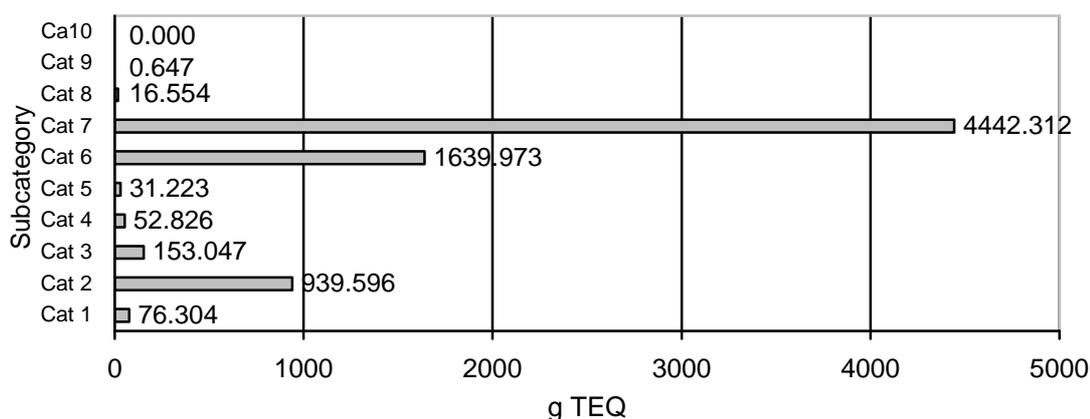


Figure 13 Estimated release of PCDDs/Fs from 10 categories, in g TEQ

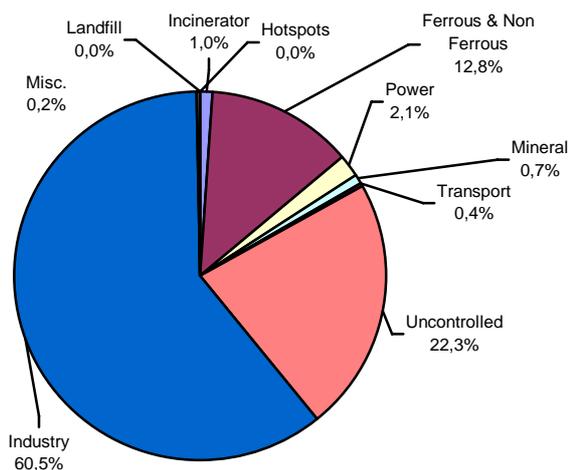


Figure 14 Percentage of release of PCDDs/Fs from 10 categories

Overall, vector analysis indicates that the most emission is released to product (48.2%), to air (24.1%) and to residue (20.7%) (Fig. 15).

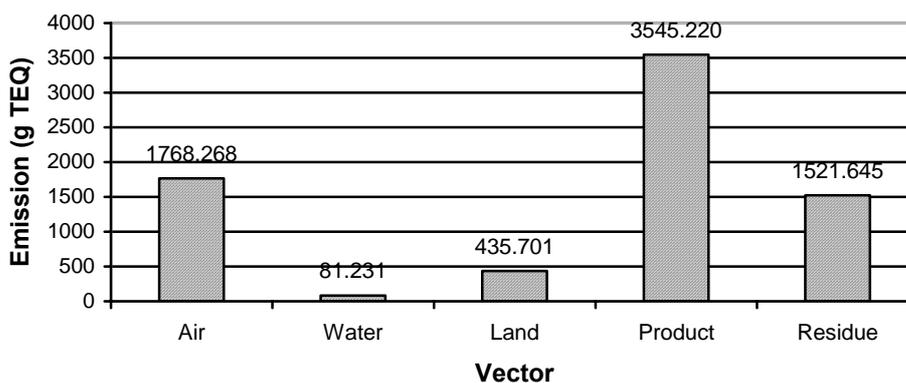


Figure 15 Estimated release of PCDDs/Fs to 5 vectors, in g TEQ

Open Biomass Burning. It is obvious that in treatment the waste, open burning is practiced by urban (36%) and by rural people (55%). Composting is small, 1% in urban and 3% in rural areas (Table 15). This information supports the high contribution of open burning to emission of UPOPs. Achievement by WJEMP¹⁷ project on an increasing percentage of urban waste composting might be replicated in other provinces.

Table 15 Percentage of domestic waste burning and ways to discard (BPS 2004)

	Urban	Rural	Total
Carried away by workers	41.28	1.49	18.41
Dumped	7.97	12.64	10.66
Turn into fertilizer	1.15	3.18	2.31
Burned	35.59	55.27	46.90
Thrown into river	6.90	8.50	7.82
Thrown anywhere	2.72	11.31	7.66
Other	4.39	7.61	6.24
Total	100.00	100.00	100.00

¹⁷ KLH. 2004. West Java Environment Management Project.

2.3.4.3 Assessment

Estimation from the inventory carried out 2004 by using emission factors in the Standardized Toolkit showed that the release ranges from 8400 to 37 453 g TEQ. Based on the emission factors in the *Toolkit*, the widest range to air is the waste incineration (ratio of 150:1 from the maximum value to minimum value). The second widest range is found in iron and non-iron category (44:1), which is largely depending on the air pollution control system employed by the manufacturers. The third largest variation is also shown by power generation category (31:1). More specific instrument is needed by analyzing PCDDs/Fs releases using laboratory methods. Therefore, more realistic emission factors shall be used in inventory of PCDDs/Fs in the future.

By using the toolkit prepared by the UNEP, the study estimated that the release of PCDDs/Fs in Indonesia is lower to as compared to that of 17 European countries, which is 20,047 g TEQ (ranging from 1318 g TEQ to 20 047 g TEQ).¹⁸

The survey did not include any assessment on PCBs and HCB as UPOPs since these are beyond the scope of UNEP toolkit. No information from the industries concerning release of PCBs and HCB. There are no regulatory limits for PCDDs/Fs, PCBs, and HCB in food products and emission standard for industries. Laboratories in Indonesia are not yet capable in testing PCDDs/Fs.

Since PCDDs/Fs releases are mostly caused by activities associated with thermal processes, it is suggested that the government and every concerned companies should control the equipment related to thermal processes and its emission to air, and its residues to land and water. Air pollution control system must be improved by using scrubber, bed carbon filter, catalyst converter, etc. Controlling the import of organochlorines can minimize release to the products.

2.3.5 Information on the State of Knowledge on Stockpiles, Contaminated Sites and Wastes, Identification, Likely Numbers, Relevant Regulations, Guidance, Remediation Measures, and Data on Releases from Sites

2.3.5.1 Introduction

Survey in 2003¹⁹ revealed that no stockpile of POPs pesticides, but the residues at high concentration was found surrounding the DDT ex-warehouses.

2.3.5.2 Institutional and Regulatory Framework

GR No. 74/2001 concerning B3 management includes several articles related to stockpile, waste, and remediation of environmental condition:

- Article 15: every container of B3 must have symbol and label in addition to MSDS (Material Safety Data Sheet).
- Article 20: B3 which is expired and or not fulfill the specification and or used containers, must be managed in accordance with the regulations in the field of LB3 management.
- Article 24: every individual carrying out B3 management must be responsible for the accident or emergency situation caused by the B3.

¹⁸ Northern Ireland Department of the Environment. 2002. Dioxins and Dioxins-like PCBs in the UK Environment: Consultation Document. London: Department for Environment, Food and Rural Affairs (DEFRA Publications)

¹⁹ KLH & UNIDO. 2003. The Second Interim Report: Enabling Activities to Facilitate Early Action on the Implementation of the Stockholm Convention on Persistent Organic Pollutants (POPs) in Indonesia

- Article 25: procedures to be taken in case of accident/emergency situation includes: (1) isolate the site of accident, (2) perform mitigation according to the standard procedure for accident, (3) report the accident/emergency situation to the local government, (4) give information, supports, and evacuate the surrounding community.

So far, there are no regulatory limits for POPs in soil and sediment. There is no institution involves in gathering information regarding stockpile, contaminated land, release from land, identification methods, and regulations regarding methods for remediation.

2.3.5.3 Sites Contaminated with POPs

Inventory in 2004 revealed that high level of DDT residues was found in yard surrounding ex-warehouse. The highest contaminated land was in the premise of Health Service Office in Malang (1585 $\mu\text{g/g}$) and on surrounding ex-factory of DDT in Bogor (246 $\mu\text{g/g}$). The highest level of DDT residues was found in agricultural land in Bedugul, Bali (2.114 $\mu\text{g/g}$). Contaminants on other sites are listed in Table 16. There is no report on the remediation on these sites.

Table 16 Contaminated land by DDT and PCBs in Indonesia (Noegrohati 2004)

Site	Media	Contaminated by Σ DDT			Contaminated by Σ PCB	
		Range	Average	DDT/DDE	Range	Average
Bali	Soil ($\mu\text{g/kg}$)	4 - 2213	806 \pm 918	4 - 44	-	-
	Water (ng/L)	7 - 36	15 \pm 14	4 - 14	-	-
Bandung	Soil ($\mu\text{g/kg}$)	89 - 1394	741 \pm 520	1 - 32	0.5 - 1	0.9 \pm 0.4
	Water (ng/L)	18	-	7	1 - 340	158 \pm 170
Bogor	Soil ($\mu\text{g/kg}$)	1762 - 498489	7512 \pm 18669	0.7 - 11	0.1 - 1.1	0.5 \pm 0.5
	Water (ng/L)	8 - 1168	305 \pm 420	1 - 5	6 - 16	13 \pm 6
Batu	Soil ($\mu\text{g/kg}$)	510 - 2531241	634557 \pm 1264456	1.7 - 4	-	-
	Air (ng/L)	28 - 23509	4730 \pm 10492	1 - 27	-	-
Brebes	Soil ($\mu\text{g/kg}$)	342 - 454	388 \pm 52	0.1 - 0.3	-	-
Jakarta	Soil ($\mu\text{g/kg}$)	8 - 2259	602 \pm 1105	0.02 - 10	0.1 - 1.1	0.6 \pm 0.5
	Water (ng/L)	8 - 15	10 \pm 4	4 - 9	1	1
Karo	Soil ($\mu\text{g/kg}$)	71 - 952	371 \pm 367	1 - 34	-	-
	Water (ng/L)	5 - 10	8 \pm 3	1 - 2	-	-
Malang	Soil ($\mu\text{g/kg}$)	-	-	-	1	1
	Water (ng/L)	-	-	-	2546	2546
Semarang	Soil ($\mu\text{g/kg}$)	-	-	-	1 - 526	263 \pm 371

Source: Noegrohati (2004)

2.3.5.4 Preliminary Identification of Priority Sites

Based on the preliminary survey, some sites suspected to be contaminated by POPs are ex-warehouse of DDT. These warehouses belong to the Ministry of Health. However, before remediation to be taken, detailed survey on the level and the area of contaminated sites must be carried out.

2.3.5.5 Current Capacity and Experience

Regular environment monitoring program which is extensive and comprehensive for POPs is not available yet. So far, the activities are considered incidental and sporadic just for the area under study. In general, measurement of pollution degree was carried out in collaboration with other parties, including with university (e.g. Padjadjaran University in 2005). In addition to lack of regular program, constraint in implementation seems to be funding and equipment in the country.

2.3.5.6 Assignment and Responsibility and Liability

In relation to accident/emergency situation, GR No. 74/2001 stipulates:

- Article 26: after receiving report regarding accident/emergency situation caused by B3 the local government officers must immediately take action for mitigation.
- Article 27: It is obligation for every individual in B3 management to (1) give compensation caused by the accident/emergency situation, and or (2) remediate the damaged and polluted condition of the environment caused by B3.
- Article 31: every individual in B3 management must give regular written report about B3 management every 6 months to the institution responsible and the authorized institution in corresponding field with a copy for the respective officers in provincial/district/municipal level.

2.3.5.7 Overview of International Experience and Practice

Agricultural extensions, with the assistance from NGO and funding from donor country have been carried out in the past, particularly in empowering the farmers in using pesticides. However, until now, there is no international experience and practice in conjunction with finding stockpiles, contaminated sites dan waste, identification, probable concentration level, guidelines, remediation method, and data on release from land.

2.3.6 Summary of Future Production, Use, and Releases of POPs – Requirements for Exemptions

According to GR No. 74/2001 (Annex II, Table 1), 10 compounds of POPs are prohibited to be used; therefore, are prohibited to be produced, imported, and exported in the future. The ten compounds are aldrin, chlordane, DDT, dieldrin, endrin, heptachlor, mirex, toxaphene, hexachlorobenzene, and PCBs. Disposal of B3 has been regulated and facility to destroy them must have permission from the MoE.

Even though POPs pesticides are not produced in Indonesia, illegal use may happen if smuggling of these commodities from other countries are not strictly controlled and sanctioned. Releases of POPs pesticides from new as well as from the past uses are likely transported to the estuaries and sediments and start to be bioavailable.

Releases of UPOPs are probably increasing due to the following facts and forecasts:

- (1) In the long-term development plan²⁰, it has stipulated that industrial sector will be strengthened, especially those in agroindustries and mining-based industries.
- (2) Steel production and consumption have been forecasted to increase.²¹ The production and consumption figures are still below the capacities of the domestic manufacturers.
- (3) Some non-governmental organizations have urged the government to ratify the regulation on domestic disposal waste. The Ministry of Environment in collaboration with the Japan International Cooperation Agency has prepared the academic draft on waste disposal.²²
- (4) Up to now, there is no real monitoring on UPOPs releases from manufacturing activities and incineration of medical wastes. On the other sides, industrial sectors have grown significantly since the economic crisis in 1998 and health services getting better that might need better medical waste disposal facilities.²³
- (5) Open burning is practiced widely and there are no regulations to control this system yet.

Indonesia has decided not to use DDT as pesticide in the agricultural practices and in malaria eradication. In relation to Stockholm Convention, Indonesia does not have any intention to take exemption because malarial mosquitoes have been resistant to DDT. The substitutes are Icon (λ -sihalotrin as the active compound), Vectron (etophenprox as the active compound), and Bendiocarp.

2.3.7 Existing Programs for Monitoring Releases and Environmental and Human Health Impacts, Including Findings

2.3.7.1 Introduction

Regular monitoring program for POPs release and the impact on environment and human health is not yet available. Based on the available national policies, conflict between economical orientation and environmental development in Indonesia in general has not been materialized because of the weak position of the MoE. The MoE (2004) stated some factors that hamper the implementation of environmental policies, namely

- 1 Structural obstruction, mainly regarding to accept the intervention of the Ministry in relevant sector;
- 2 Weak enforcement of national laws;
- 3 Weak in programme identification that is based on real problems in the field.

In addition to weak support to the implementation of the Ministry's policies by other sectors, there are also gaps in capacity in implementing regional autonomy among governmental level, causing weak performance of the government in general.

2.3.7.2 Declaration and Reporting of Priority Pollutant Releases

Based on the obligation to comply with the Convention, evaluation on the existing and the forecasted releases must be carried out, including development and maintenance of source inventory and release estimation, as well as source category enlisted in Annex C of the Convention text.

Up to now, essentially no evaluation regarding this matter. Hence, there is no corresponding strategy to comply the obligation of evaluation, steps to improve education in relation with awareness on the strategies, and schedule to implement the action plans.

²⁰ Bappenas. 2005. Long-Term Development Plan of Indonesia, 2005-2025 (draft)

²¹ FER. 2003. Industri baja tak 'sekuat' baja itu sendiri (Steel industry is not as tough as the steel itself). *Kompas* 13 May 2003. p 15, col. 1-9

²² <http://www.kompas.com>. 2005. Pemerintah didesak sahkan RUU Sampah.

²³ PUN. Ratusan rumah sakit belum miliki insinerator medis. *Kompas* 25 May 2003. p 9, col. 8-9

Obligation to report DRE (with the criteria among others is efficiency about elimination of UPOPs) has been done by some imcinetarors' owners. In the future, release of UPOPs quantitatively is very likely to be realized. This will be more significant if regulatory limits also include UPOPs parameters.

2.3.7.3 Current Monitoring Standards and Capacity for POPs

Institution responsible for environmental standards is the MoE, particularly Pusarpedal. However, the existing standards to comply the Convention eequirement is not complete, amog others are sufficiency of human resource, laboratory, an regulatory limits. Standards for organochlorine pesticides in water and in agricultural products are available already (referring to WHO), but no standard for soil/sediment. For a while, there are no regulatory limits for UPOPs. Especially for UPOPs, the first thing to be measure is the release to be used as baseline and from there on, the release of UPOPs must be decreasing.

2.3.7.4 Background on Potential Sources of POPs Impacts

Evidence of POPs in the environment can be seen in Table 8 and Fig. 10-12. Environment quality caused by POPs residue pollution was monitored in April-October 2005. Samples were taken from agricultural land and river in the cities of Medan, Agam (West Sumatera), Lampung, Cianjur, Brebes, Yogyakarta, and Batu-Malang. The samples consisted of river waters, river sediments, and agricultural land. The results showed that POPs, especially DDT and its derivatives, were still detected in the water, soil and sediment samples. In the river waters, the compounds of *p,p*-DDT and its derivatives were detected in the concentration range of 0.002 and 0.022 ppb. The highest concentration was detected for *p,p*-DDT as high as 0.022 ppb at apple orchard in Batu-Malang (Fig. 16).

In river sediment, POPs, also predominated by DDT and ita derivatives, were detected with the range of 0.230~8.62 ppb. In the river sediment, HCB and heptachlor were also detected (Fig. 17). Soil samples only contain DDT and its derivatives in the range 0.24~48.4 ppb. The highest concentration was found for *p,p*-DDT on the agricultural land in Batu, Malang. On the agricultural land in Cianjur, *p,p*-DDT was also detected with even higher concentration compared to the derivatives (Fig. 18).

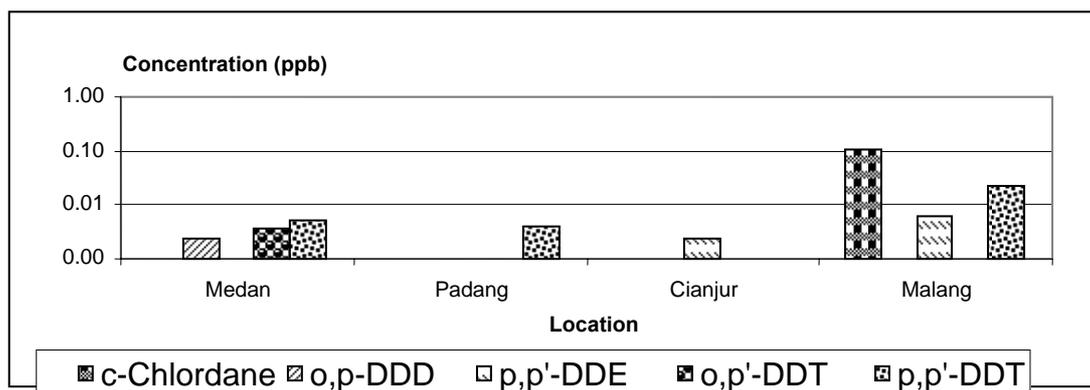


Figure 16 Highest concentration of POPs detected in waters (KLH 2005)

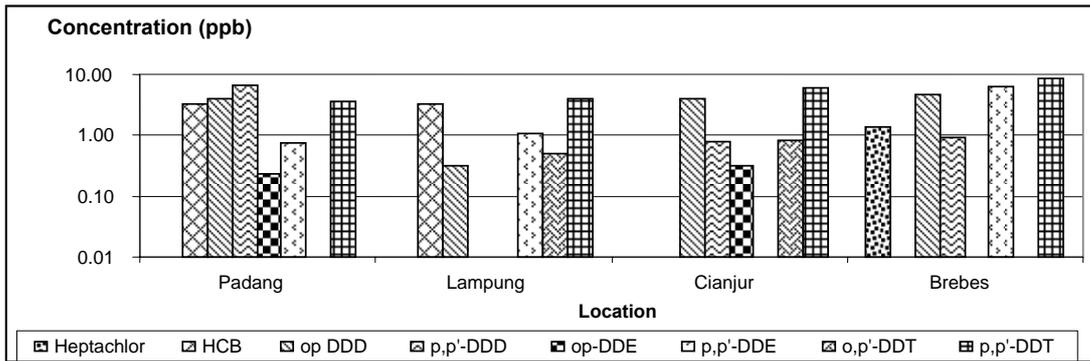


Figure 17 The highest concentration of POPs detected in Sediments (KLH 2005)

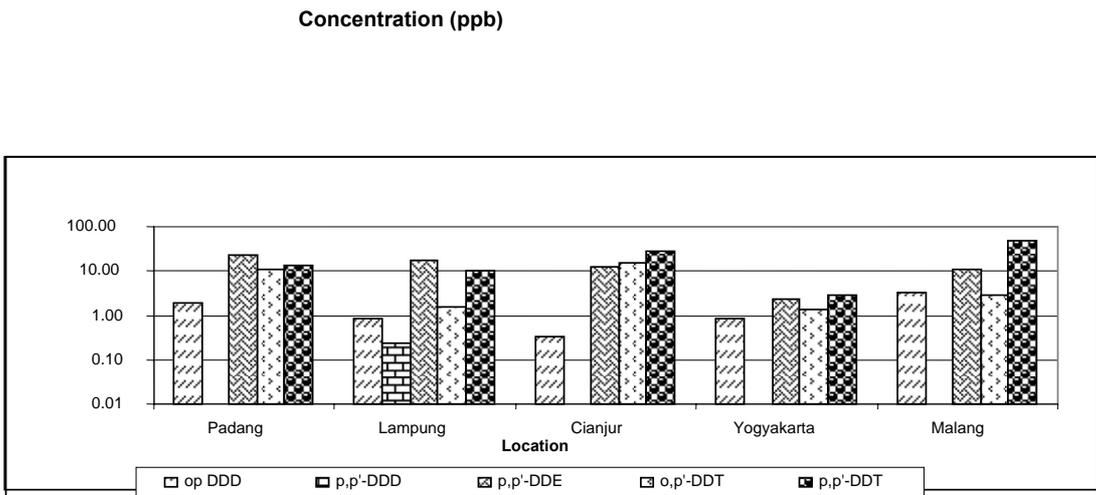


Figure 18 The highest concentration of POPs detected in agricultural land (KLH 2005)

Monitoring has been carried out also in collaboration with four institutions: (1) the United Nation University Project on Environmental and Governance: POPs Pollution in the East Asian Coastal Hydrosphere; (2) Monitoring of POPs in the Coastal Hydrosphere of Indonesia, under the collaboration with the United Nation University and the Environmental Management Centre, Deputy of Technical Facilities of Environmental Management, (3) Pusarpedal-MoE Japan, dan (4) KLH. The data covers the year of 2001 to 2003. Atmosphere above the city of Jakarta has been polluted by POPs pesticides.²⁴

A collaboration survey between Pusarpedal and the MoE of Japan in June 2005 revealed that POPs concentration at a location 25 km south of the Greater Jakarta ranged from not-detected to 110 pg/L for HCB. Meanwhile, the joint survey between the Padjadjaran University and the MoE in July-October 2005 showed that overall, POPs were still detected in the environment, ranging from 0.002-3.910 ppb in river water, 0.240-713.4 ppb in river sediments, and 0.340-1.282 ppb in soil.²⁵ It can be concluded that despite the prohibition in Indonesia, POPs are still detected in the environment, particularly DDT and its derivatives. Soil and sediment are commonly some places for accumulation of POPs, so that the concentrations detected in these media were much higher than that in the river water.

Pesticide residue maximum limit (BRMP) is defined as a maximum concentration allowed from the legal aspect or known as acceptable concentration in or at agricultural products, food or feed. The concentration is stated in milligram pesticide residue per kilogram of agricultural product. Due to some constraints, regulation concerning BMRP in the Annex of the joint decree of the Ministry of Health and the Ministry of Agriculture in 1996 adopted the regulation in Codex 1995/1996. It is the time to revise and update the BMRP regulation according to the latest regulation in the Codex.

²⁴ KLH. 2005. Outcome from the Trial Air Monitoring of POPs Chemicals in Indonesia

²⁵ KLH bekerja sama dengan Universitas Padjadjaran. 2005.

Level of DDT residue in breast milk (ASI) has been measured by Sumatra.²⁶ It was reported that 88.5% of ASI contain pesticides, with DDE content of 54.05 ppb in the colostrum. Maximum DDE in ASI allowable by WHO is 50.0 ppb while LD₅₀ of DDT is 113 mg/kg body weight. Noegrohati *et al.*²⁷ reported that DDT in ASI was in average of 45.3 µg/g fat of ASI. The research was carried out especially for groups exposed to DDT and the results were, in factn very high as compared to those of general community. Burke *et al.*²⁸ reported the level of *p,p*-DDT in fat of ASI of the urban inhabitants in Indonesia was 0.11 mg/kg fat of ASI in in rural was 0.07 mg/kg. Level of DDE of ASI taken from urban areas was 0.05 mg/kg fat of ASI and in the rural areas was 0.76 mg/kg fat of ASI. There was no difference of DDT level and its metabolite in ASI taken from urban and rural areas. Although Indonesia is a tropical country with a large consumption of DDT in the past, level of DDT in ASI was relatively low and comparable to that in the temperate developing countries. On the other side, the percentage of samples cpntaining pesticides was relatively high (40-60%), indicating that the use of pesticides was extensive and the environment has been contaminated by this kind of pesticides.

2.3.7.5 Potential Risk Groups

Groups with highest risk of POPs exposure are

- (a) Workers (including factory supervisors) who handle and deal with POPs, especially in the maintenance of transformer and capacitor containing PCB.
- (b) Workers work closely with release of UPOPs, for example they who involve with open biomass burning, workers in textile, pulp and paper, iron and steel, and aluminum factories, and they who handle medical waste incinerator;
- (c) General public on the contaminated land and sediment, especially the women giving breast milk.

Based on the available national policies, conflict between economical orientation and environmental development in Indonesia in general has not been materialized because of the weak position of the Ministry of Environment as compared to the existing economic sectors. The Ministry of Environment (2004) stated some factors that hamper the implementation of environmental policies, namely

- 1 Structural obstruction, mainly in regard to acceptability of the Ministry intervention to the relevant sector;
- 2 Weak enforcement of national laws;
- 3 Weakening of national law implementation in the field due to various factors;
- 4 Weak in programmed identification that is based on real problems in the field.

In addition to weak support to the implementation of the Ministry's policies by other sectors, there are also gaps in capacity in implementing regional autonomy among governmental level, causing weak performance of the government in general.

2.3.8 Current Level of Information, Awareness, and Education among Target Groups; Existing systems to Communicate Such Information to the Various Groups; Mechanism for Information Exchange with Other Parties to the Convention

²⁶ Sumatra, M. 1984. Residu insektisida klororganik dalam air susu ibu. Tesis Fakultas Pascasarjana. Jakarta: Universitas Indonesia

²⁷ Noegrohati S, Sardjoko, Untung K, Hammers WE. 1992. Impact of DDT spraying on the residue levels in soil, chicken, fishpond water, carp, and human milk samples from malaria infested villages in Central Java. *Toxicological and Environmental Chemistry* 34:237-251

²⁸ Burke ER, Holden JA, Shaw CI. 2003. A method to determine residue levels of persistent organochlorine pesticides in human milk from Indonesia women. *Chemosphere* 50:529-535.

2.3.8.1 Introduction

Impact of chlorinated pesticides on human health and environment has been known for quite some time in Indonesian community. However, PCBs and UPOPs are quite new information. Educated community is rarely aware of these matters, let alone the general public.

Although the community has known the impact of DDT, they do not aware of the terminology of POPs. The Enabling Activity project just started in 2003. Some institutions, officials, and individual were invited to the workshops and participated in the survey, but their number is not significant compare to the number of inhabitants that might be exposed to POPs. The information is not sufficient and access to information is relatively low when considering educational background of the community in general.

2.3.8.2 Overview of Public Information Policy/Practice Related to Environment

In general, the MoE functions as a center of information for environmental issues. Nevertheless, a system to access the information regarding POPs, and use and exchange of information in relation to reporting, is not yet formulated. A stakeholder forum corresponding to reduction and elimination of POPs has been established, initiated by the Enabling Activities Project in 2003. Yet, a system to communicate and disseminate the relevant information to the target groups should be provided

2.3.8.3 Present Public Information Tools and Mechanisms

No mechanism for information exchange and assurance for accurate information to date in relation to compliance of the Convention (article 9 point 1). To address this matter, the establishment of B3 Committee is a must. Many regulations must be harmonized, for example information exchange regarding pesticides, limitation on secrecy of information, assurance of information accuracy in accordance with compliance of article 9 and 14 of the Convention. The community's right for information on environment in general has been stipulated in Act No. 23/1997 article 5. Based on article 35 of the GR No. 21/2001, the community has its right to obtain information on the effort in controlling the impact of B3 management activities on the environment. Again, the establishment of B3 Committee is important in this matter. The information should be delivered through print media, electronic media, bulletin board, and MoE's website. Target groups for specific information are described in Subchapter 2.3.7.5.

2.3.8.4 Assessment of Environment as a Public Priority

In regard with POPs, so far there is only advocacy about hazard of DDT by FIELD, but not about other POPs yet. The following things are not yet carried out to comply with Stockholm Convention:

- (1) giving information to the community;
- (2) community participation to address and develop measures to implement the Convention;
- (3) make information available to the community regarding social and economic impacts caused by elimination of POPs.

2.3.8.5 Chemical Contaminant and Pollutant Release Public Information Programs

Community information program concerning chemical contamination and release of pollutant has not yet in a good structure within the MoE. In the future, the information about POPs will be handled by the B3 Committee. The Committee will be established in the MoE in accordance with the stipulation in GR No. 74/2001, with its tasks to provide suggestions and consideration to the government. The Committee may consist of several subcommittees. The membership consists of representatives of authorized institutions, of the responsible institutions, of the

relevant institutions, of the universities, environment organizations, and associations. The membership, tasks, functions, and the management of the B3 Committee will be stipulated by a Presidential Regulation.

2.3.8.6 Relevant Case Studies of Public Involvement

Indonesia community is very concern with environment when the accident has happened. One example is the case of Buyat, involving suspected mercury pollution in gold mining in North Sulawesi. Mercury pollution is also threatening the inhabitants along the Barito River. The community that has an obvious attempt in environment protection is in the reclamation of mangrove at the coastal areas. The result was significant, indicated by the developing growth of mangrove, and fish catches by the fishermen was increasing. Except that the community does not want to use DDT any longer, their participation in reducing and eliminating UPOPs does not yet obvious. One reason is that they still practice open burning.

In conjunction with the compliance to the Convention, to date

- (1) awareness on POPs among the decision makers is lacking;
- (2) information on POPs to the community is insufficient;
- (3) community awareness program, especially to women and children is not available;
- (4) community participation in addressing POPs and their impact to the environment and to human health and in developing response as well as giving suggestions to the implementation of Convention is not yet obvious;
- (5) training for workers, scientists, teachers, technical and managerial workers is very limited;
- (6) exchange of education materials for community awareness is not implemented, both at national and international levels.

In many cases, the Ministry of Environment serves as the centre for environmental issues. However, the system for POPs information access, use, and exchanging relevance for reporting are not yet formulated. Stakeholders in conjunction with eliminating and reducing POPs have been formed, initiated by the Enabling Activities Project in 2003. A system for communicating and disseminating relevant information to the target groups is not available yet.

There is no mechanism to undertake information exchange, and assurance of information accuracy in conjunction to fulfillment to the Convention (Article 9 point 1). Various regulations within the country must be harmonized, for example, exchange of information on pesticides, agreement on confidential information, assurance on information accuracy regarding the fulfillment of Articles 9 and 14 of the Convention, the community's right upon information regarding environment that has been generally stipulated in Act No. 23/1997 article 5.

Committee on B3 will be established within the Ministry of Environment as stipulated in the GR No. 74/2001, with its task to provide advice and consideration to the government. Committee on B3 may consist of several B3 Subcommittees. The members may consist of representatives of relevant authorized institutions, representatives of responsible offices representatives from universities, environment organizations, and associations. The composition of members, duties, functions, and working mechanism is to be set by a presidential decree.

2.3.9 Relevant Activities of Non-Governmental Stakeholders

Lacks of public understanding on problems related to POPs have caused no appearance of relevant activities from NGOs. However, a policy on public-private partnership has turned out to give positive impact. A cement-producing company Holcim, with assistance from GTZ, has produced guidance on waste co-processing in cement production. This technology may improve waste management at national and local levels, besides reducing environment degradation due to cement production in a clean production concept and 3R (reduce, recycling, reuse).

There have been several domestic NGOs dealing with POPs management help implementing Basel Convention, among others, through training, waste management studies, PCB management, and LB3 incineration that do not produce UPOPs.

Lack of understanding on POPs has caused no relevant activities contributed by the NGOs.

Some NGOs have involved in the NIP preparation (Table 17). They had been actively participated in dissemination of Enabling Activity (designation of stakeholders, results of POPs inventory, and drafting NIP). In the implementation of POPs pesticide inventory in Brebes, the NGO Farmer's Initiatives for Ecological Livelihoods and Democracy (FIELD) had been actively participated in the inventory. Inventory in the District of Bandung was carried out in collaboration with the Green Earth Foundation (GEFo), and in the District of Kerinci with WWF.

Table 17. NGO and associations involved in Enabling Activity

No.	Name of NGO or Association
1	Asia Pacific Vinyl Network
2	Asosiasi Industri Baja (Association of Steel Industries)
3	Asosiasi Industri Perlindungan Tanaman Indonesia (Association of Plant Protection Industries)
4	Asosiasi Pabrik Tekstil Indonesia (Association of Textile Factories)
5	Asosiasi Pembuat Transformator Indonesia (Association of Transformer Makers)
6	Asosiasi Pengusaha Automotif Indonesia (Association of Automotive Business)
7	Asosiasi Pengusaha Cat Indonesia (Association of Paint Business)
8	Asosiasi Pulp dan Kertas Indonesia (Association of Pulp and Paper)
9	Asosiasi Tambang Indonesia (Association of Miners)
10	Aspembaya (Merchants & Users of Hazardous Substances Association)
11	Chemical Manufacturers Association
12	FIELD
13	Forum Industri Gunung Sugih (Forum of Industries at Gunung Sugih)
14	Himpunan Kerukunan Tani Indonesia (HKTI) (Association of Farmers)
15	Masyarakat Pestisida Nasional (Association of National Pesticides)
16	Pesticide Action Network (PAN)
17	World Wild Fund (WWF)
18	Yayasan Konsumen Indonesia (YLKI) (Indonesian Consumer Foundation)

2.3.10 Overview of Technical Infrastructure for POPs Assessment, Measurement, Analysis, Alternative and Prevention Measures, Management, Research & Development – Linkage to International Programs and Projects

2.3.10.1 Introduction

The Convention implementation requires capacity building, including about information on emissions and releases. It implies the importance of improvement in the collecting system of information and preparation of emission and release factors that needs support in terms of organization, technical, and funding. Technical and financial assistance as well as human resources must be available for further POPs inventory (stockpiles, wastes, equipment containing/contaminated by POPs). Technical and professional capacities to address POPs problems must be strengthened. Unfortunately, financial sources are very limited.

2.3.10.2 Waste Management Facilities

Transporting B3 wastes and disposal procedure have been stipulated in GR No. 74/2001. In 2004 inventory, there were only one facility for B3 destruction in Indonesia, namely in Cibinong

(PT PPLI). This facility is located in Java Island. This situation has a consequence in high cost for the business operators to eliminate POPs (B3). PT PPLI is one of B3 destruction facility that has permission from the government. If POPs can be destructed by cement kilned equipped with good thermal control and release filter, then the opportunity to add the number of POPs destruction facility in outer Java Island should be better, since many cement kilns are scattered in the archipelago.

2.3.10.3 Contaminated Site Remediation Capability

So far, there is no experience in remediating POPs contaminated sites. The experience is in remediating sites contaminated with oil spill. The area of oil-spilt remediation as considered small, by employing bioremediation.

2.3.10.4 Environmental Monitoring Capability

In the last four years, environment monitoring was carried out by Pusarpedal/KLH in collaboration with universities and donor countries, such as the United Nation University, Padjadjaran University, and the MoE of Japan, However, the monitoring was not carried out regularly. Research on methods and laboratory analysis of POPs are considered costly and requires additional support. Generally, the existing environmental laboratories provide services for analysis of pesticides POPs and PCBs according to the published literature, for example by employing ASTM method.

Ability in environment monitoring for UPOPs parameters is still weak. Some industries monitored the UPOPs releases due to certain reasons, for instance in applying operational permit. The most difficult task in implementing Stockholm Convention will be in reducing UPOPs releases. To address this problem, some actions to be performed are

- (1) public awareness for not practicing open burning;
- (2) exact values of each source category because the emission factors enlisted in the Standardized Toolkit seem to be inappropriate for the condition in Indonesia;
- (3) modern burning system especially those using coal as the raw material;
- (4) modern incineration system for old-aged industries.

2.3.10.5 Health Monitoring Capability

The results of inventory imply that contamination monitoring on biological materials (feed, food, and human tissues) was not performed regularly by the responsible institutions, which are the Ministry of Agriculture, the Ministry of Health, and BPOM. In the future, efforts must be done to develop monitoring method, which is, up to now, was not yet carried out comprehensively, regularly, and at national level.

Badan POM has 26 provincial laboratories, (Balai Besar POM and Balai POM) and one Laboratorium Pusat Pengujian Obat dan Makanan Nasional (PPOMN) in Badan POM, Jakarta . Within the Ministry of Industry there are 26 provincial laboratories. LIPI (Indonesian Science Academy) has some laboratory facilities in the city of Jakarta, Bogor, and Bandung. Nonetheless, these facilities are not yet equipped with appropriate technicians and equipment for analyzing UPOPs. The capacity (instrumentation) and capability (human resource and methods of analysis of PPOMN must be improved to be able to analyze DDT, PCDD/F, PCB, and other POPs, especially in food and other consumer goods.

2.3.10.6 Technical Support and Release Mitigation Services

Inventory in 2003 reported that there was no technical assistance and services for mitigation of POPs releases. For a country in economic transition, all of these activities need substantial funding and research for finding new technologies. In relation to these, Indonesia needs collaboration in research, development, and monitoring, not only for the existing POPs compounds, but also for the POPs candidates. Areas to be covered in the collaboration regarding POPs are

- (1) source and release to the environment;
- (2) existence, level, and trend in human body and in environment;
- (3) transport, fate, and transformation in environment;
- (4) impact to human health and environment;
- (5) impact to socio-economy and culture;
- (6) rate of reduction and elimination;
- (7) inventory methods and techniques in analyzing releases.

2.3.10.7 Research and Development Assets

Some universities' laboratories are relatively potential to be developed for UPOPs testing. Some other laboratories are managed by private companies such as ALS (Australian Laboratory Service), Corelab, and Sucofindo (in all provinces).

The following is description on laboratory condition in Indonesia.

Laboratory for Chemical Analysis. The MoE has one laboratory in Serpong, Province of Banten, namely Pusarpedal (Center for Environment Impact Control). Under the Ministry of Health are 26 provincial health laboratories (*labkesda*), and 10 accredited sanitary laboratories, consists of 3 higher level laboratories (BBTKL-PPM, in Jakarta, Yogyakarta, and Surabaya), and 7 lower level (BTKL-PPM) in Medan, Batam, Palembang, Banjarmasin, Ambon, Makassar, and Manado.

Survey in 2003 clearly indicated that 55% of laboratory workers were S1-holders (bachelor degree), 38% S2-holders (master degree), and only 7% S3-holders (doctoral degree). Most of the laboratories (71%) only employed less than 5 researchers. Twenty two percent of the laboratories were managed by personnel with diploma background and even lower. Pusarpedal has been accredited for POPs residue.²³

2.3.10.8 Information Management Capacity

Inventory in 2003 revealed that information on POPs has not been managed centrally or well coordinated. Information on export/import was recorded by BPS and by the Directorate General of Customs, although it was not easy to trace the data before 1994. Information on stockpile of POPs pesticides could not be found in any institution, including in the Ministry of Agriculture/Pesticide Committee. Information on UPOPs releases were not well recorded and scattered based on the information given by the industries applying permit for operating incinerator. UPOPs release from hospital incinerators did not seem to be measured and reported to the Ministry of Health.

Stockholm Convention obliges each member to carry out research and monitoring, and report the COP regularly, including the statistical data. Based on today's condition, in fulfilling the requirement, the government must develop a reliable information system with sufficient and reliable data. The type of information expected to be given by the system must cover 2 main categories:

- (1) statistical data on production, import and export of all chemicals listed in Annex A or B, that will be obtained from the statistical offices and estimation made by research institutions and the related sectors;

(2) data on the existing and the forecasted POPs emissions and releases.

Evaluation on the existing emission and releases as well as the forecast can be carried out and related to the national regulatory limits and the registration data of sources enlisted in the Annex C. Hence, the government must develop (1) a national inventory system for emission and releases, and (2) registration for sources of emission and releases for each source category. This capability strengthening needs substantial technical and financial assistances.

2.3.11 Identification of Population and Environment Suffered from Impacts, Level of Threat to Public Health and Quality of Environment and Social Implication to Workers and Local Communities

Population affected by POPs was difficult to be measured during the past inventory. However, based on the PCBs survey, much equipment containing PCBs in industries were scattered, from some location surrounding big cities such as Bekasi to remote areas such as tin mining in Bangka Island. Factory workers dealing with transformers and workers in transformer service were not aware of the negative impact of PCBs to human health and environment. At national level, the number of workers to be the target of awareness was not known yet.

If POPs chemicals that are bioaccumulative in nature were flown to the water and precipitate in the sediment, it is obvious that these chemicals will enter the food chain, especially through fishes that are consumed in large amount by the community in Indonesia. Chickens in Central Java area were evidently contaminated by DDT used in the past (Noegrohati 1992).

2.3.12 Details of Relevant Systems for the Assessment and Listing of New Chemicals

The following is a description regarding registration for new chemicals. The system can fulfill the requirement as stated in Article 3 point 3 of the text of Convention.

In accordance with GR No. 74/2001, B3 management consists of three categories (B3 allowed to use, prohibited, and limited to use). B3 management under the scope of this regulation does not cover radioactive materials, explosives, mining products including oil and natural gases as well as the respective derivatives, food and beverages as well as food additives, household health and cosmetics, pharmaceutical ingredients, narcotics, psychotropics, and their precursors as well other addictive substance, chemical weapons, and biological weapons (Article 3).

GR No. 74/2001 Article 6 states that each B3 should be registered (registration and designated number for B3 that is in the jurisdiction of the Republic of Indonesia) by the producers or importers. Obligation to register B3 is only once for B3 that is produced or imported for the first time. Registration for B3 as stipulated in Article 3 is applied to the authorized institution according to the prevailing legislation, that is, institution that has authority in giving permit and performs control, based on its field. Meanwhile, other materials that are not specified in Article 3 should be registered by responsible institution, that is, institution responsible for controlling impact to the environmental, which is the MoE.

The authorized institution for giving registration number upon B3 that is not included in the GR No. 74/2001 sends a copy to MoE. MoE that gives registration number for B3 stated in the GR No. 74/2001 send a copy to the authorized institution. Registration procedure is specified in a decree issued by the respective institution head.

MoE informs B3 Committee and ask for advice and or consideration for new B3. Based on advice and or consideration made by B3 Committee, MoE (1) asks for adjustment to the annex of GR No. 74/2001 and (2) gives approval to the Ministry of Trade as a consideration to issue or decline permit for importation.

Especially for pesticide, Pesticide Committee was established based on the Ministry of Agriculture Decree 319/Kpts/OT.160/5/2006. The Committee constitutes of Technical Team for

Evaluation on Pesticide Registration. This Team has a task to prepare evaluation on technical data/information related to the registration and evaluate technical aspects on pesticide registration application and or pesticides that have been registered and approved. In performing their task, the Team is responsible and must report to Secretary General for the Minister of Agriculture as the Head of Pesticide Committee through the Head of the Center of Permit and Investment as the Secretary of the Committee. Analysis on pesticide residues on agricultural products is carried out by designated laboratories, based on the regulation in the Ministry of Health and the Ministry of Agriculture. According to the result of risk analysis, Pesticide Committee gives advice and consideration to the Minister of Agriculture.

Regulation concerning registration of the new chemicals is not fully consider the chemical properties listed in the Annex D of the Convention text, namely chemical identity, persistency, bioaccumulation, potential to be transported in the distance environment , and the adverse impact (toxicity or ecotoxicity data).

2.3.13 Details of Relevant System for the Assessment and Regulation of Chemicals Already in the Market

The following is a description on regulation of chemicals already in the market. This system can fulfill the requirement stated in the Article 3 point 4 of the Convention text.

GR No. 74/2001 regulates the following matters:²⁹

- Every individual exporting B3 under limited use has to notify the authority of the export destination country, the authority of the transited country, and MoE. Exportation can only be done after approval from the authority of the export destination country, the authority of the transited country, and MoE. Approval from MoE is a foundation to issue or to decline export permit from the Ministry of Trade.
- Every individual importing B3 that falls into limited use category and or imported for the first time has to follow the notification procedure. Notification has to be sent to the authority of the exporting country to MoE. MoE has to response the notification no later than 30 working days after the notification has been received.
- Every individual producing B3 has to provide MSDS (Material Safety Data Sheet).
- Every individual responsible in transportation, storing, and distributing B3 has to include MSDS.
- B3 has to be transported using proper means and carried out according to regulation issued by the Ministry of Transportation.
- Each B3 produced, transported, distributed, and stored has to be packed according to its category, with the procedure in packing, adhered symbol and label, and attached MSDS, according to the regulation issued by the head of responsible institution.
- Every B3 storage has to have appropriate symbol and label in terms of building site and construction. The storage must be equipped with emergency response system and procedure for B3 handling.
- B3 that has been expired and or does not meet the specification and or used packaging has to be managed according to regulation for LB3.
- Every individual performing B3 management has to comply with safety and occupational health, in line with guidelines issued by the Ministry of Labor and Transmigration and periodically undertake health checkup. The individual has also carried out mitigation on accident and or emergency situation caused by B3. Other obligation is sending periodic

²⁹ KLH. 2002. Peraturan Pemerintah Republik Indonesia Nomor 74 Tahun 2001 tentang Pengelolaan Bahan Berbahaya dan Beracun (Regulation of the Government of Indonesia No. 74/2001 regarding Hazardous and Toxic Materials)

written report at least every 6 months to the MoE and the authorized institution with a copy to the governor/local government.

- In case of accident caused by B3, every individual carrying out B3 management has to isolate the site of accident, performs mitigation according to the procedure, reports the accident or the emergency situation to the local government, gives information, supports, and evacuates the surrounding community. The management of B3 has to give compensation caused by the accident and or emergency situation, and or remediate the damaged and polluted condition of the environment caused by B3.
- Control of B3 management is under the MoE and the authorized institution. In a particular case, the authorization can be delegated to the local government (provincial/regent/city)
- A person on duty to control B3 management must have identification card issued by MoE and the authorized institution. The person is permitted to enter B3 operational site, sampling, takes picture, and or makes graphs.
- The governor/regent/mayor/Minister of Environment and authorities of the respective institution can raise community awareness on adverse potential effect of B3 management on the environment, human health and other organisms, through dissemination of information regarding B3.
- The community has the right to obtain information on effort to control impact to the environment caused by B3 management. The information must be provided by the responsible person in the activity of B3 management. The information can be delivered through printed or electronic media, and or information board.
- Violation to GR No. 74/2001 might get administrative sanction, financial compensation, and or punishment in accordance with the degree of violation.

NATIONAL STRATEGY AND ACTION PLANS

Stockholm Convention on POPs is a global treaty that has entered into force on 23 May 2001. Objective of the convention is to protect human health and environment from persistent organic pollutants (POPs). As one of signatories to the Convention, Indonesia has obligations to prepare and implement a NIP (Article 7). This document was approved by stakeholders in November 2007 and has been reviewed by The Steering Committee.

3.1 Policy Statement

The NIP was prepared prior to ratification of the Convention. Principal policies in accordance with POPs are:

- (1) Awareness of the risks imposed by POPs to human health and environment (by identifying location, magnitude, and purpose),
- (2) Need of human health and environment protection by reducing and eliminating release and use of POPs,
- (3) Encouraging linkages with various sectors in relation to POPs handling,
- (4) Possibility of receiving support from developed countries in line with the commitment stipulated in Article 13 of the Convention, to encourage programs in reducing and eliminating POPs.

Urgency of ratification of Stockholm Convention for the government of Indonesia:

- (1) POPs pesticides have been banned since 1993, but these substances are suspected to be marketed in Indonesia and the community might still use them.
- (2) Chemicals potential to be POPs other than those stated by the Convention are still in the market, for example endosulfan and paraquat.
- (3) Community in general is not aware of POPs chemicals and their negative impacts to human health and environment.
- (4) Level of comprehension of the community regarding POPs management is considered low, for example, knowledge on POPs formation, properties, and characteristics resulting from open burning practices.
- (5) Technical and human resource capacities of the laboratories are very limited to analyse POPs.
- (6) National policies, concerning chemical management, are not adequate.

The government of Indonesia will ratify the Stockholm Convention. From thereon, the government of Indonesia has a commitment to meet all obligations to the Convention. The obligations are to prepare and implement the NIP (Article 7). In a consultation with stakeholders on 15 March 2006, it was agreed that following the ratification of the Convention, a presidential decree concerning NIP should be enacted and to be implemented by all stakeholders.

Act 23/1997 regarding Environment Management gives authority to the MoE to manage all aspects of environment, including general control on hazardous and toxic materials (B3). In implementing the law, the government enacted GR No. 74/2001 concerning B3 management. This regulation prohibits the use of 10 POPs chemicals in Indonesia. In addition, PCDDs/Fs releases from incinerators have been regulated in two decrees of Head of Bapedal (No. 3 & 4/1995). NIP implementation enforces the government to review GR No. 74/2001 regarding POPs and UPOPs as well. Review on this GR showed that detail regulation must be formulated in the form of ministerial decrees from the relevant ministries. Furthermore, the government will also review other government regulations regarding water, soil, marine, and atmosphere pollution to accommodate obligations to the Convention. Review on ministerial decrees in agricultural, health, and industrial sectors will be carried for comprehensive regulation in POPs management.

National Development Vision Year 2005-2025 foresees a well developed Indonesia, self-relying, equitable and democratic, secured and united in the frame of unified country of Republic of Indonesia. Goals to be achieved in natural resources and environment management are (1) the accomplishment of sustainable management and utilization of natural resources and environment functions in equitable and balanced manners, in order to achieve optimum added value gain for the country interest and for the maximum benefit of the people of Indonesia, (2) the achievement of increased awareness, mental attitude, and behaviour of public at large in natural resources management and environment function preservation. Others are the achievement of increased public awareness on the importance of natural resources utilization and environment through the empowerment of various social and economic institutions at local level.

Economic development is aimed at activities, which are environmentally sound as such that pollution and degradation of environmental quality can be minimised, and at economic activities which are increasingly based on exploitation of environmental services. Restoration and rehabilitation of environmental condition is prioritized on efforts to enhance environment carrying capacity in supporting sustainable development.

Efforts to achieve the quality of sustainable management of natural resources and environment will be increased through the strengthening of the institutions dealing with natural resources and environmental management; the enforcement of environmental law promptly manners; credible political system in controlling conflicts; qualified human resources; and increasing implementation of environmental ethics. Furthermore, environmental ethics is gradually enforced through its internalization into production and consumption activities, and instilling

environment value and ethic into daily life including social learning, and formal education at all levels.

The MoE has developed strategies for environment sustainability as follow:³⁰

- 1 To materialize improvement in the quality of environment functions, with the targets are
 - (1) Reducing environment pollution burden in water, air, atmosphere, marine, and soil
 - (2) Reducing environment degradation rate (water resource, forest and land, biodiversity, energy, atmosphere, and coastal and sea ecosystems)
 - (3) Integrating and implementing considerations on environment functions in planning development and implementation, as well as in controlling the spatial and environment utilization
 - (4) Increasing compliance of development actors to maintain the environment functions.
- 2 Bringing into reality the good environmental governance, with the targets are to form the mainstream of good governance principles in natural resources and environment at the central and local governments
- 3 Increasing the capacity of MoE to be reliable and proactive in the management of natural resources and environment, with the targets are to achieve the increasing capacity of MoE in implementing its main task and functions.
- 4 Low awareness of the society on the natural resource management and conservation of environment.

It has been identified that one factor that have caused environmental damage by the community is misconception on the functions of environment. However, in general, environment degradation is related to 3 problems:

- 1 Weak political support to obtain sustainable environment in the process of decision making,
- 2 Low sanction to violators to environmental cases, and
- 3 Poverty.

3.1.1 Priorities and Requirements

Three categories of POPs will impose adverse effects to environment and human health in Indonesia. Indonesia will not submit any exemption for using DDT and other POPs chemicals. Prioritized action plans to be implemented based on POPs categories are shown in the following table (the number corresponds to its priority)

Category of POPs	Action Plan
POPs Pesticide	<ol style="list-style-type: none"> 1 Improve effectiveness of legislation 2 Continue monitoring on exposure to human health and environment 3 Strengthen resources and capacity building 4 Find and develop alternatives for POPs pesticides 5 Remediate contaminated sites 6 Expand the application of IPM and IVM 7 Inventory on HCB 8 Disseminate information on POPs hazards and alternatives to POPs pesticides 9 Give assistance on expired pesticide handling (not by burying)
PCB and Equipment	<ol style="list-style-type: none"> 1 Review regulations regarding reduction and elimination of PCB as required by the Stockholm Convention 2 Complete inventory on equipment containing PCB 3 Strengthen capability and capacity of infrastructures and human resources

³⁰ <http://www.menlh.go.id/archive.php?action=info&id=6>

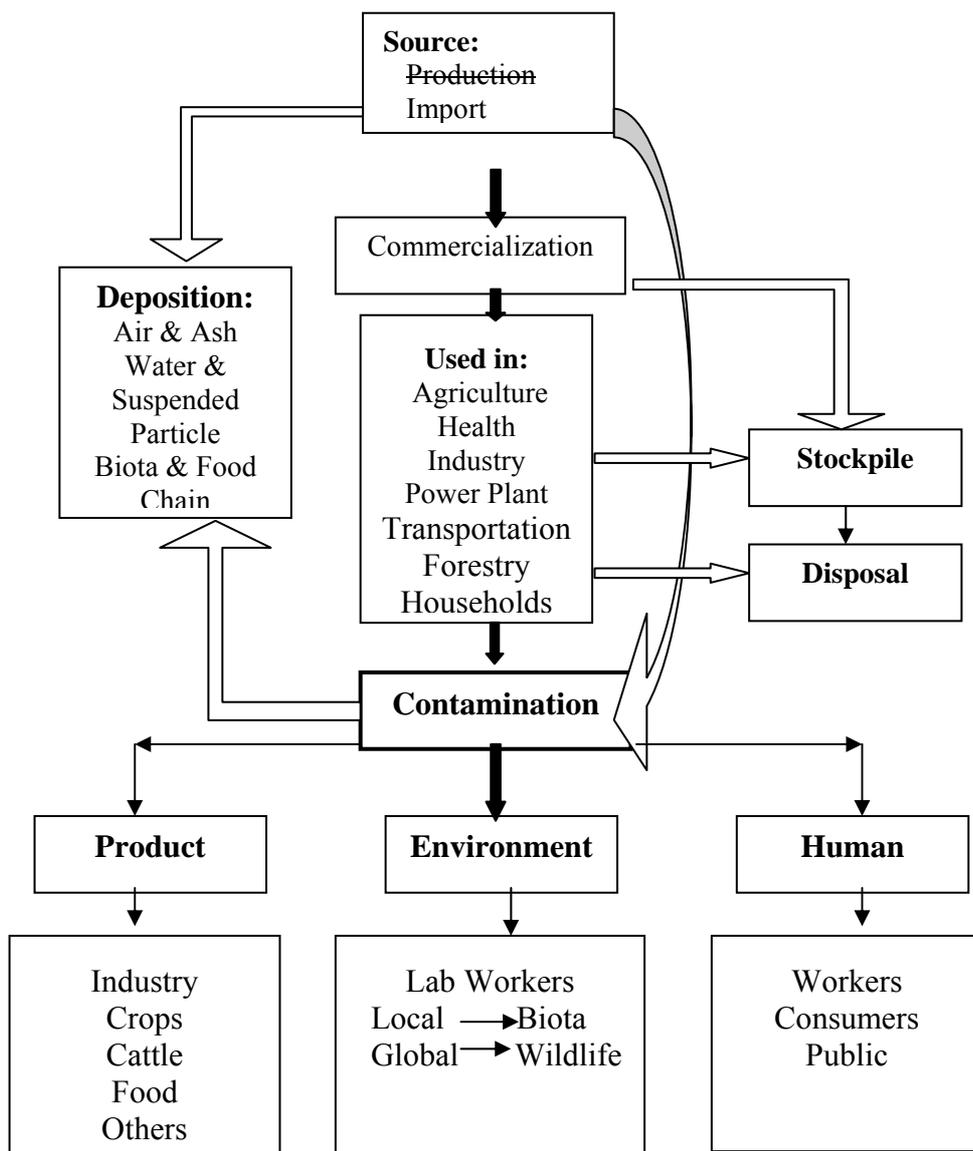
Containing PCB	<p>4 Ensure that destruction of PCB and PCB-wastes is undertaken based on ESM and in accordance with BAT/BEP</p> <p>5 Increase number of destruction facilities based on regional consideration</p>
UPOPs	<p>1 Develop accredited laboratories capable to analyze UPOPs</p> <p>2 Determine baseline and monitoring UPOPs releases</p> <p>3 Apply BAT/BEP for source categories in Part II and III of Annex C</p> <p>4 Expedite and improve Blue Sky Program</p> <p>5 Improve legislation regarding POPs</p> <p>6 Increase public awareness</p>

The quality of resources (human, equipment, and funding) at this moment is not adequate to be able to implement Convention requirements completely. Therefore, technical assistance from international agencies is needed to support all planned activities, as a commitment in the Convention implementation.

3.2 Implementation Strategies

3.2.1 Outline of Actions to Be Taken

In formulating the strategy to implement the Stockholm Convention, life cycle of POPs (Fig. 19) must be understood. POPs marketed in Indonesia are imported, except for UPOPs. Afterwards, these chemicals are used and the residues contaminated various products of industries, environment, and human. Therefore, the risks to be assessed should cover environmental risks, ecological risks, and human risks.



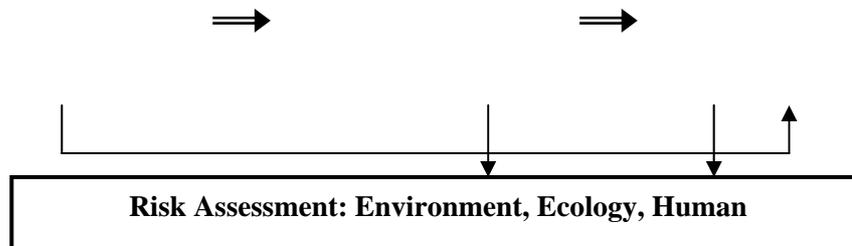


Figure 19 Life cycle of POPs (Noegrohati 2004)

By analyzing Fig. 19, institutions relevant to the life cycle can be identified, namely MoE as the focal point, the Ministry of Trade, the Ministry of Finance (Directorate General for Customs), the Ministry of Agriculture, the Ministry of Health, BPOM (Agency for Drugs and Food Control), the Ministry of Energy and Mining, the Ministry of Industry, the Ministry of Forestry, the Ministry of Home Affairs, the Ministry of Communication and Information, universities, BPPT, and LIPI (Indonesian Science Board). Other institutions: the Ministry of National Education, the Ministry Defence, The Ministry of Justice and Human Right, police, BSN (National Standardization Agency), BPS (Statistical Bureau), NGOs, and industrial associations. Gaps are indicated in fulfilling the obligation to the Convention concerning legalities, institutional, and human resources. With these in mind, the necessary actions are to:

- 1 Evaluate regulations and policies related to POPs and decide instruments necessary for the effectiveness of the legislation,
- 2 Organize the law instruments necessary to meet the Convention, for example about the regulatory limits of pollutants,
- 3 Complete the inventory on POPs (import/export, distribution, use, stockpile, disposal),
- 4 Strengthen infrastructure, capacity, and capability in producing analytical data which is valid and reliable,
- 5 Integrate monitoring and risk assessment caused by exposure of POPs, communication and education on the danger of POPs and the risks to ecosystem and human health,
- 6 Increase public awareness on the importance of reducing and eliminating POPs in ESM-wise,
- 7 Coordinate research & development regarding fate and distribution of POPs in the tropics, techniques or alternative chemicals for POPs,
- 8 Coordinate the national implementation to meet the obligation of the Convention, and

- 9 Coordinate periodical reviews and reporting to POPs Secretariat. A year prior to the report to the Secretariat, the focal point will gather and analyzed all relevant information with the stakeholders.

Objectives of Stockholm Convention are (United Nations Environment Program in August 2002).

- 1: Eliminate dangerous POPs, starting with the 12 worst
- 2: Support the transition to safer alternatives
- 3: Target additional POPs for action
- 4: Clean-up old stockpiles and equipment containing POPs
- 5: Work together for a POPs-free future

In handling such extensive aspects, a specific unit so called B3 Committee (stipulated in GR No. 74/2001 Chapter 4 Article 21) is needed. In specific, there are 4 points:

- (1) In undertaking B3 management, the B3 Committee has a task to give advice and or consideration to the government.
- (2) The Committee may have several subcommittees.
- (3) The members of B3 Committee, as stated in point (2) may consists representatives of the authorized institutions, representatives of the responsible institutions, representatives of the relevant institutions, representatives of universities, environmental organisations, and professional societies.
- (4) Membership, task, function, and working rules of the Committee as intended in point (3) should be stipulated in a Presidential Decree.

The Committee's tasks are in strategic planning, implementing coordination so as to achieve the effective and efficient interdisciplinary works. Hence, members of the Committee should be selected carefully to obtain optimum performance.

In principle, the Stockholm Convention is a risk management of POPs based on risk assessment on POPs. Risk assessment is a scientific activity, whilst risk management is a managerial activity that is based on scientific considerations (risk assessment) and other considerations including political, social, economy, and cultural aspects.

Works involved are depicted in Fig. 20. As a consequence, these activities need a team of experts, specific in the field of: chemodynamics, modeling, instrumental analysis, toxicology, ecotoxicology, ecology, epidemiology, environmental economy, environmental law, sociology, cultural, information technology.

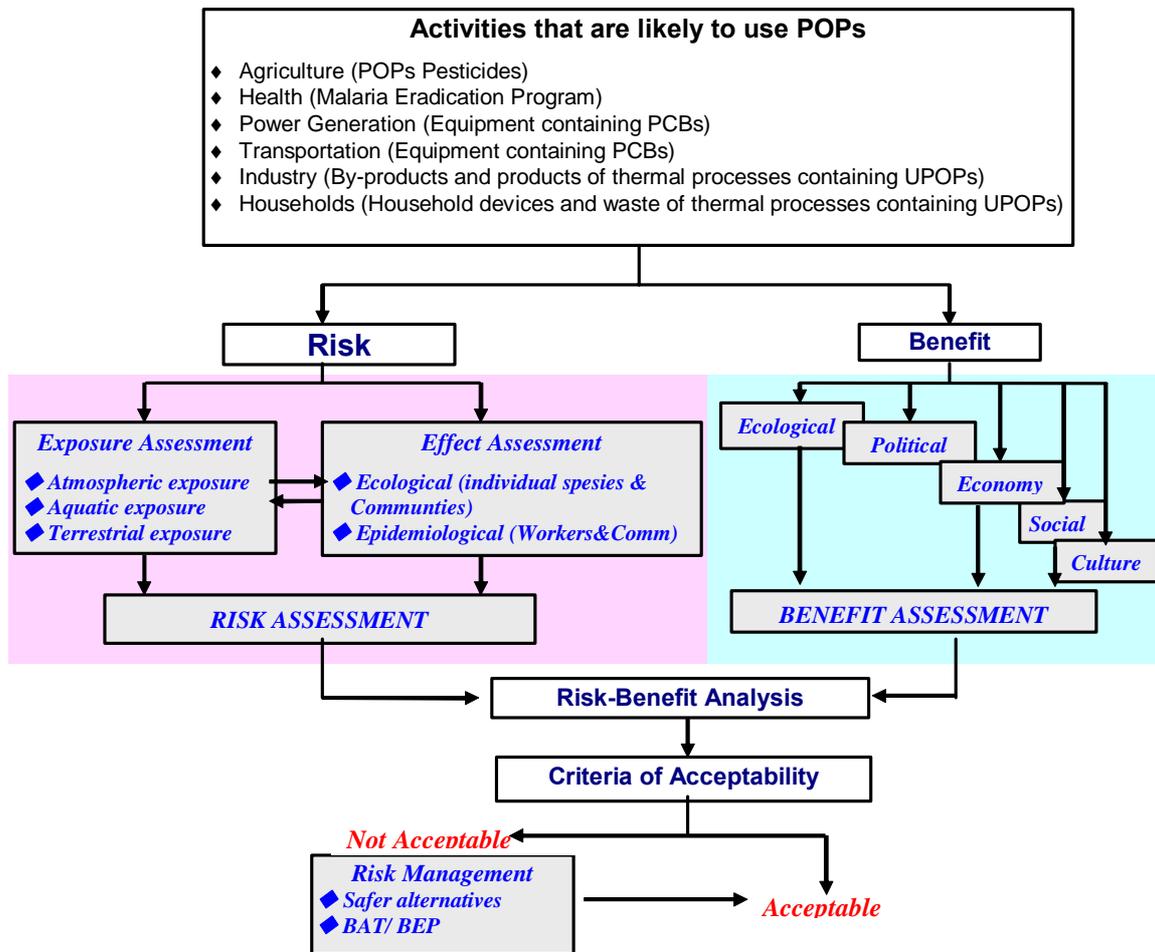


Figure 20. Identified expert team for risk-benefit analysis (Noegrohati 2007)

To obtain effective and efficient implementation, these activities need an integrated organization system, involving: the MoE, Ministry of Trade, Ministry of Finance (Directorate General for Customs), Ministry of Agriculture, Ministry of Health, Ministry of Energy and Mining, Ministry of Industry, Ministry of Forestry, Ministry of Home Affairs, Ministry Communication and Information, Ministry of National Education, Ministry of Defense, Ministry of Law and Human Right, Agency for Drugs ad Food Control, National Standardization Agency (BSN), Statistical Bureau (BPS), universities, Agency for Research and Technology Development (BPPT), Indonesian Science Academy (LIPI), NGOs, associations of industry. The role and tasks of experts and relevant institutions are described in Fig 21.

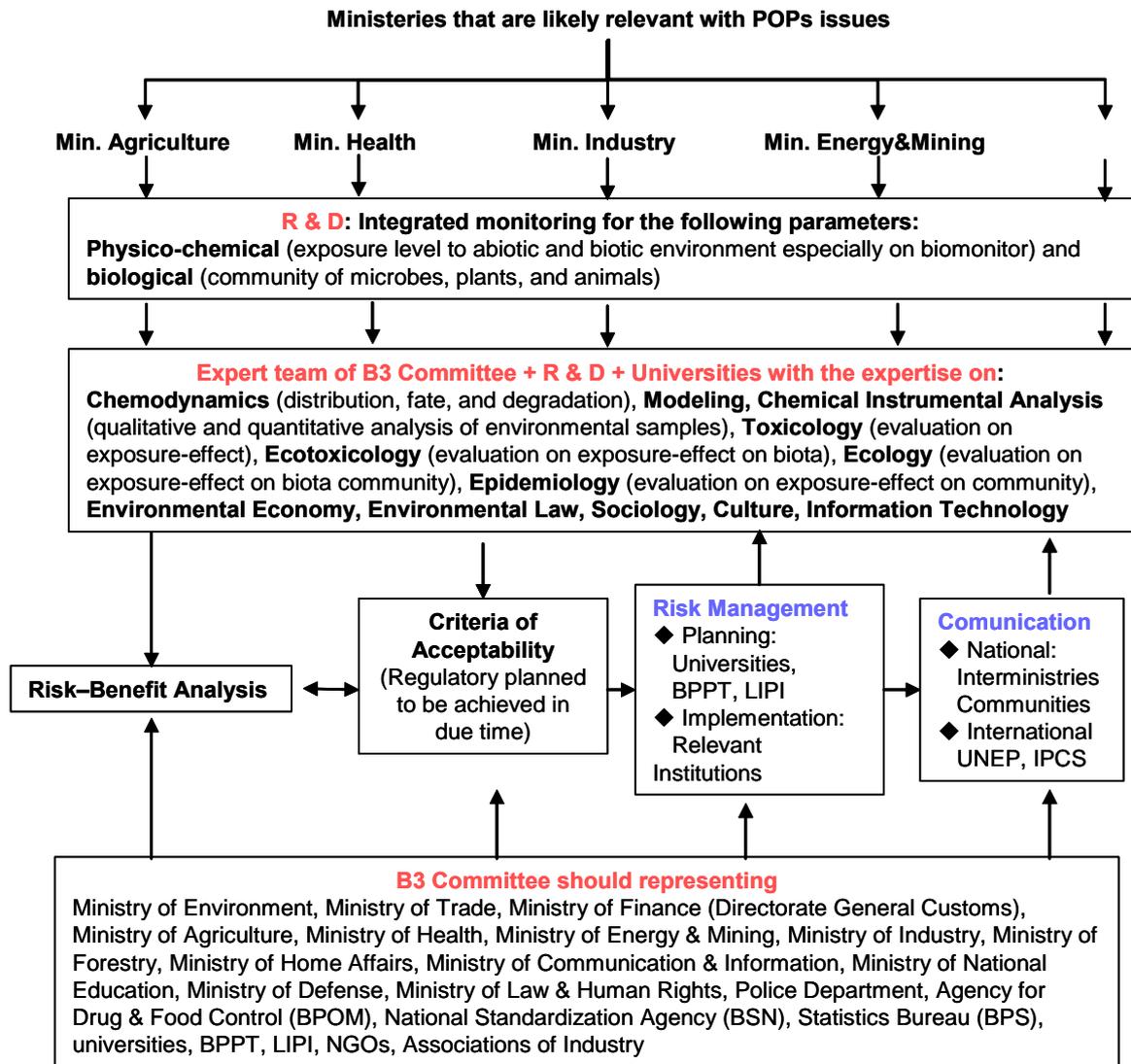


Figure 21 Recommended membership of B3 Committee (Noegrohati 2007)

Constraints that are likely to be faced in implementing Convention obligations include (1) lack of infrastructure capacity, (2) weak human resources from the aspects of knowledge, skills, and attitude in handling POPs, (3) funds, (4) ineffective coordination, and (5) ineffective law enforcement.

The following is an outline of the action plans: (responsible institutions are shown in Subchapter 3.3.1 to 3.3.17)

- 1 Actions based on management of certain category of POPs, consist of
 - Reduction and prohibition of POPs pesticides
 - Prohibition use of PCB and equipment containing PCB
 - Reduction of UPOPs releases.
- 2 Strengthening political will in implementing policies in line with the Convention, through coordination in
 - Monitoring of residues and reporting
 - Control of imported used materials containing POPs
 - Application of alternative techniques and use of alternative materials
 - Application of alternative techniques in reducing UPOPs releases
 - Public education
 - Determination of regulatory limits
 - Enhancement of community participation
 - Information exchange
 - Control and evaluation of programs on reduction and elimination of POPs releases.
- 3 Performance indicators must be determined as the base for monitoring and evaluation in reviewing the effectiveness of NIP implementation. Monitoring and evaluation should be conducted in the midst and end of the corresponding year of activity.

3.2.2 Actions Based on the Management of Chemicals Category

Action plans to reduce and eliminate the use of POPs pesticides, the elimination PCB utilization and PCB-equipment, and to reduce UPOPs releases should be started with review and evaluation on the laws and regulations, beginning in the year I and to be ended in the year II.

a To reduce and to eliminate POPs pesticides

Actions to be taken to reduce and eliminate POPs pesticides are

- Law enforcement since POPs pesticides have been banned according to GR No. 74/2001 regarding B3 Management and the decree of the Minister of Agriculture No. 7/2007 concerning Requirement and Procedure for Pesticide Registration,
- Raise public and stakeholder awareness about negative impacts of using POPs pesticides,
- Encourage application of alternative pesticides that is likely to support sustainable development, based on economic and ecological point of views,
- Determine comprehensive regulatory limits for POPs pesticides in water and soil,
- Increase efforts to retrieve quantitative information about POPs pesticides entered/imported/produced, distributed, stored, and exported/disposed,
- Revitalize IPM and IVM activities that have been implemented in the past as successful national programs.

Effort to eliminate the use of POPs pesticides by controlling illegal trading should be initiated in year II (begins with review on policies in the relevant sectors) and expected to be completed in year V. The method that is likely to be effective is by controlling the manufacturers that are now operated in India and China.

b. To reduce and to eliminate PCB

Inventory data showed the existence of PCBs and equipment containing PCBs in the environment in significant level. Inventory on PCB in transformers and capacitors must be extended, including use of PCB in semi-closed and open systems, which are not known to date. Actions to be taken are

- Extend the inventory on PCB and equipment containing PCB.
- Increase infrastructure and human resource capacities to be able to apply the protocol of Stockholm Convention.
- Increase efforts to retrieve quantitative information about PCB and equipment containing PCB entered/imported/produced, distributed, stored, and exported /disposed of.
- Review regulations concerning prohibition prohibiting the use of PCB and equipment containing PCB
- Increase the number of facility to destroy stockpile of PCB in several regions.

The use of equipment containing PCBs >0.05% and >5 L should be banned before the year 2018, and for equipment containing >0.005% and >0.05 L should not be used from the year 2020 thereon.

c. To reduce unintentional POPs releases (UPOPs)

Estimation of PCDDs/Fs releases in 2000 using the Standardized Toolkit showed that PCDDs/Fs releases were relatively high. If the estimation was correct, Indonesia has to prepare action plans to reduce PCDDs/Fs in two years after the Stockholm Convention entered into force for her, and apply them thereafter. Actions to be taken are

- Refine the estimated PCDDs/Fs releases by monitoring the level of PCDDs/Fs from the suspected sources and samples from the environment surrounding the sources.
- Increase public awareness regarding negative impacts caused by UPOPs.
- Inform the public about UPOPs sources and how to reduce the releases to the environment.
- Promote alternative technologies that are more supportive to sustainable development, both from economic and ecological viewpoints.
- Involve the communities and stakeholders to take part in reducing UPOPs releases.
- Strengthen infrastructure and human resource capacities to meet obligations of the Stockholm Convention.

- Determine regulatory limits for UPOPs in air (maximum release), in water (maximum level), soil (maximum level/level of intervention and target), in food (maximum level) and feed (maximum level).
- Increase the effectiveness of laws.

Attempts to reduce UPOPs releases require laboratory provision so that baseline determination and the monitoring can be carried out in year III.

3.2.3 Goodwill in implementing policies related to Stockholm Convention

Indonesia is not only burdened by financial problems, but also by other matters such as the limited institutions and capabilities, women workers in agricultural sector that are exposed to POPs, knowledge of farmers and public about the risks of using POPs, socio-economic problems such as addressing various diseases that are considered more urgent as compared to the risk of POPs. Nevertheless, knowing the negative impact of the 12 POPs chemicals that will be faced by the next generations, both at national and international scope, the objectives of Stockholm Convention must be met. Ratifying the Stockholm Convention is a prerequisite to the success of the government in reducing and eliminating POPs in Indonesia. Implementation of Stockholm protocols requires integrated programs among ministries and sectors as well as between the government and other stakeholders.

Elaboration of the Actions to Be Taken

For the following eight matters, all activities will be coordinated by the B3 Committee that will serve as a clearing house as well. The B3 Committee will also provide reports to the POPs focal point and promote linkages in POPs mitigation.

a Coordinating the Monitoring of POPs residues

Monitoring of POPs in the environment continuously, covering POPs pesticides, industrial raw materials, and UPOPs, must be taken to determine level of pollution by

POPs, based on spatial and temporal basis. Therefore, the monitoring activities must be coordinated among ministries, such as the MoE, the Ministry of Agriculture, the Ministry of Health, and BPOM. In this way, success or failure of these governmental efforts can be detected and corrected quickly. Coordinator for issues related to capacity building will be the MoE, for POPs pesticides will be the Ministry of Agriculture, and for PCBs will be the Ministry of Energy and Mining, for UPOPs will be the Ministry of Industry and the Ministry of Home Affairs, and for public awareness will be the Ministry of Communication and Information. The Coordinator should report the plans and the results of the corresponding activities at the middle and the end of each year to MoE as the focal point.

To smooth the action, support from laboratories (central and regional) are necessary. These laboratories have to be able to measure traces of POPs, both as single compound and in mixture of POPs pesticides and UPOPs, and in complex environmental matrixes, with high validity and reliability. Otherwise, policies on POPs management will not be supported by the national and international communities. Therefore, it is imperative that the government increase laboratory capacity and human resource capability within the appropriate ministries and regions.

Increase the capability, performance of laboratories, and scope related to POPs, for example by providing analytical instruments that are sensitive and specific to detect POPs at trace levels such as that usually found in the environment samples. Other requisites for a good laboratory are continuous and constant supply of electricity, clean and sufficient water supply, and contaminant-free environment. International standard ISO/IEC 17025 should be applied and if possible the laboratories must be accredited by the National Accreditation Committee (KAN).

Increase capability of human resource (researchers, field workers, chemical analysts and technicians, and government officials) so that they altogether can perform proper

POPs management. The efforts may include (1) education on ecotoxicology, analytical chemistry, laboratory instrumentation, computation, and environmental management, (2) integrated and interdisciplinary research to obtain status of pollution caused by POPs, and (3) quality control and quality assurance on testing and research results, which is reliable and valid.

b Coordinating Application of Alternative Techniques and Use of Alternative Materials

[(See subchapter 3.3.12, Action Plan (2)]

In agriculture sector

Implementation of the Integrated Pest Management (IPM) will not directly relate to POPs management but will reduce dependency of farmers to pesticides. IPM as a national program on plant protection has been proven to be a good alternative technique that is effective and environment sound, especially on paddy fields. By implementing IPM, the farmers have been able to reduce pesticides consumption significantly. Some farmers groups even do not use chemical pesticides any longer and they developed fully organic agriculture practices. Therefore, this particular technique is considered the best available technique (BAT) in Indonesia. IPM Field School should be expanded to other regions and to other crops.

In health sector

Integrated vector management (IVM) is not directly related to POPs management as well, but this program proved to reduce the use of pesticides in health sector. IVM has been successful in Mexico.³¹ Part of this IVM technique in eradicating vectors by not using DDT has been introduced to the public, in terms of environmental sanitation. However, (1) more supports are still needed, such as from the MoE, the Ministry of

³¹ [IFCS] InterGovernmental Forum on Chemical Safety. 1966.

Agriculture, and the Ministry of Home Affairs and (2) active participation from the communities in environment sanitation. Public education regarding the relation between environment health and endemic disease prevention is expected to raise concern and participation in implementing IVM. In IVM, contact with disease vectors is reduced by cleaning surface water, water drainage, using impregnated mosquito net, and applying larvicides in water tubs. Other measure in IVM is eliminating plasmodium parasites in blood and human livers.

c Coordinating BAT/BEP to Reduce UPOPs Release

[(See subchapter 3.3.12, Action Plan (3)]

d Coordinating Public Education

- Education and public awareness regarding risks of using POPs pesticides, in agriculture sector, health sector, and households, as well as benefit of using alternative materials and best techniques that are safe for public health and environment must be disseminated to the public at large. The education is prioritised toward women and children, considering the vulnerability of women and the next generations to long term toxicity risks caused by POPs. Teachers should have important role in this matter.
- Education on formation of UPOPs, exposure risks, and attempts to prevent the formation of UPOPs and their releases to the environment.

e Coordinating Determination of Regulatory Limits for POPs

[(See subchapter 3.3.12, Action Plan (4)]

f Coordinating Participation of Community and Stakeholders

[(See subchapter 3.3.12, Action Plan (5))]

g Coordinating Improvement on Information Exchange

[(See subchapter 3.3.12, Action Plan (6))]

h Coordinating Improvement on Control and Program Evaluation

Synchronization of several aspects might improve the capability of controlling (a) legislative framework (regulation on regulatory limit/obligation/prohibition), (b) human resources performing the control (human resource and institution), (c) coordination of relevant parties in carrying out the control function, and (d) facilities for implementing the control function (accuracy of data, supporting laboratory, etc.).

[(See also subchapter 3.3.12, Action Plan (7))]

i Monitoring and Evaluation

- Monitoring and evaluation activities should be carried out by MoE as the focal point. Implementation of the monitoring and evaluation refers to the performance indicators previously determined, carried out in the middle and at the end of each corresponding year.
- Coordinators should be designated among the most responsible institution, i.e. the Ministry of Agriculture (related to pesticides), the Ministry of Industry (related to activities in industries and manufacturers), the Ministry of Health (related to elimination of hospital wastes and monitoring of impact of POPs on human health),

BPOM (related to reduction of risk caused by hazardous chemicals), DG Customs (for controlling illegal trade), Pusarpedal (for laboratory capacity building), the Ministry of National Education (for research), and the Ministry of Communication and Information (for public awareness). Roles of these institutions can be seen in Subchapters 3.3.1-3.3.17).

- Based on the results of monitoring and evaluation activity in the middle and at the end of the year, the NIP should be reviewed by the focal point and should be updated. If necessary, the strategy can be revised based on the result of monitoring and evaluation and recent information.

3.3 Activities, Strategies, and Action Plans

3.3.1 Activity: Institutional and Regulatory Strengthening Measures

Obligation

Indonesia as one of the signatories to the Convention is aware of the need to undertake measures to prevent adverse effects of POPs at all levels of their life cycle.

Present Condition

- Annex II of GR No. 74/2001 has stated prohibition use of aldrin, chlordane, DDT, dieldrin, endrin, heptachlor, Mirex, toxaphene, hexachlorobenzene, and PCBs. However, there is an indication that POPs pesticides, especially DDT, are still traded illegally. This GR comprehensively regulates activities in producing, transporting, distributing, storing, using, and or disposing of B3.
- Permentan No. 7/2007 Article 6 also states prohibition of aldrin, chlordane, dieldrin, DDT, endrin, and toxaphene.
- GR No. 82/2001 is dealing with regulatory limit of POPs pesticides in water, for instance aldrin, dieldrin, chlordane, DDT, endrin, heptachlor, toxaphene, except mirex, HCB, and PCBs.
- Waste management contaminated with PCDDs/Fs has been regulated in the GR No. 85/1999 regarding B3 waste, Decree of Head of Bapedal No. Kep-03/Bapedal/09/1995 regarding technical requirement for B3 waste processing, and Decree No. Kep-04/Bapedal/09/1995 regarding procedures and requirements for stockpiling waste treated products, requirements for former waste treatment location and former locations for stockpiling of B3 wastes. However, these three regulations have not stipulated limit level of PCDDs/Fs in air, water, soil, and exhaust gas from stacks.
- In the Ministry of Health, impact of POPs on human health has never been studied. The decision makers have not considered POPs problems as priority so that information on POPs should be understood by officials of this particular institution. The same situation can be found in other sectors as well.

Action Plans

In implementing the NIP, programs related to Stockholm Convention must be synchronized with those of Basel and Rotterdam Conventions. This is in line with the commitment of Strategic Approach to International Chemicals Management (SAICM) that was signed by the Government of Indonesia in Dubai in February 2006. Actions to be performed are:

- (1) Establishment of B3 Committee (as stipulated in the GR No. 74/2001). The B3 Committee has to give advices to the focal point regarding POPs and Stockholm Convention. Coordinator: MoE. Coordination is attempted through meetings by inviting the focal point, experts, including experts provided by technical assistance program, and stakeholders. Object of monitoring and evaluation is the predetermined performance indicator, i.e. establishment of B3 Committee. Monitoring and evaluation should be performed through meetings at the middle and at the end of the year.
- (2) Increase coordination and socialization. Coordinator: MoE. Coordination should be attempted through meetings to provide a master plan for operational work and workshops participated by all stakeholders, local governments (especially from populated areas and industrial zones), and provincial planning board (Bapelda) to provide activity planning from 2007 to 2012. Object of monitoring & evaluation is a performance indicator, i.e. the establishment of stakeholder networking. Monitoring and evaluation should be done through meetings in MoE and in the relevant regions, twice a year.
- (3) Ratification of the Convention will be in 2008. Coordinator: MoE. Coordination through meetings for preparation of the ratification and discussion with the House of Representative. Object of monitoring & evaluation is a performance indicator, which is the ratified Stockholm Convention. Monitoring and evaluation should be performed through meetings at the middle and at the end of the designated year.
- (4) Law and regulatory review and evaluation. Specific regulations to be reviewed and evaluated including
 - (a) GR No. 18/1999 jo GR No. 85/1999 regarding management of LB3
 - (b) GR No. 74/2001 regarding management of B3
 - (c) GR No. 150/2000 regarding control on soil degradation for biomass production
 - (d) GR No. 19/1999 regarding pollution control and or marine degradation
 - (e) GR No. 41/1999 regarding control on air pollution
 - (f) KepMentan No. 434.1/Kpts/TP.270/7/2001 regarding requirement and procedure for pesticide registration
 - (g) Joint Decree between the Minister of Health and the Minister of Agriculture No. 881/Menkes/SKB/VIII/1996, No. 881/Kpts/TP.270/8/96 regarding limit of pesticide residues in agricultural products
 - (h) Decree of the Minister of Industry No. 148/1985 regarding management of hazardous materials in industrial environment
 - (i) Decree of the Minister of Industry and Trade No. 230/MGR/Kep/X/1998 regarding importation of specific goods
 - (j) Decree of the Minister of Industry and Trade No. 254/MGR/Kep/VII/2000 regarding importation of certain hazardous materials

A consequence of amendment of Law No. 22/1999 to Law No. 32/2004 concerning regional autonomy in environment aspect is delegation of all responsibility on environment and natural resources management to the regencies and city councils. Including in the delegation are budgeting, personnel, institutional, regional regulation, and prioritized activities in accordance with the local condition that will be the foundation in the environment management. The GR No. 8/2002 regarding guideline in establishment of regional institutions directs the local government to form institutions in the regions. Nevertheless, the guideline has resulted variety in institution levels for environment management in the regions, for example, in the organisational level of agency, service, section, or subservice. This situation shows that the commitment degree of the local government varies considerably. This situation might affect the environment quality in each region. Coordinator: MoE. Coordination through meetings, field visit, meetings for discussing results of activities, meetings for annual report approval and for preparing implementation plan for the subsequent year, based on the results of monitoring and evaluation by the focal point. Object of monitoring & evaluation is the performance indicator, i.e. the comprehensive regulations for POPs management and the regulations must be

disseminated. Monitoring and evaluation should be done through meetings at the middle and the end of the year.

- (5) Capacity building begins with improvement of information collecting system and preparation of emission & release factors that need support from professional and technical institutions, e.g. supporting laboratory equipment, laboratory system, accreditation for laboratory (especially in scope of POPs: environment and living organisms), analysis methods (Indonesian National Standard/SNI for POPs, 10 organochlorines have been included in the Draft of SNI, including 4 POPs, namely aldrin, dieldrin, PCB, and DDT), information gathering, training, dissemination of regulations, and strengthening of intersectoral cooperation. Coordinator: Pusarpedal. Coordination through meetings for procurement of goods, for appointing committee responsible for SNI on POPs, and committee meetings for laboratory staff, by considering advices from laboratories under the Ministry of Health, BPOM, and some selected university laboratories. Object of monitoring & evaluation is a performance indicator, i.e. the achievement of laboratory capacity as one of infrastructure in POPs management. Monitoring and evaluation should be carried out through mid-annual and annual meetings.
- (6) Monitoring and evaluation should be performed by the coordinator MoE as the focal point in meetings. Coordination can be implemented by inviting experts and all implementing units. The meetings should produce operational plan and field tasks. The meetings also discuss findings from the field, approve annual report, and implementation plan for the subsequent year. Objects of monitoring & evaluation are all performance indicators for each action plan.

Description for time tables and funding for Action Plan 3.3.1 to 3.3.17:

- 1 Budget for coordination activity in each action plan has been included in the calculated budget of the corresponding action plan.
- 2 In the timetable, stakeholder that is listed first will act as the coordinator for the corresponding activity. The coordinator should coordinate the results of activities performed by the involved institutions and report them to the focal point.
- 3 The focal point is responsible to do monitoring and evaluation.
- 4 Budget for monitoring and evaluation each year as written in Table 3.3.1 is meant for all monitoring and evaluation activities in the corresponding year.
- 5 The budget is based on price in 2007. For the years 2008-2012, correction for inflation are 110%, 120%, 130%, 140%, and 150%, respectively.

Time Table for Institutional and Regulatory Strengthening Measures

Action Plan (3.3.1)	I	II	III	IV	V	Stakeholder*	Funding Source
1. Establishment of B3 Committee						MoE	MoE
2. Increase coordination and dissemination						MoE, related instutions	MoE, related institutions
3. Ratification						MoE	MoE
4. Law and regulatory review and evaluation						MoE, MoA, BPOM, MoI, MoT, MoHA, related instutions	MoE, MoA, BPOM, MoI, MoT, MoHA, related institutions, donor and other funding sources
5. <i>Capacity building</i> : procurement on laboratory equipment and system , accreditation, preparing analysis method (SNI POPs), training, socialization of regulations, and strengthening intersectoral						Pusarpedal, accredited local laboratories, BSN, BPOM, related instutions	Pusarpedal, BSN, BPOM, related instutions, donor and other financial resources

Action Plan (3.3.1)	I	II	III	IV	V	Stakeholder*	Funding Source
cooperation							
6. Monitoring and evaluation						MoE, related institutions	MoE, MoA, MoH, MoE&M, MoTransp, MoNE, MoDef, MoC&I, MoF, BPPT, BPOM, MoI, MoT, BSN, MoHA, DGC, Pusarpedal, regional lab, related institutions, donor and other financial resources

* The first listed institution will act as coordinator

Budget for Institutional and Regulatory Strengthening Measures

Action Plan (3.3.1)	Total Budget (x IDR 1000)					
	I	II	III	IV	V	VI
1. Establishment of B3 Committee	278,740					
2. Increase coordination and dissemination	289,245					
3. Ratification	502,260					
4. Law and regulatory review and evaluation	224,125	4,400,000				
5. <i>Capacity building:</i> procurement on laboratory equipment and system, accreditation, preparing analysis method (SNI POPs), training, socialization of regulations, and strengthening intersectoral cooperation**		31,278,500	35,112,000	26,812,500		
6. Monitoring and evaluation	1,100,000	2,420,000	2,640,000	2,860,000	3,080,000	3,300,000

** including technical assistance, excluding budget for experts

3.3.2 Activity: Measures to Reduce or Eliminate Releases from Intentional Production and Use

Obligations (Article 3)

- (1) Prohibit and/or take the legal and administrative measures necessary to stop import and export of chemicals listed in Annex A in accordance with the provisions of paragraph 2.
- (2) Pesticides to be used in agricultural sector must be registered and permitted by the Ministry of Agriculture. All active ingredients containing POPs have been banned in Indonesia.
- (3) Undertake measures to prevent production and use of new pesticides or new POPs chemicals.
- (4) Assess pesticides or industrial chemicals that are being used.
- (5) Prevent or minimized POPs exposure to human and release to environment.

Present Condition

- (1) Indonesia prohibited production, import, use, and stockpiles of all chemicals listed in Annex A and B through GR No. 74/2001 and Permentan No. 7/2007. However, in accordance with monitoring by the MoE, there was new input of DDT into the environment and the existence of HCB after entering the Indonesian customs.
- (2) Indonesia should not register for exemption to use chemicals listed in Annex A and B of the Convention text.

- (3) Assessment on the use of pesticide has been regulated in Permentan No. 7/2007; however, the persistent characteristics should be reviewed due to short time of trial period for the registered pesticide formulation.

Action Plans

- (1) Controlling distribution of POPs pesticides. Performance indicator for this action is reduction of distributed POPs pesticides and reduction of residue levels in the environment. Coordinator: MoA. Coordination through meetings participated by the focal point, experts, related institutions to prepare operational plan, and field visits to a number of important harbours. Object of monitoring & evaluation is performance indicator, i.e. the availability of technical guidelines for controlling & preventing distribution of POPs and the decreasing traded POPs pesticides, and the decreasing residue levels in the environment. Monitoring and evaluation should be venue at the middle and at the end of year and site visits to harbors suspected to be the entry points of illegal commodities.
- (2) Inventory on HCB used is pesticide and in industry. Coordinator: Mol. Coordination should be done through meetings discussing methods of inventory; field task, inventory results, and follow-up activities based on findings from monitoring and evaluation (see also Subchapter 3.3.9). Object of monitoring & evaluation is the performance indicator concerning results of inventory on HCB in industries. Monitoring and evaluation should be carried every 6 months by visiting industries using HCB.
- (3) Inventory on PCBs and equipment containing PCBs. Coordinator: MoE&M. Coordination through meetings for discussing methods of inventory, field task, inventory results, and follow-up activity based on findings of monitoring and evaluation (see also Subchapter 3.3.4). Object of monitoring & evaluation is the performance indicator, i.e. the availability of inventory data on PCBs and equipment containing PCBs. Monitoring and evaluation should be carried out by visiting PCB-users every 6 months.
- (4) Regulate the use of transformers, capacitor, and other articles suspected to contain PCBs by labelling them with information of the electrical medium. Coordinator: MoE&M. Coordination through meetings discussing various regulations with related institutions and experts. Object of monitoring & evaluation is the disseminated regulations concerning importation of equipment containing PCB to all stakeholders and general public. Monitoring and evaluation should be done by meetings at the middle and at the end of the year.
- (5) Find alternatives for POPs substitutes (see Subchapter 3.3.16) and alternative process and practices that release POPs. Coordinator: Mol. Coordination through meetings with related institutions for discussing the implementation and results of research. Object of monitoring & evaluation is the performance indicator, i.e. the availability of information regarding alternative/substitutes for POPs. Monitoring and evaluation should be performed twice a year with the involved research institutions.
- (6) Find technology for POPs destruction according to ESM. Coordinator and Coordination: see point (5). Object of monitoring & evaluation is the performance indicator, i.e. appropriate technology for destroying POPs in accordance with ESM. Monitoring and evaluation can be done in meetings to monitor the progress and annual meetings with the institutions implementing the research.
- (7) Improve access to, and transfer of technology, products, and alternative practice which are environmentally sound, for example IPM, IVM, and BAT/BEP to minimize POPs release. Coordinator and Coordination: see point (5). Object of monitoring & evaluation is the performance indicator, i.e. increasing access to technology and the transferred technology to relevant users. Monitoring and evaluation should be done by visiting the location where IPM and IVM are practiced, and to institutions applying BAT/BEP, every 6 months.
- (8) Manage the use and ultimately eliminate POPs. Coordinator: MoE. Coordination through meetings for preparing guidelines, socialization, field visit, discussing results of activities, preparing implementation plan for the subsequent year by considering the results of monitoring and evaluation. Object of monitoring & evaluation is the performance indicator, i.e. the decreasing use of POPs. Monitoring and evaluation should be done by field visit every 6 months to regions receiving socialization of POPs management.

- (9) Monitor POPs in various media. Coordinator: MoE. Coordination through consultation with experts, field visit, discussing results of activities and preparing plan for the subsequent year by taking into account the results of monitoring and evaluation. Object of monitoring & evaluation is the performance indicator, i.e. the availability of database concerning POPs monitored in various media. Monitoring and evaluation should be carried out by field visit and sampling every 6 months to POPs laboratories.

Timetable for Measures to Reduce or Eliminate Releases from Intentional Production and Use

Action Plan (3.3.2)	II	III	IV	V	Stakeholder*	Funding Source
1. Controlling distribution of illegal POPs pesticides					MoA, DGC, MoT, Mol, MoH, MoE	MoA, DGC, MoT, Mol, MoH, MoE
2. Inventory on HCB used as pesticide and in industry					Mol, MoA, DGC, MoE	Mol, MoA, DGC, MoE, Donor and other financial resources
3. Inventory on PCB and equipment containing PCB					MoE&M, Mol, MoTransp, MoNE, MoDef, universities, MoE	MoE&M, Mol, MoTransp, MoDef, MoE, Donor and other financial resources
4. Regulation for transformer, capacitor, and other articles containing PCB					MoE&M, MoE, DGC, Mol, MoTransp, MoNE, MoDef	MoE&M, MoE, DGC, Mol, MoTransp, MoNE, MoDef, MoT, donor and other funding sources
5. Look for alternative/substitute for materials and products free of POPs and alternative processes and practices not producing POPs					Mol, MoA, MoE&M, MoE, research institution, MoNE/ universities, BPPT	Mol, MoA, MoE&M, MoE, Donor and other financial resources
6. Look for destruction technology for POPs according to ESM					Mol, MoNE/ universities, research institution, BPPT	Mol, Donor and other financial resources
7. Increase access to , and transfer of technology, products, and alternative management practices according to ESM					Mol, MoNE/ universities, research institution, BPPT	Mol, Donor and other financial resources
8. Management for reducing and ultimately eliminating POPs					MoE, Mol, MoA	MoE, Mol, MoA, Donor and other financial resources
9. Monitoring on POPs in various media					MoE	MoE, Donor and other financial resources
10. Monitoring and evaluation					MoE, related institutions	MoE, MoA, MoH, MoE&M, MoTransp, MoNE, MoDef, MoC&I, MoF, BPPT, BPOM, Mol, MoT, BSN, MoHA, DGC, Pusarpedal, regional laboratories, related institutions, donor and other financial resources

* The first listed institution will act as coordinator

Budget for Measures to Reduce or Eliminate Releases from Intentional Production and Use

Action Plan (3.3.2)	Total Budget (x IDR 1000)			
	II	III	IV	V
1. Controlling distribution of illegal POPs pesticides	1,161,600	1,452,000	1,573,000	
2. Inventory on HCB used as pesticide and in industry	2,420,000	1,320,000	715,000	
3. Inventory on PCB and equipment containing PCB	4,537,500	1,320,000		
4. Regulation for transformer, capacitor, and other articles containing PCB	5,000,000	5,000,000		
5. Look for alternative/substitute for materials and products free of POPs and alternative processes and practices not producing POPs**	6,204,000	6,768,000	7,332,000	7,896,000
6. Look for destruction technology for POPs according to ESM**		4,897,200	5,305,300	5,713,400
7. Increase access to , and transfer of technology, products, and alternative management practices according to ESM		2,455,200	2,659,800	2,864,400
8. Management for reducing and ultimately eliminating POPs	1,028,500	2,244,000	1,215,500	
9. Monitoring on POPs in various media**	9,680,000	10,560,000	11,440,000	12,320,000
10. Monitoring and evaluation	see 3.3.1.6	see 3.3.1.6	see 3.3.1.6	see 3.3.1.6

** including technical assistance, excluding budget for experts

3.3.3 Activity: Production, Import and Export, Use, Stockpiles and Wastes of Annex A, Part 1 (Chemicals)

Obligation (Article 3 paragraphs 1 and 2)

- (1) Prohibit and/or take the legal and administrative measures necessary to stop import and export of the chemicals listed in Annex A in accordance with the provisions of paragraph 2.
- (2) Prevent production and use of new pesticides or new industrial chemicals, by considering criteria in Annex D paragraph (1), which exhibit the characteristics of POPs.

Present Condition

- (1) Existence of GR No. 74/2001 regarding B3 management, including prohibition use of POPs pesticides and PCBs.
- (2) The inventory carried out in 2003 revealed that there was no stockpile of pesticides listed in Annex A part 1 (see Subchapter 2.3.1).
- (3) There was no export of chemicals listed in Annex A part 1.
- (4) There was import of HCB (and DDT) recorded until 2002.
- (5) Stockpiles of material and wastes have not been exactly known; however, there are indications of contaminated sites by DDT.
- (6) Indonesia is an agricultural country, meaning that use of pesticides to support agricultural activities must be relatively significant.
- (7) Residues in the environment have not been monitored comprehensively and continuously. Data on organochlorine pesticide residues in river water and soil/sediment were scattered in some regions. Partial monitoring has been carried out by the MoE in cooperation with the United Nation University (2002) and the University of Padjadjaran (2005).
- (8) Survey indicated an illegal trade and pesticide adulteration. Mirex has never been registered, but was detected in the field. Illegal pesticides are suspected came from China. Prevention of illegal trade will be difficult due to many entry points to the country.

- (9) Pesticide adulteration. Parts of the community still believe on the effectiveness of DDT for vector eradication; therefore, they tend to use DDT, if possible. On the other side, laboratory analysis confirmed that the commodity with DDT on the labels did not contain DDT at all.
- (10) From 8 pesticides, chlordane and dieldrin happened to be registered for termite mitigation. In fact, these two pesticides were used in the field to eradicate insect in general.
- (11) The integrated pest management (IPM) as a national policy to reduce dependency of the community on the use of pesticides has been applied in agricultural sector, but was limited to 12 provinces. Farmers participated in the field school for IPM (SLIPM) was over 1 million, 90% of the subject materials corresponds to rice and 10% to horticultural crops.
- (12) IPM for small-holder plantation (IPM-PR) has been implemented in 13 provinces for coffee, cacao, tea, pepper, cotton, and cashew. In 6 years of experience the results were lower loss of harvest caused to pests and increase income of the IPM-PR participants.

Action Plans

- (1) Prevent and to control illegal trade. This can be done with strict law enforcement, education and dissemination of information on illegal trade and pesticide adulteration to the community, particularly to farmers. In addition, there must be pesticide control by the central government, provincial, regencies. Pesticide inspectors should accommodate intersectoral problems so that the resource and the importers can be retrieved. Monitoring should be intensive to restrict importation of pesticides that are no longer used in the producing countries and also to monitor the distribution, through optimizing pesticide control. Cooperation with China and India to combat illegal trading will be important since some illegal pesticides may come from China (labels with Chinese characters). Performance indicator for this particular action is reduction of illegal trading of POPs listed in Annex A. Coordinator: Directorate General of Customs. Coordination through meetings with resource person and related institutions and field visit to disseminate information concerning preventing and controlling illegal trade. Object of monitoring & evaluation is the performance indicator, i.e. no production, export, and import of chemicals listed in Annex A part 1. Monitoring and evaluation should be carried out through meetings at the middle and at the end of the year.
- (2) Inventory on contaminated sites followed by development of remediation strategy to find methods/alternatives for land remediation that are suitable for land condition in Indonesia (see also Subchapter 3.3.11). Performance indicator for this activity is a complete data regarding contaminated sites as a baseline for remediation of the sites. Coordinator: MoH. Coordination through meetings for field task, strategy for sampling, study on remediation strategy, discussion on field findings, and implementation plan for the subsequent year by considering the results of monitoring and evaluation. Object of monitoring & evaluation is the performance indicator, i.e. the availability of inventory data regarding contaminated sites. Monitoring and evaluation should be done every 6 months by visiting the POPs-contaminates sites and remediated land, as well as sampling and sample analysis.
- (3) Implement IPM and IVM although it may not directly related to reduction of POPs residue, but will be meaningful for relieving the dependency of the community in using pesticide in agriculture, horticulture, plantation, and in disease vector eradication. Implementation of IPM mainly through improvement of SLPHT is expected to minimize the use of pesticides or avoid the use of pesticides at all if possible. In this system, the use of natural factors should be optimized to control plant disturbing organisms and use of pesticides only if necessary. These programs should be disseminated through campaign and demonstration on procedure of pest and vector control, publication, and farmer empowerment through SLHPT (field school for IPM). In SLHPT, the farmers learn to analyze the agroecosystem so that they do not depend on the use of synthetic pesticides in the cultivation. These efforts should be under the responsibility of extension workers in all provinces. IPM program has been successful in 12 provinces and is recommended to be expanded to 21 other provinces. Expansion to other provinces can be lead by experienced farmers in the previous 12

provinces. Coordinator: MoA and MoH. Coordination through meetings with the technical team on socialization of IPM and IVM to the regions. Object of monitoring & evaluation is the performance indicator, i.e. the implementation of IPM and IVM. Monitoring and evaluation is performed every 6 months through field visit, sampling & sample analysis.

- (4) Provide training of trainers. Mechanism of TOT on IPM to other provinces is as follows: from the trained 500 farmers, should be designated 50 leaders (25 farmer leaders, 15 workers for extension worker for plant pests (POPT), and 10 agricultural extension workers (PPL). Coordinator: MoA. Coordination through meetings with experts and committee of TOT in the provinces. Object of monitoring & evaluation is the performance indicator, i.e. the TOT for IPM in the target provinces is implemented. Monitoring and evaluation should be carried out by evaluating the effectiveness of the implemented training.
- (5) Carry out IPM program for small holder plantations (IPM-PR). The mechanism to be adopted is on-the-job training in the targeted provinces. The participants should undertake internship program for future extension workers, expansion of SLHPT to provinces other than the targeted province for other prominent commodities, and initiate the implementation of IPM in 13 provinces. Ikatan Pemandu Lapang Perkebunan Indonesia (IPLPI, Association of Indonesian Field Extension Workers) in the 13 provinces of IPM-PR responsible for maintaining the results of SLIPM, continue sustain the good results, and develop SLPHT for the main and other commodities in regencies to initiate SLHPT. Coordinator: MoA. Coordination through meetings with experts and field visit for disseminating the information regarding IPM-PR program. Object of monitoring & evaluation is the performance indicator, i.e. the implementation of IPM-PR. Monitoring and evaluation should be carried out by evaluating the effectiveness of IPM-PR activity in each location every year.
- (6) Minimize the use of chemicals through environmental management and bio control undertaking IVM. In general, although some IVM methods are considered adequate; some improvements in implementation are still needed. Implementation in regions with malarial endemic should be intensified, for example in brackish area in the islands of Kalimantan and Papua. The implementation of IVM should be expanded to other areas, supported by the clear organisation structure of the MoH. Coordinator: MoH. Coordination through meetings to discuss results of study on alternatives in the field of vector control. Object of monitoring & evaluation is the performance indicator, i.e. the decreasing of the community's dependency on synthetic pesticides by implementing IVM in accordance with ESM. Monitoring and evaluation is carried out by field visits and sampling & sample analysis every year.
- (7) Strengthening monitoring capacities on POPs and law enforcement on POPs to ensure compliance, for example in the use of products vector control in various sectors. Coordinator: MoE. Coordination through meetings with resource persons from the related and field visit, to discuss the implementation results and to prepare the subsequent implementation plan by considering the findings in monitoring and evaluation activities. Object of monitoring & evaluation is the performance indicator, i.e. the increasing monitoring capacity and the law enforcement related to the use of POPs in various sectors. Monitoring and evaluation should be carried out through meetings with stakeholders at the middle and at the end of the years.

Timetable for Activities Regarding Production, Import and Export, Use, Stockpiles and Wastes of Annex A, Part 1 Chemicals)

Action Plan (3.3.3)	II	III	IV	V	Stakeholder*	Funding Source
1. Preventing and controlling illegal trade through enforcement of the existing law, education and dissemination of information to public, and control on pesticides					DGC, MoT, MoA, MoI, MoH, MoE, MoC&I	DGC, MoT, MoA, MoI, MoH, MoE, MoC&I

Action Plan (3.3.3)	II	III	IV	V	Stakeholder*	Funding Source
2. Inventory and strategy to remediate contaminated sites					MoH, MoA, MoF, MoE, MoNE/ universities, research institution, BPPT	MoH, MoA, MoF, MoE, MoNE, Donor and other financial resources
3. Expansion of IPM and IVM program implementation: program dissemination through campaign, demonstration on controlling, publication, and farmer empowerment through field school					MoA, MoH, MoF	MoA, MoH, MoF, Donor and other financial resources
4. Training of trainers for IPM program to other provinces					MoA	MoA, Donor and other financial resources
5. IPM program on smallholder plantation					MoA	MoA, Donor and other financial resources
6. IVM program by reducing the use of chemicals and increasing environmental management and biocontrol					MoH	MoH, Donor and other financial resources
7. Monitoring residues of POPs pesticides					MoE, MoA, MoF, MoH	MoE, MoA, MoF, MoH, Donor and other financial resources
8. Capacity building for monitoring and law enforcement, e.g. use of products for vector control and for eradicate crop pests					MoE, MoHA, MoA, MoH	MoE, MoHA, MoA, MoH
9. Monitoring and evaluation					MoE, related institutions	MoE, MoA, MoH, MoE&M, MoTransp, MoNE, MoDef, MoC&I, MoF, BPPT, BPOM, Mol, MoT, BSN, MoHA, DGC, Pusarpedal, regional laboratories, related institutions, donor and other financial resources

* The first listed institution will act as coordinator

Budget for Activities Regarding Production, Import and Export, Use, Stockpiles and Wastes of Annex A, Part 1 Chemicals)

Action Plan (3.3.3)	Total Budget (x IDR 1000)			
	II	III	IV	V
1. Preventing and controlling illegal trade through enforcement of the existing law, education and dissemination of information to public, and control on pesticides	2,274,800	2,481,600	2,688,400	
2. Inventory and strategy to remediate contaminated sites	13,105,268	19,576,656	5,720,000	
3. Expansion of IPM/IVM program implementation: program dissemination through campaign, demonstration on controlling, publication, and farmer empowerment through field school			1,215,600	1,309,000
4. Training of trainers for IPM program to other provinces			1,251,250	1,347,500
5. IPM program on smallholder plantation			1,215,500	1,309,000
6. IVM program by reducing the use of chemicals and increasing environmental management and biocontrol			1,215,500	2,618,000
7. Monitoring residues of POPs pesticides	3,428,333	3,740,000	4,051,666	
8. Capacity building for monitoring and law enforcement, e.g. use of products for vector control and for eradicate crop pests			2,264,841	2,439,060
9. Monitoring and evaluation	see 3.3.1.6	see 3.3.1.6	see 3.3.1.6	see 3.3.1.6

** including technical assistance, excluding budget for experts

3.3.4 Activity: Production, Import and Export, Use, Identification, Labelling, Removal, Storage and Disposal of PCBs and Equipment Containing PCBs (Annex A Part II Chemicals)

Obligations

- (1) With regard to the elimination use of PCBs in equipment (e.g. transformers, capacitors, or other receptacles containing liquid stocks) by 2025, subject to review by the COP, take action in accordance with the following priorities:
 - (i) Make determined efforts to identify, label, and remove from use equipment containing greater than 10% PCBs and volume greater than 5 litres.
 - (ii) Make determined efforts to identify, label, and remove from use equipment containing greater than 0.05% PCBs and volume greater than 5 litres.
 - (iii) Endeavour to identify and remove from use equipment containing greater than 0.005% PCBs and volume greater than 0.05 litres.
- (2) Promote the following measures to reduce exposures and risk to control the use of PCBs:
 - (i) Use only in intact and non-leaking equipment and only in areas where the risk of environmental release can be minimized and quickly remedied.
 - (ii) Not use equipment in areas associated with the production or processing of food or feed.
 - (iii) When used in populated areas, including schools and hospitals, all reasonable measures to protect from electrical failure which could result in a fire, and regular inspection of equipment for leaks.
- (3) Ensure that equipment containing PCBs should not be exported or imported except for the purpose of environmentally sound waste management.
- (4) Except for maintenance and servicing operations, not allow recovery for the purpose of reuse in other equipment of liquids with PCBs content above 0.005%.

- (5) Make determined efforts designed to lead to environmentally sound waste management of liquids containing PCBs and equipment contaminated with PCBs having PCBs content above 0.005%, as soon as possible but no later than 2028, subject to review by the COP;
- (6) Endeavour to identify other articles containing more than 0.005% PCBs (e.g. cable sheaths, cure caulk, and painted objects) and manage them accordingly;
- (7) Provide a report every five years on progress in eliminating PCBs and submit it to the COP;
- (8) The reports shall, as appropriate, be considered by the COP in its reviews relating to PCBs. The COP should review progress toward elimination of PCBs at five years intervals or other periods, as appropriate, taking into account such reports.

Present Condition

- (1) PCBs have not ever been produced in Indonesia. Equipment containing PCBs is always filled with imported PCBs mixtures.
- (2) PCBs are listed as B3.
- (3) B3 management is regulated by GR No. 74/2001. However, in this regulation there are two categories for PCBs, namely PCBs as B3 that is prohibited and PCBs as B3 as chemical in limited use. In addition, this regulation does not state about concentration and volume of PCBs.
- (4) Symbol and label for B3 waste are regulated in the Decree of the Head of Bapedal No. 05/Bapedal/09/1995, except labelling for equipment containing PCBs. Labelling is only for packaging for B3 waste, vehicles transporting B3 waste, and storage for B3.
- (5) Procedure and technical requirement for storing and collecting B3 are stated in the Decree of the Head of Bapedal No. 1/Bapedal/09/1995.
- (6) Documenting B3 waste is regulated in the Decree of the Head of Bapedal No. 2/Bapedal/09/1995.
- (7) Technical requirement for B3 waste management is stipulated in the Decree of the Head of Bapedal No. 3/Bapedal/09/1995.
- (8) Procedure and requirement for stockpiling of waste treatment results, requirements for former waste treatment location and former locations for stockpiling LB3 are stated in the Decree of the Head of Bapedal No. 4/Bapedal/ 09/1995.
- (9) Results of the inventory on PCBs and equipment containing PCBs in 2004 showed that (i) no export, import, and production of PCBs as chemicals in the year 2000, (ii) PCBs in closed-system equipment (transformers and capacitors) were found, mainly in equipment made before 1985, (iii) inventory on PCBs in semi-closed and open systems has never been conducted, (iv) the community, the owner, and the collector of equipment containing PCBs were not aware of the negative impact caused by PCBs, (v) equipment containing PCBs in ships made before 1970s (for example, dredge ships) were still in use, and (vi) facility for PCBs waste destruction was limited and was considered costly by the equipment owners, and the existing destruction facility still used combustion technology.

Action Plans

- (1) Strengthen capacity and capability of infrastructures (including laboratory accreditation) and human resource to be able to comply with the Convention (Description of activity, coordinator, and coordination see subchapter 3.3.1.5). Object of monitoring & evaluation is the performance indicator, i.e. the availability of accredited laboratories and human resources that are able to manage the laboratories. Monitoring and evaluation should be carried out by visiting laboratories and analysis on infrastructure (see Subchapter 3.3.8).
- (2) Improve regulations concerning PCBs elimination. (Description of activity, coordinator, and coordination: see subchapter 3.3.1.4). Object of monitoring & evaluation is the performance indicator, i.e. the availability of regulations regarding PCBs. Monitoring and evaluation should be carried out through meetings at the middle and at the end of the corresponding year.

- (3) Carry out extended inventory to equipment and materials containing PCBs as well as establish dynamic database. (Description of activity, Coordinator, and Coordination see subchapter 3.3.2.3). Object of monitoring & evaluation are the performance indicators, i.e. the availability of inventory data on PCBs gathered from extended coverage as compared with the data in the year 2004. Monitoring and evaluation should be carried out every year by site visits to PCBs-users, and sampling & sample analysis.
- (4) Ensure that the disposal of PCBs and the waste in accordance with ESM. Coordinator: MoE&M. Coordination through meetings discussing feasibility studies and funding analysis on alternatives of PCBs destruction to some sampled regions, socialization of the results of studies and improvement the existing disposal facilities (for example, landfill, incineration, and *co-processing*). Object of monitoring & evaluation are performance indicators. i.e. the managed PCBs, equipment containing PCBs, and PCBs waste in accordance with ESM. Monitoring and evaluation should be carried out every 6 months through field visit and analysis on the effectiveness of PCBs by the users of equipment containing PCBs.
- (5) Destroy PCBs and PCBs waste in accordance with ESM and BAT/BEP. Coordinator: MoE&M. Coordination through meetings to select strategies in PCBs destruction and to increase PCBs destruction facility. Object of monitoring & evaluation are performance indicators, i.e. methods to destroy PCBs, equipment containing PCBs, and waste of PCBs in accordance with ESM. Monitoring and evaluation should be performed every 6 months by visiting PCBs destruction facilities, sampling & sample analysis.
- (6) Provide training/awareness raising for PCBs users and groups vulnerable to exposure of PCBs. Coordinator: MoC&I. Coordination through meetings for preparing training materials, visits to regions, preparing implementation plan for the subsequent years by considering the results of monitoring and evaluation. Object of monitoring & evaluation are the performance indicators, i.e. the implemented trainings and the increasing awareness on adverse impact of PCBs on the vulnerable groups. Monitoring and evaluation should be carried out by evaluating the effectiveness of every implemented training.

Description of Specific Action Plan

- (1) *Extended inventory.* Inventory on PCBs application in open systems (lubricant, coating material, adhesive, plasticizer, and ink) has never been done. The previous inventory on the use of PCBs in ships was very limited, in contrary that Indonesia is a maritime country that requires many ships. Many ships used are old-age. The inventory carried out in 2004 for PCBs and equipment containing PCBs involved respondents from mining, power plants, harbors, airports, hotels, government buildings, commercial buildings, military facilities, and laboratories in the universities. Although the previous inventory received good responses from the respondents from manufacturers and mining, further inventory should be done because these two sectors have many installations in urban and remote areas. Because it was considered sufficient, inventory will not be necessary involving hotels, government offices, commercial buildings, and universities. The previous inventory was limited to closed-systems (transformers and capacitors) and semi-closed (hydraulic pumps) applications. Transportation sector, for instance, ships and trains, have not been deeply investigated. Method used for the inventory should consist of sending questionnaires to the respondents; review the responses, verification to the field, qualitative and quantitative analysis of PCBs, and reporting.
- (2) *Disposal of PCB safely and increase number of destruction facilities.* Safe PCBs destruction should be in accordance with BAT/BEP and noncombustion technologies. The technologies include gas phase reduction, catalytic decomposition, sodium reduction, supercritical water oxidation, plasma arch, and pyrolysis. In the beginning, techniques in accordance with BAT/BEP will be adopted, and in further steps noncombustion technique that is appropriate for Indonesia will be searched. Lastly, trials in pilot plant and full scale plant should be established.

Timetable for Activity on Production, Import and Export, Use, Identification, Labelling, Removal, Storage and Disposal of PCBs and Equipment Containing PCBs (Annex A Part II Chemicals)

Action Plan (3.3.4)	I	II	III	IV	V	VI	Stakeholder*	Funding Source
1. Strengthening infrastructure capacity and ability (e.g. accredited laboratory) and human resources to be able to implement Convention obligation							Pusarpedal, accredited regional labs, BSN, BPOM, related institutions	Pusarpedal, BSN, BPOM, related institutions, Donor and other financial resources
2. Improve regulations regarding elimination of PCBs							MoE&M, MoE, MoA, BPOM, Mol, MoT, MoHA	MoE&M, MoE, MoA, BPOM, Mol, MoT, MoHA
3. Inventory on PCBs equipment containing PCBs							MoE&M, Mol, MoTransp, MoNE, MoDef, MoE, MoNE/ universities	MoE&M, Mol, MoNE, MoTransp, MoDef, MoE, Donor and other financial resources
4. Management on PCBs, equipment containing PCBs, and PCBs waste according to ESM							MoE&M, MoE, Mol	MoE&M, MoE, Mol, Donor and other financial resources
5. Destruction of PCBs & PCB wastes according to ESM and BAT/BEP (research and implementation), and enhance destruction facility number in-country							MoE&M, Mol, MoNE/ universities, research institution, BPPT, MoE	MoE&M, Mol, MoE, MoNE, Donor and other financial resources
6. Provide training /awareness for users & vulnerable group to PCBs							MoC&I, MoE&M, MoE, Mol	MoC&I, MoE, MoE&M, Mol, Donor and other financial resources
7. Monitoring and evaluation							MoE, related institutions	MoE, MoA, MoH, MoE&M, MoTransp, MoNE, MoDef, MoC&I, MoF, BPPT, BPOM, Mol, MoT, BSN, MoHA, DGC, Pusarpedal, regional laboratories, related institutions, donor and other financial resources

* The first listed institution will act as coordinator

Budget for Activity on Production, Import and Export, Use, Identification, Labelling, Removal, Storage and Disposal of PCBs and Equipment Containing PCBs (Annex A Part II Chemicals)

Action Plan (3.3.4)	Total Budget (x IDR 1000)					
	I	II	III	IV	V	VI
1. Strengthening infrastructure capacity and ability (e.g. accredited laboratory) and human resources to be able to implement Convention obligation		see 3.3.1.5	see 3.3.1.5	see 3.3.1.5		
2. Improve regulations regarding elimination of PCBs	see 3.3.1.4	see 3.3.1.4				

Action Plan (3.3.4)	Total Budget (x IDR 1000)					
	I	II	III	IV	V	VI
3. Inventory on PCBs equipment containing PCBs		see 3.3.2.3	see 3.3.2.3			
4. Management on PCBs, equipment containing PCBs, and PCBs waste according to ESM			40,000,000	42,600,000**		
5. Destruction of PCBs & PCBs wastes according to ESM and BAT/BEP (research and implementation), and enhance destruction facility number in-country**				50,000,000	50,000,000	33,000,000
6. Provide training /awareness for users & vulnerable group to PCBs			1,020,000	1,105,000	1,190,000	
7. Monitoring and evaluation	see 3.3.1.6	see 3.3.1.6	see 3.3.1.6	see 3.3.1.6	see 3.3.1.6	see 3.3.1.6

** including technical assistance, excluding budget for experts

3.3.5 Activity: Production, Import and Export, Use, Stockpiles and Wastes of DDT (Annex B Chemicals) If Used in the Country

Obligations

- (1) Production and use of DDT should be eliminated except for Parties that have notified the Secretariat of their intention to produce and/or use it.
- (2) Promote research and development of safe alternative chemical and non-chemical products, methods and strategies to decrease the human and economic burden of disease. Factors to be promoted when considering alternative or combinations of alternatives for DDT should include the human health risks and environmental implications of such alternatives. Viable alternatives to DDT should pose less risk to human health and the environment, be suitable for disease control based on conditions and supported with monitoring data.

Present Condition

- (1) DDT used to be produced in Indonesia, but the facility was closed in 1993.
- (2) Import and export were ended in 1993.
- (3) Use of DDT is formally prohibited, however, DDT distributed illegally may still be found.
- (4) Exact stockpile of DDT was not known.
- (5) DDT-contaminated sites have been identified: in ex-warehouse of DDT manufacture and in warehouse of the Health Service in Malang.
- (6) DDT is no longer used to eradicate disease vectors.
- (7) The Ministry of Health controlled (surveillance) risk factors of hazardous materials and drugs, but the guidelines are still in progress to be a ministerial decree. The control also involves health inspector.

Action Plans

- (1) Control illegal distribution and trade (Coordinator and Coordination see subchapter 3.3.2.1). Object of monitoring & evaluation are the performance indicators, i.e. no production, import, and export of DDT. Monitoring and evaluation should be conducted through meetings at the middle and at the end of the corresponding years.
- (2) Extend inventory to other ex-warehouse of DDT. Coordinator: MoH. Coordination through consultation with experts, resource person from relevant institutions, meetings to discuss strategies on data gathering by distributing questionnaires, discuss the results, and prepare implementation plan for the subsequent years by considering the results of

monitoring and evaluation. Object of monitoring & evaluation are the performance indicators, i.e. the availability of data on stockpiles and contaminated land by DDT. Monitoring and evaluation should be done through meetings at the middle and at the end of the years to evaluate the effectiveness of the inventory strategy.

- (3) Identify and determine level of DDT residues. Coordinator: MoH. Coordination through meetings in consultation with experts and regional institutions to prepare strategies in sampling, to discuss results of analysis and implementation plan for the subsequent years by considering the results of monitoring and evaluation. Object of monitoring & evaluation is the performance indicator, i.e. levels of DDT residues in the environment. Monitoring and evaluation should be carried out every year through field visit, sampling, and analysis of samples taken from ex-warehouse of DDT that will be the object of inventory.
- (4) Remediation of polluted sites (see also Subchapter 3.3.11). Coordinator: MoH. Coordination through meetings with experts and related institutions to discuss the selected remediation methods. Object of monitoring & evaluation is the performance indicator, i.e. remediated the DDT polluted sites. Monitoring and evaluation should be conducted every year through field visits, sampling & analysis of samples taken from the remediating sites.

Timetable for Activity on Production, Import and Export, Use, Stockpiles and Wastes of DDT (Annex B Chemicals) If Used in the Country

Action Plan (3.3.5)	II	III	IV	V	Stakeholder*	Funding Source
1. Controlling illegal distribution and trade					DGC, BPOM, MoA, MoT, MoI, MoH, MoE	DGC, BPOM, MoA, MoT, MoE
2. Extension of inventory on ex-DDT warehouse					MoH, MoA, MoE	MoH, MoA, MoE, Donor and other financial resources
3. Identification and measurement/examination on DDT residue level					MoH, MoA, MoE	MoH, MoA, MoE, Donor and other financial resources
4. Remediation on polluted sites					MoH, MoA, MoF, MoE, related institutions	MoH, MoA, MoF, MoE, related institutions, Donor and other financial resources, <i>polluters</i>
5. Monitoring and evaluation					MoE, related institutions	MoE, MoA, MoH, MoE&M, MoTransp, MoNE, MoDef, MoC&I, MoF, BPPT, BPOM, MoI, MoT, BSN, MoHA, DGC, Pusarpedal, regional laboratories, related institutions, donor and other financial resources

* The first listed institution will act as coordinator

Budget for Activity on Production, Import and Export, Use, Stockpiles and Wastes of DDT (Annex B Chemicals) If Used in the Country

Action Plan (3.3.5)	Total Budget (x IDR 1000)			
	II	III	IV	V
1. Controlling illegal distribution and trade	see 3.3.2.1	see 3.3.2.1	see 3.3.2.1	
2. Extension of inventory on ex-DDT warehouse	1,541,794	1,681,957		
3. Identification and measurement/examination on DDT residue level	1,964,929	2,143,559	2,322,189	
4. Remediation on polluted sites			12,870,000	13,860,000
5. Monitoring and evaluation	see 3.3.1.6	see 3.3.1.6	see 3.3.1.6	see 3.3.1.6

** including technical assistance, excluding budget for experts

3.3.8 Activity: Register for Specific Exemptions and the Continuing Need for Exemptions (Article 4)

Obligation

Parties may have specific exemptions for using DDT or other POPs.

Present Condition

In compliance with WHO regulations, Indonesia has decided not to use DDT as pesticide in agricultural sector and in combating malaria disease. This is also in line with DDT banned as stipulated in GR No. 74/2001. In relation to Stockholm Convention, Indonesia does not have intention to register exemption as the malarial mosquitoes have been resistant to DDT. Chemicals in use to date are Icon (active compound: λ -sihalotrin), Vectron (active compound: etophenprox), and Bendiocarp.

3.3.9 Action Plan: Measures to Reduce Releases from Unintentional Production (Article 5)

Obligations

Indonesia at least has to take the following actions to reduce the total releases derived from anthropogenic sources of the chemicals listed in Annex C, namely

- (1) *polychlorinated dibenzo-p-dioxins* (PCDD or dioxins);
- (2) *polychlorinated dibenzofurans* (PCDF or furans);
- (3) hexachlorobenzene (HCB); and
- (4) *polychlorinated biphenyls* (PCBs),

with the goal of their continuing minimization and, where feasible, ultimate elimination.

- (1) Develop an action plan or, where appropriate, a regional or subregional action plan within two years of the date of entry into force of this Convention for it, and subsequently implement it as part of its implementation plan (NIP) specified in Article 7, designed to identify, characterize and address the release of the chemicals listed in Annex C, and to facilitate NIP.
- (2) Promote the application of available, feasible, and practical measures that can expeditiously achieve a realistic and meaningful level of release reduction or source elimination.
- (3) Promote the development and, where it deems appropriate, require the use of substitute or modified materials, products, and processes to prevent the formation and release of UPOPs, taking into consideration the general guidance on prevention and release reduction measures in Annex C and guidelines to be adopted by decision of the COP.
- (4) Promote and, in accordance with the implementation schedule of its action plan, require the use of BAT for new sources within source categories with a particular focus on source categories identified in Part II of Annex C as soon as practicable but no later than four years after the entry into force of the Convention for Indonesia. Indonesia should promote the use of BEP. When applying BAT and BEP, Indonesia should take into consideration the general guidance on prevention and release reduction measures in that Annex and the guidelines on BAT and BEP to be adopted as decided by the COP.
- (5) Promote, in accordance with its action plan, the use of BAT and BEP:
 - (a) For existing source, and

- (b) For new sources, those are all sources constructed or substantially modified, commenced at least one year after the date of entry into force of the Convention for Indonesia.
- (6) Release limit values or performance standards may be used by Indonesia to fulfil its commitments for BAT.

Present Condition

Indonesia has some regulations concerning UPOPs, namely

- (1) GR No. 74/2001, regarding B3 management that regulate the prohibition use of POPs pesticides and PCBs.
- (2) GR No. 85/1999, regarding amendment to GR No. 18/1999 concerning B3 waste management, define HCB (code D3092) and halogenated hydrocarbons) in the lists of B3.
- (3) Decree of the Head of Bapedal No. Kep-03/Bapedal/09/1995 regarding technical requirement for processing B3 waste, including
 - (a) POPs pesticides are used as criteria in regulatory limits for toxicity characteristic leaching procedure (TCLP).
 - (b) efficiency in destruction and removal efficiency (DRE) and combustion efficiency (EP) as information to be stated in incinerator specification.
 - (c) regulatory limits of incinerator's DRE for POHC (principal organic hazard constituents) parameters, PCBs, and PCDDs/Fs.
 - (d) information to be obtained from combustion trials before the continuous operation of incinerator should include incomplete combustion results. In this regulation, POHC, PCBs, and PCDDs/Fs are categorized as principal B3 waste.
- (4) Decree of the Head of Bapedal No. Kep-4/Bapedal/09/1995 regarding required procedure for stockpiles of treated results, requirement for former treatment sites and former stockpile sites of B3 wastes. This regulation does not specify that PCBs and PCDDs/Fs are included as criteria of B3 wastes to be disposed in landfill.

In short, it can be said that

- (1) Legislation in Indonesia contains regulations on B3 management in general way;
- (2) There is no specific regulation for UPOPs in terms of
 - (a) prevention, control, and reduction measures, and
 - (b) regulatory limits for air, water, soil, in products, and in residues.

Domestic Waste/Rubbish. Indonesia has serious problems concerning wastes.³² The main problem in the management of final disposal sites (TPA) is the high operational cost for collecting, transporting, and further treatment, especially if the TPA site is far away and not in the respective region. Due to the limited budget, the local government, in general, cannot provide TPA with proper sanitation and environment or sanitary landfill. Usually, they dispose the waste on the ground (open dumping). With open dumping system, the TPA becomes pollutant source at local and global levels. At local level, TPA may release leachates that pollute water bodies and ground water and release smoke and odour that pollute the air. At global level, TPA releases green house gases that cause global warming and climate change. Even if the government were able to provide TPA with sanitary landfill system, the facility may not be operated using standard procedure due to the limited operational budget. Draft of Waste Law in 2006 stated also that the way of thinking of the community members must be changed, for example, that rubbish can be processed into useful products.

The followings are the condition of TPA in Indonesia in general:

- (1) Drainage system in the TPA is poorly constructed, inadequate, and do not function properly,

³² MoE. 2004. Status Environment Indonesia

- (2) Leachate treatment is poor; the leachate is directly drained to public water bodies,
- (3) Exhaust gas handling is inappropriate, there is no gas piping to channel it that can cause explosion, as happened in TPA Leuwigajah.
- (4) Land or zone designation is inappropriate,
- (5) No monitoring pit for measuring ground water pollution caused by the leachate,
- (6) Waste volume entering the TPA is rarely recorded routinely, indicating the poor management of the facilities, and
- (7) Closure of the land in TPA facility is not done in proper way.

The high volume of waste is usually addressed by burning or incineration, as planned by the government of Jakarta.³³ This incineration will, in turn, cause UPOPs emission if its operation does not follow BAT/BEP.

Blue Sky Program and unleaded gasoline (in relation to air pollution and atmospheric damage) have been practiced in certain areas in Indonesia. These programs should be continued to support the achievement of Stockholm Convention.

Accurate data on UPOPs emission in Indonesia is not available. The only available information is estimated release of UPOPs inventory which was based on secondary data in the year 2000 (see Subchapter 2.3.4). Results of the inventory is considered a rough estimate, just using Standardized Toolkit method prepared by UNEP and secondary data from BPS as reference for releases from point, regional, and moving sources. Up to now, there is no laboratory in Indonesia that is able to measure PCDDs/Fs quantitatively.

Action Plans

UPOPs management in Indonesia is mainly focussed on PCDDs/Fs releases. Reduction of HCB release is expected in line with reduction of PCDDs/Fs release. Little is known about unintentional formation and release of PCBs. However, action to address release of PCDDs/Fs is assumed to contribute to the management of unintentional formation of PCBs.

- (1) First, formulate regulation to prevent, control, and reduce UPOPs, including regulatory limits for PCDDs/Fs to be applied in Indonesia:
 - (a) The MoE as the focal point should improve the regulation regarding regulatory limit of atmospheric pollution:
 - to be considered as a requirement for owner/operator of industrial facility in obtaining operational permit;
 - the permit should be effective in certain period and must be renewed continually;
 - for new facilities, the environment must be assessed comprehensively and implementation of BAT should be emphasized;
 - to be implemented in the regional regulations, especially in controlling, which should be in line with the regional regulations;
 - (b) Determine regulatory limits for PCDDs/Fs releases, prioritized for 4 source categories, namely
 - Incinerator for urban solid waste, hazardous waste, medical waste, and sludge;
 - Cement kiln burning hazardous waste;
 - Pulp production using elemental chlorine or chemicals producing chlorine;
 - Thermal processes in the following metallurgical industries: secondary copper production, sinter plants in the iron and steel industry, secondary aluminium production, and secondary zinc production.

³³ Dinas Kebersihan Propinsi DKI Jakarta. 2005. Laporan Antara Western Java Environmental Management Project. Solid Waste Management for Jakarta: Master Plan Review and Program Development (IBRD Loan 4612 IND/IDA Credit 3519-IND).

For other categories, focus on

- Open burning of wastes, including burning on landfill sites
- Processing in power plants (not in Annex C).

(c) UPOPs management in this regulation should be a national approach to eliminate UPOPs as much as possible;

(d) Possibility to enlist new potential UPOPs sources to the regulation.

Coordinator and Coordination: see 3.3.1.4. Object of monitoring & evaluation is the performance indicator, i.e. the availability of regulation and regulatory limits for UPOPs. Monitoring and evaluation should be carried out through meetings at the middle and at the end of the corresponding years.

- (2) Measure quantitatively PCDDs/Fs releases industrial zones and in dense populated areas and use the results as a baseline for the efforts in reducing UPOPs releases. Questionnaire system and field verifications should be needed in selecting some good areas in industrial zones in Indonesia and later on to be developed as pilot projects. The selected locations are those having the highest number of source category in Annex C Part II. Coordinator: MoE. Coordination through consultation with experts, team of data collectors, and regional institutions in order to design sampling and analysis method. Object of monitoring & evaluation is the performance indicator, i.e. the availability of data from the dense populated areas and industrial areas, to be used as baseline and their progress at the following years. Monitoring and evaluation should be done every 6 months through visits to industrial zones and dense populated areas, sampling & sample analysis.
- (3) Later on, a program should be developed to fulfil obligation of reporting annual release of PCDDs/Fs by public and private sectors that are potential in releasing UPOPs. These should be under the government regulation. Coordinator: MoE. Coordination through discussion with experts regarding reports from public and private sectors, and plan the follow-ups. Object of monitoring & evaluation is the performance indicator, i.e. the availability of reports from public and private sectors regarding annual PCDDs/Fs releases. Monitoring and evaluation should be conducted through visits to the industries potential to release UPOPs and evaluate the effectiveness.
- (4) Extend the implementation of Blue Sky Program in industrial and dense populated areas, for example by supporting environmental friendly fuel such as unleaded gasoline, use of catalytic converter, and befouls. Regulations should also be improved to support the Blue Sky Program. Coordinators: Mol for industrial zones and MoHA for dense populated areas. Coordination through discussion with experts upon the reports submitted by the sectors and the regions, and the planned follow-ups. Object of monitoring and evaluation should be the performance indicator, i.e. the implementation of Blue Sky Program in industrial and dense populated areas. Monitoring and evaluation should be done every 6 months by visiting the areas and evaluate the effectiveness of the program implementation.
- (5) Apply BAT/BEP in various sectors, e.g.:
- (a) Endeavour domestic waste management using technology that can prevent release of PCDDs/Fs and in line with BAT/BEP criteria (composting, gasification, smelting, incineration, etc.)
- (b) Endeavour specific incinerator for medical waste that in line with BAT/BEP criteria;
- (c) Endeavour cooperation with cement factories to use kiln that in line with BAT criteria to incinerate hazardous waste:
- To be able to treat hazardous waste from industrial zones (Lhok Seumawe, Medan, Pulau Batam, Palembang, Cilegon/Anyer/ Merak, Cikarang, Kawasan Jababeka, Kawasan PT Pupuk Kujang, Cilacap, Kawasan Pupuk Kaltim, Kawasan Petrokimia Gresik, and Rungkut);

- The facilities should be placed in several islands (1 in Sumatra, 3 in Java, and 1 in Sulawesi), to minimize the dependency on such facility in Java Island;
- (d) Apply BAT/BEP guidelines for pulp production that are still using elemental chlorine or chemicals that may produce chlorine in the bleaching stage;
- (e) Apply BAT/BEP guidelines for thermal processes in metallurgical industries (secondary copper, secondary aluminium, secondary zinc, sinter plants in iron and steel industries);
- (f) Provide BEP operating guidelines for incinerators and cement kilns and carry out training for processing hazardous waste and non-hazardous in cement kilns;
- (g) Provide BEP training guidelines for scrap separation of materials that are potential as precursors of PCDDs/Fs as the application of BEP in the processing of secondary Cu, Al, Fe, and Zn;
- (h) Apply BAT/BEP guidelines for copper-sheathed cables, textile dyeing and leather processing, refinery of used vehicle lubricants, especially those using leaded gasoline;
- (i) Apply BAT/BEP guidelines for production of certain chemicals;
- (j) Apply BAT/BEP guidelines for other thermal processes in metallurgical industries (secondary lead, secondary steel, primary aluminium, magnesium, primary basic metal such as copper, lead, nickel, and zinc);

Coordinator: Mol. Coordination through consultation with expert and related sectors to discuss guidelines and proposal to implement BAT/BE\p in Indonesia. Object of monitoring & evaluation is the performance indicators, i.e. the application of BAT/BEP by the industrial sources. Monitoring and evaluation should be done every 6 months by visiting the industries implementing BAT/BEP and evaluate the effectiveness of its implementation.

- (6) Program in education and change-out technology on source category that are more spreading, such as open-burning (domestic wastes, burning of wood or other biomass), use of fossil fuel, industrial boilers, and use of firewood in households. For facilities such as waste incinerator, cement kiln, pulp and paper factory, and new metallurgical thermal process, the performance of BAT as assessed by environmental assessment process (in accordance with regulatory limit) should be used as the main consideration in granting extension of business permit/licence by the local government. In this respect, law enforcement should be the key aspect. For the existing facilities, there are two options: (1) continue to operate using the existing system until the year 2015, and closed; or (2) equip or improve the facility in accordance with BAT criteria. Facility choosing the second option should be given technical assistance and funds. There is also a need to give incentive in the form of free promotion or enhancement of product quality. Rewards can be given to new and existing factories applying BAT. Coordinator: Mol. Coordination through consultation meetings with experts and related sectors to discuss guidelines and proposals to apply BAT/BEP in Indonesia. Object of monitoring & evaluation is the performance indicator, i.e. the application of BAT/BEP by the sources in industries. Monitoring and evaluation should be done every 6 months through field visit to industries applying BAT/BEP and evaluate the implementation effectiveness
- (7) Use materials, products, and substituted or modified processes, for example
- (a) Carry out survey on defoaming substance that are precursors of dioxins and furans still in used by pulp and paper factories and suggest use of DBD-free and DBF-free materials;
 - (b) Replace the chlorine-based bleaching process in pulp and paper. To address the release of dioxins and furans to water, immediate action should be taken by the MoE and the Indonesia Association of Pulp and Paper to
 - Encourage (by providing technical assistance, funds, or incentives) the factories to change the technology with chlorine-free bleaching or use chlorine-free materials to minimize the formation and to prevent release of PCDDs/Fs to the environment;
 - Let the factories in operation until the year 2015 and closed, if the investment for new installation is considered very costly and unprofitable.

Coordinator and coordination: see subchapter 3.3.2.5. Object of monitoring & evaluation is the performance indicator, i.e. the decreasing open burning activities that can cause UPOPs. Monitoring and evaluation should be carried out by field visits to evaluate the effectiveness of the implementation of teaching programs. .

- (8) Research related to power generation and transportation (see subchapter 3.3.16). Coordinator: MoE. Coordination through meetings to discuss planning, designation, and research results with research institutions (universities, LIPI, and BPPT). Object of monitoring & evaluation is the performance indicator, i.e. the implementation of research in the field of power generation and transportation to reduce UPOPs. Monitoring and evaluation should be done through meetings at the middle and at the end every year to evaluate the strategy and the research results.
- (9) Increase education, training, and awareness (see subchapter 3.3.13). Coordinator: MoC&I. Coordination through consultation with experts, meetings to prepare and implement socialisation in regions, to discuss results of activities and implementation plan for the subsequent year by taking into account the results of monitoring and evaluation. Object of monitoring & evaluation is the performance indicator, i.e. the availability and the socialization of teaching materials about POPs for the public. Monitoring and evaluation should be done through field visits to evaluate the effectiveness of teaching materials at every activity in raising awareness.
- (10) Develop strategy for pollution prevent that can give alternatives to be recommended as means/facility to minimize pollutants. This strategy should be developed and reviewed every 5 years. Coordinator: MoE. Coordination through consultative meetings with experts and resource persons from the related institutions, and workshops. Object of monitoring & evaluation is the performance indicator, i.e. the strategy for developing prevention caused by POPs. Monitoring and evaluation should be done through meetings.
- (11) Determination of *mass concentration* of PCDDs/Fs, HCB, and PCBs in monitoring activities, as required by the Secretariat of Stockholm Convention to follow up “Decision 2/5”. Coordinator: MoE. Coordination through consultative meetings with experts and resource persons from Mol to discuss sampling techniques and the results of analysis. Object of monitoring & evaluation is the performance indicator, i.e. the known *mass concentration* of PCDDs/Fs, HCB, and PCBs. Monitoring and evaluation should be carried out through meetings at the middle and at the end of year with POPs laboratories.

Timetable for Measures to Reduce Releases from Unintentional Production (Article 5)

Date for new installation to Implement BAT/BEP: 2011 (4 years after ratification) and for the existing installation: 2016.

Action Plan (3.3.7)	I	II	III	IV	V	Stakeholder*	Funding Source
1. Preparing UPOPs regulations, including regulatory limit for air emission						Mol, MoE, MoHA	Mol, MoE, MoHA
2. Quantitative measurement of PCDDs/Fs releases in industrial and populated areas to be used as baseline for effort in reducing releases						MoE, universities, BPPT	MoE, Donor and other financial resources
3. Program for annual report on PCDDs/Fs release by public and private sectors potential to release UPOPs						MoE, Mol, MoHA	MoE, Mol, MoHA, Donor and other financial resources
4. Expansion of Blue Sky Program in industrial and						Mol, MoHA, MoE&M, MoE	Mol, MoHA, MoE&M, MoE, Donor and other financial

Action Plan (3.3.7)	I	II	III	IV	V	Stakeholder*	Funding Source
populated areas							resources
5. Implementation of BAT/BEP in various sectors, including preparation of BEP guidelines and provision of training on BEP						MoI, MoHA, MoH, MoE	MoI, MoHA, MoH, MoE, Donor and other financial resources
6. Increasing public awareness and using alternative technology/processing to inhibit open burning (domestic waste, shifting cultivation, wood burning in households)						MoC&I, local government, MoE&M, Mol, MoE, MoA, MoF, related institutions	MoC&I, MoE&M, Mol, MoE, MoA, MoF, related institutions, Donor and other financial resources
7. Using alternative materials, products and process or the modified ones						MoI, MoA, MoE&M, research institution, MoNE/ universities, BPPT, MoE	MoI, MoA, MoE&M, MoE, MoNE, Donor and other financial resources
8. Research related to power generating and transportation						Research institution, MoNE/ universities, BPPT, MoE	MoE, MoNE, Donor and other financial resources
9. Education, training, and awareness raising						MoC&I, MoNE, universities, Mol, MoE&M, BPOM, MoA, NGO, MoE	MoC&I, MoNE, Mol, MoE&M, BPOM, MoA, MoE, Donor and other financial resources
10. Developing strategy for pollution prevention that will give recommended alternatives as equipment/facility to minimize pollutants						MoE, MoNE/ universities, research institution, BPPT	MoE, MoNE, Donor and other financial resources
11. Determination on <i>mass concentration</i> of PCDDs/Fs, HCB, and PCBs						MoE, Mol	MoE, Mol, Donor and other financial resources
12. Monitoring and evaluation						MoE, related institutions	MoE, MoA, MoH, MoE&M, MoTransp, MoNE, MoDef, MoC&I, MoF, BPPT, BPOM, Mol, MoT, BSN, MoHA, DGC, Pusarpedal, regional laboratories, related institutions, donor and other financial resources

* The first listed institution will act as coordinator

Budget for Measures to Reduce Releases from Unintentional Production (Article 5)

Action Plan (3.3.7)	Total Budget (x IDR 1000)				
	I	II	III	IV	V
1. Preparing UPOPs regulations, including regulatory limit for air emission	see 3.3.1.4	see 3.3.1.4			
2. Quantitative measurement of PCDDs/Fs releases in industrial and populated areas to be used as baseline for effort in reducing releases**			18,480,000	20,020,000	
3. Program for annual report on PCDDs/Fs release by public and private sectors potential to release UPOPs					1,607,052
4. Expansion of Blue Sky Program in industrial and populated areas				1,939,080	2,088,240

Action Plan (3.3.7)	Total Budget (x IDR 1000)				
	I	II	III	IV	V
5. Implementation of BAT/BEP in various sectors, including preparation of BEP guidelines and provision of training on BEP**		21,780,000	23,760,000	21,450,000	23,100,000
6. Increasing public awareness and using alternative technology/processing to inhibit open burning (domestic waste, shifting cultivation, wood burning in households)**		13,794,000	27,258,000	28,600,000	24,255,000
7. Using alternative materials, products and process or the modified ones				see 3.3.2.5	see 3.3.2.5
8. Research related to power generating and transportation**			5,280,000	5,720,000	6,160,000
9. Education, training, and awareness raising		1,028,500	1,122,000	1,215,500	1,309,000
10. Developing strategy for pollution prevention that will give recommended alternatives as equipment/facility to minimize pollutants			1,848,000	2,002,000	1,309,000
11. Determination on <i>mass concentration</i> of PCDDs/Fs, HCB, and PCBs**			15,180,000	16,445,000	17,710,000
12. Monitoring and evaluation	see 3.3.1.6	see 3.3.1.6	see 3.3.1.6	see 3.3.1.6	see 3.3.1.6

** including technical assistance, excluding budget for experts

3.3.8 Activity: Measures to Reduce Releases from Stockpiles and Wastes

Obligations (Article 6)

In relation to the Stockholm Convention, to ensure that stockpiles consisting of or containing POPs, Indonesia has to

- (1) Develop strategies for identifying
 - (a) Stockpiles consisting of or containing chemicals listed either in Annex A and Annex B; and
 - (b) Products and articles in use and wastes consisting of, containing or contaminated with a chemical listed in Annex A, B, or C;
- (2) Identify, to the extended practicable, stockpiles consisting of or containing POPs.

Present Condition

- (1) Indonesia has never produced or exported POPs chemicals. Inventory in 2003 revealed that there were no stockpiles of POPs (DDT, aldrin, dieldrin, chlordane, endrin, hexachlorobenzene, heptachlor, mirex, and toxaphene) in ex-warehouses sampled in 9 cities, 6 regencies, and 2 subregencies (see subchapter 2.3.1).
- (2) GR No. 74/2001 regulated and limited the pesticides to be used in Indonesia. The prohibition use of these substances is also stated in Permentan No. 7/2007. Pesticides that will be used in agricultural sector must be registered and permitted by the Ministry of Agriculture.
- (3) Subchapter 2.3.11 discusses in brief about technical infrastructure for management, research, and development in addressing POPs. To date, there is only one laboratory that has facilities equivalent to international level. Therefore, the government should improve the laboratories and capability of human resources from various testing institutions in some ministries and local governments.

- (4) Impact of POPs including of DDT exposures on human has been known, which is likely to cause spontaneous abortion in human and cattle. DDT having lipophilic character is capable to accumulate in the body fat and breast milk causing decrease of the next generation quality. Integrated monitoring on POPs releases and their effects on human health and environment have not been conducted continuously by a designated institution. Hence, the resulted data are scattered and incomplete (see also subchapter 2.3.9).
- (5) A survey in 2003 showed that residues in high concentration were found around ex-warehouse owned by Health Service in the city of Malang and in ex-warehouse of DDT manufacturer in Bogor. Some agricultural lands found to contain DDT residues up to 2214 ng/g (see subchapter 2.3.5). Old DDT warehouses are located in 17 provinces (see subchapter 3.3.11).
- (6) The Ministry of Health has 11 technical units of environmental health (BTKL) and health laboratories in 33 provinces, however, equipment and human resources are considered inadequate.
- (7) Basel Convention has been complied with, along with some Asian countries.

Action Plans

- (1) Strengthen infrastructure to identify release from stockpile and waste. Infrastructure strengthening includes strengthening of laboratory performance for analyzing POPs pesticides, PCBs, and PCDDs/Fs from various environmental compartments. Planned activities fall into four steps:
 - (a) Carry out inventory, mapping, and select laboratories in year II. Criteria to be considered in this step are management system [quality assurance (QA), quality control (QC)], staff and qualification, laboratory facility and utilities (equipment, electrical supply, clean water supply, protection system toward contaminants), and geographical location. From these facts, 10–15 laboratories should be selected and further surveyed to determine 6 laboratories (5 laboratories for analysis of POPs pesticides and PCB, and 1 laboratory for analysis of PCDDs/Fs) to be strengthened. The laboratories should be in the following location: 1 laboratory in Medan/Pekanbaru (representing western regions), 3 laboratories in Surabaya, Jakarta/ Bandung/Bogor, Yogyakarta (representing Java and Nusa Tenggara islands), and 1 laboratory in Makassar (representing eastern regions).
 - (b) Strengthen laboratory capability and performance in year IV-VII. This step includes improving maintenance system and providing auxiliaries to the existing equipment, equipment and chemicals procurement (also certified reference material), training for analysis (from sampling to reporting of data analysis), and preparing the laboratories to obtain accreditation for POPs analysis. The accredited lab has to apply ISO/IEC 17025:2005 regarding general laboratory competency and calibration laboratory, consisting of management system of QA, QC, staff competency, and quality of physical lab environment.
 - (c) Prepare SNI in year VII. This step should be implemented after the laboratories have been accredited for POPs analysis, so that the methodologies formulated in the SNI are valid and resulted accurate results.
 - (d) Increase number of laboratories for POPs analysis starting in year VIII. This step should be implemented after the selected five or six laboratories have been well established.

In addition, enhancement of human resource, including researchers, field workers, laboratory analysts and technicians, and government officials should be performed to ensure the proper POPs management, among other through

- (a) Education in the field of ecotoxicology, identification and quantification, instrumentation, environmental management, and environmental micro-biology.
- (b) Interdisciplinary research program to determine the levels of POPs pollution.
- (c) Quality control and quality assurance for valid and reliable test results and research results.

Laboratory strengthening for analysis of POPs pesticides should be carried out first due to fewer requirements of specific instruments to be provided. This action can be initiated in year III. Laboratory strengthening for PCB analysis can also be carried out simultaneously with strengthening for POPs pesticide analysis. Capacity strengthening for addressing UPOPs requires more specific and sophisticated equipment, therefore, the provision related to this aspect needs relatively longer period than for POPs pesticides and PCBs.

Coordinator and Coordination: see subchapter 3.3.1.5. Object of monitoring & evaluation is the performance indicator, i.e. the accredited POPs laboratories and the availability of human resources that can manage POPs laboratories. Monitoring and evaluation should be performed every 6 months through visits to POPs laboratories and evaluate the effectiveness of the infrastructure.

- (2) Impact Assessment on Health. POPs release to various environmental compartments may affect human health, including oestrogenic effect, genotoxic effect, and effects to development, reproduction, and immune system. Estimation of impact on human health should be carried out by the Ministry of Health every one year prior to reporting to the POPs Secretariat. The activities include checking on blood serum and breast milk of the community surrounding the old DDT warehouses (in 17 provinces), community directly connected with POPs (workers in cement factories, pulp and paper, and in metallurgical production (secondary copper production, iron sinter, secondary aluminium, and secondary zinc), and medical patients suspected to suffer from POPs (for example, extreme neurological symptoms, liver cirrhosis, abortive of pregnant women, prostate cancer, sexual abnormality, kidney disorder, and arthritis). The government should provide funding for the activities approximately Rp500 millions from APBN. Coordinator: MoH. Coordination through consultative meetings with experts and discussion on proposals on impact of POPs release to human health. Object of monitoring & evaluation is the performance indicator, i.e. the availability of results of study on human health. Monitoring and evaluation should be done through meetings at the middle and at the end of year.
- (3) Remediation. To reduce release from waste stockpiles, each contaminated sites must be restored. (Coordinator and Coordination: see subchapter 3.3.5.4). Object of monitoring & evaluation is the performance indicator, i.e. the remediated contaminated sites. Monitoring and evaluation should be carried out through field visits and analysis of samples taken from the remediated land.

Timetable for Activity on Measures to Reduce Releases from Stockpiles and Wastes

Action Plan (3.3.8)	II	III	IV	V	VI	Stakeholder*	Funding Source
1. Infrastructure strengthening (strengthening lab performance for POP analysis, preparing SNI and human resource development, including researchers, field workers, analyst, technicians, and government officials)						Pusarpedal, accredited regional laboratories, BSN, BPOM, universities, BPPT, research institution, MoNE, related institutions	Pusarpedal, BSN, BPOM, MoNE, related institutions, Donor and other financial resources
2. Evaluating impact of POPs releases to environment on human health						MoH	MoH, Donor and other financial resources
3. Remediating polluted sites						MoH, MoA, MoF, MoE, related institutions	MoH, MoA, MoF, MoE, Donor and other financial resources, related institutions, <i>polluters</i>
4. Monitoring and evaluation						MoE, related institutions	MoE, MoA, MoH, MoE&M, MoTransp, MoNE, MoDef, MoC&I,

Action Plan (3.3.8)	II	III	IV	V	VI	Stakeholder*	Funding Source
							MoF, BPPT, BPOM, MoI, MoT, BSN, MoHA, DGC, Pusarpedal, regional laboratories, related institutions, donor and other financial resources

* The first listed institution will act as coordinator

Budget for Activity on Measures to Reduce Releases from Stockpiles and Wastes

Action Plan (3.3.8)	Total Budget (x IDR 1000)				
	II	III	IV	V	VI
1. Infrastructure strengthening (strengthening lab performance for POP analysis, preparing SNI and human resource development, including researchers, field workers, analyst, technicians, and government officials)	see 3.3.1.5	see 3.3.1.5	see 3.3.1.5		
2. Evaluating impact of POPs releases to environment on human health		1,623,600	3,260,400	3,126,200	1,897,500
3. Remediating polluted sites			see 3.3.5.4	see 3.3.5.4	see 3.3.5.4
4. Monitoring and evaluation	see 3.3.1.6	see 3.3.1.6	see 3.3.1.6	see 3.3.1.6	see 3.3.1.6

3.3.9. Strategy: Identification of Stockpiles, Articles in Use and Wastes

Obligations (Article 6)

- (1) Develop strategies for identifying
 - (a) Stockpiles consisting of or containing POPs chemicals; and
 - (b) Products and articles in use and wastes consisting of, containing or contaminated with a chemical of POPs;
- (2) Identify, to the extended practicable, stockpiles consisting of or containing POPs.

Present Condition

- (1) Subchapter 2.3.1 describes that there is no production of HCB in Indonesia. Import of HCB was usually combined with DDT and these two substances have the same code, specified with HS No. 290362000 or SITC 51139620. An inventory in 2004 revealed that HCB entered the country territory, but the information was incomplete. Thus, the information must be verified through in-depth inventory. The survey also indicated that POPs pesticides were no longer distributed in Indonesia and there were no importation-exportation of these commodities recorded by BPS (the National Statistic Bureau).
- (2) Uses of pesticides have been prohibited since 1980 and the ban was stated in the GR No. 74/2001 and Permentan No. 7/2007 regarding Requirement and Procedure for Pesticide Registration.
- (3) Inventory on HCB showed that HCB was detected on agricultural land. There was an indication that HCB was used as auxiliary additives in textile industries, which is important commodity for Indonesia (see subchapter 2.3.1).
- (4) In accordance with BPS, there was no export, import, and production of PCBs as chemicals from 2000.

- (5) From the preliminary survey on PCBs in 2004, which was focused on the existing transformers and capacitors, only 25% of 1500 respondents gave responses (see Subchapter 2.3.2).
- (6) The abovementioned inventory only involved equipment with PCBs content $\geq 0.05\%$ and volume >5 litre in closed systems.

Action Plans

- (1) Identification and management according to ESM the stockpiles and waste of POPs. Coordinator: MoA. Coordination through consultative meetings with experts and resource persons from MoI and MoH about strategies in identification of stockpiles, plan and results of data collecting, socialization of management methods, and meetings for preparing implementation plan for the subsequent year. Object of monitoring & evaluation is the performance indicator, i.e. the identified stockpiles and wastes of POPs. Monitoring and evaluation should be done through meetings at the middle and at the end of the year to evaluate strategies and methods to identify and to manage stockpiles and waste of POPs.
- (2) Survey on the existence and use of HCB. Information on export-import and stockpile of HCB were inadequate and should be verified through further inventory. Based on difficulties in retrieving information from the Directorate General of Customs in the past, sensitive method directly to members of association of hazardous material traders and members of association of textile factories seems to a good approach and can be started in 2006. In addition, the inventory may also use some kind of incentives. The incentive should not necessarily in financial form, but in the form of free advertisement or by labelling system. These methods are expected to trigger the industries not to use POPs pesticides; instead, they may increase the selling because the products are certified to be POPs-free.

The respondents will be selected (10% of the association members) and questionnaires will be distributed, to ask the respondents to list the imported goods since 1997. Distributor agents for textile dyes will be one of the inventory respondents. Based on the received responses, approximately 25% of the respondents will be visited and interviewed. The collected information will be associated with the use and storage (if any). The stored HCB should be destroyed appropriately, by sending it to the designated facility.

Coordinator, Coordination, and Object of monitoring & evaluation: see subchapter 3.3.2.2. Monitoring and evaluation should be done through field visits and analysis of HCB samples that are still used in the sampled industries.

- (3) Survey on PCBs and equipment containing PCBs. In accordance with the present condition, extensive survey on PCBs must be carried out. Coordinator, Coordination, and Object of monitoring & evaluation: see subchapter 3.3.2.3. Monitoring and evaluation should be done every year through field visits, sampling, and analysis of PCBs samples taken from the surveyed respondents.

Timetable for Identification of Stockpiles, Articles in Use and Wastes

Action Plan (3.3.9)	II	III	IV	Stakeholder*	Funding Source
1. Identification and management of POPs stockpile and wastes according to ESM				MoA, MoE, MoI, MoH	MoA, MoE, MoI, MoH, Donor and other financial resources
2. Survey on existing and use of HCB				MoI, MoE, MoA, MoNE/ universities	MoI, MoE, MoA, Donor and other financial resources
3. Inventory on PCBs and equipment containing PCBs				MoE&M, MoI, MoTransp, MoNE, MoDef, MoNE/	MoE&M, MoI, MoTransp, MoDef, MoE, Donor and other financial resources

				universities, MoE	
4. Monitoring and evaluation				MoE, related institutions	MoE, MoA, MoH, MoE&M, MoTransp, MoNE, MoDef, MoC&I, MoF, BPPT, BPOM, MoI, MoT, BSN, MoHA, DGC, Pusarpedal, regional laboratories, related institutions, donor and other financial resources

* The first listed institution will act as coordinator

Budget for Identification of Stockpiles, Articles in Use and Wastes

Action Plan (3.3.9)	Total Budget (x IDR 1000)		
	II	III	IV
1. Identification and management of POPs stockpile and wastes according to ESM	1,829,169	2,472,334	18,658,640**
2. Survey on existing and use of HCB	see 3.3.2.2	see 3.3.2.2	see 3.3.2.2
3. Inventory on PCBs and equipment containing PCBs	see 3.3.2.3	see 3.3.2.3	
4. Monitoring and evaluation	see 3.3.1.6	see 3.3.1.6	see 3.3.1.6

** including technical assistance, excluding budget for experts

3.3.10 Activity: Manage Stockpiles and Appropriate Measures for Handling and Disposal of Articles in Use

Obligations (Article 6)

- (1) Manage stockpiles, as appropriate, in safe, efficient, and environmentally sound manner.
- (2) Take appropriate measures so that such wastes, including products and articles upon becoming wastes are
 - (a) Handled, collected, transported, and stored in an environmentally sound manner;
 - (b) Disposed of in such a way that the POPs content is destroyed or irreversibly transformed so that they do not exhibit the characteristics of POPs or otherwise disposed of in an environmentally sound manner;
 - (c) Not permitted to be subjected to disposal operations that may lead to recovery, recycling, reclamation, direct reuse or alternative uses of POPs; and
 - (d) Not transported across international boundaries without taking into account relevant international rules, standards, and guidelines;
- (4) Endeavour to develop appropriate strategies for identifying sites contaminated by POPs; if remediation of those sites is undertaken it should be performed in an environmentally sound manner.
- (5) The COP should cooperate closely with the appropriate bodies of the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal.

Present Condition

- (1) Preliminary inventory on equipment containing PCBs showed that number of transformer owned by each respondent (except PLN) ranged from 1 to 600 pieces. Mining enterprises such as Pertamina, copper mining, and automotive assembler seemed to be highly correlated with number of transformer owned.
- (2) Information regarding the volume of oil in transformers showed that some respondents still use equipment containing PCBs.
- (3) The main problems faced by owners of equipment containing PCBs were waste disposal and handling cost.

Action Plans

- (1) Prepare Guidelines. In accordance with the guidelines to be prepared, waste stockpiles and articles must be disposed safely, efficient, in environmentally sound manner; and ensure not to leave POPs residues. Further action should be regulations on the stored POPs (particularly PCBs) and the corresponding waste.

As mentioned in subchapter 3.3.4, regulation on PCBs should include

- Prohibition to store equipment containing PCBs after 2011,
- Prohibition to store equipment containing PCBs in a long period,
- Prohibition to store PCBs in sensitive sites,
- Dispose used and stored PCBs, and
- Provide policies regarding elimination of PCBs.

Coordinator: MoE. Coordination through meetings with experts and resource persons from related institutions to discuss guidelines to manage stockpiles of materials/residues of POPs and how to dispose articles containing POPs. Object of monitoring & evaluation is the performance indicator, i.e. the availability of guidelines on the management of POPs stockpile. Monitoring and evaluation should be done through meetings at the middle and at the end of the year to evaluate the effectiveness of the guidelines.

- (2) In addition, an agency to control registration and collect POPs pesticides that may exist in agricultural sector as well as to do safe storage and disposal is needed. The agency should consist of government, industries, and farmers, to protect environment and human health. All programs should involve stakeholders representing the Ministry of Agriculture and MoE, retailers, and agrochemical industries. Coordinator: MoA. Coordination through meetings with related institutions to establish an agency for the control and to prepare and to discuss the work plan. Object of monitoring & evaluation is the performance indicator, i.e. the establishment of a control agency for *safe storage and disposal*. Monitoring and evaluation should be carried out through meetings at the middle and at the end of the year to evaluate the effectiveness of the agency of *safe storage and disposal*.
- (3) Research on alternative technology for PCBs destruction in accordance with BAT/BEP. Coordinator, Coordination, and the object of monitoring & evaluation can be seen in subchapter 3.3.4.5. Monitoring and evaluation should be carried out through meetings at the middle and at the end of the year to evaluate strategy and effectiveness of the research results.
- (4) Handle, collect, transport, store, and dispose waste of POPs in accordance with ESM. Coordinator: MoE&M. Coordination through meetings with experts to make planning on management of POPs waste in accordance with ESM and to discuss the results in order to plan the follow-ups in the following years. Object of monitoring & evaluation is the performance indicator, i.e. the availability of regulations on handling, collecting, and disposing PCBs in accordance with ESM. Monitoring and evaluation should be done through meetings at the middle and at the end of the year to evaluate the effectiveness of the research results.
- (5) Destruction of POPs waste in accordance with ESM. Coordinator: MoE. Coordination with experts to discuss proposal on alternative technology in POPs destruction and the selected technology will be used in pilot project that are to build in the following year. Object of monitoring & evaluation is the performance indicator, i.e. the destruction of PCBs in accordance with ESM. Monitoring and evaluation should be performed through meetings to evaluate effectiveness of the alternative technology for POPs destruction.
- (6) Provision of facility that fulfil BAT/BEP (for example: noncombustion technology) to destroy equipment containing PCBs. Technology for destruction of PCBs and equipment containing PCBs is available. Description of activity, Coordinator, and Coordination: see subchapter 3.3.4.5. Object of monitoring & evaluation is the performance indicator, i.e. the provided facility to destroy PCBs in accordance with ESM. Monitoring and evaluation should be done through field visits to evaluate the effectiveness of pilot project facilities *in* destroying POPs.

Timetable for Activity on Manage Stockpiles and Appropriate Measures for Handling and Disposal of Articles in Use

Action Plan (3.3.10)	II	III	IV	V	VI	Stakeholder*	Funding Source
1. Preparing guidelines on management of POPs stockpile/residue , destruction of articles containing POPs, and destruction of POPs waste according to ESM						MoE, Mol, MoE&M, MoA, MoF, BPOM	MoE, Mol, MoE&M, MoA, MoF, BPOM, Donor and other financial resources
2. Establishment of a body for controlling registration, maintenance, and collecting POPs pesticides in agricultural areas that may be exist (<i>safe storage and disposal</i>)						MoA, Mol, BPOM, MoE	MoA, Mol, BPOM, MoE
3. Research on PCBs destruction according to BAT/BEP						MoE&M, Mol, MoNE/universities, research institution, BPPT	MoE&M, Mol, MoNE, Donor and other financial resources
4. Handling, collecting, transporting, storing, and disposing POPs waste according to ESM						MoE&M, MoE, Mol, MoA	MoE&M, MoE, Mol, MoA, Donor and other financial resources
5. Destruction of POPs waste according to ESM						MoE, related institutions	MoE, related institutions, Donor and other financial resources
6. Establishment of PCBs destruction facility according to BAT/BEP						MoE&M, Mol, MoE	MoE&M, Mol, MoE, Donor and other financial resources
7. Monitoring and evaluation						MoE, related institutions	MoE, MoA, MoH, MoE&M, MoTransp, MoNE, MoDef, MoC&I, MoF, BPPT, BPOM, Mol, MoT, BSN, MoHA, DGC, Pusarpedal, regional laboratories, related institutions, donor and other financial resources

* The first listed institution will act as coordinator

Budget for Activity on Manage Stockpiles and Appropriate Measures for Handling and Disposal of Articles in Use

Action Plan (3.3.10)	Total Budget (x IDR 1000)				
	II	III	IV	V	VI
1. Preparing guidelines on management of POPs stockpile/residue , destruction of articles containing POPs, and destruction of POPs waste according to ESM		1,015,575	1,886,706		
2. Establishment of a body for controlling registration, maintenance, and collecting POPs pesticides in agricultural areas that may be exist (<i>safe storage and disposal</i>)	851,598	929,016			
3. Research on PCBs destruction according to BAT/BEP			see 3.3.4.5	see 3.3.4.5	see 3.3.4.5
4. Handling, collecting, transporting, storing, and disposing POPs waste according to ESM**		11,285,736	10,582,000		
5. Destruction of POPs waste according to ESM**			2,860,000	3,080,000	8,250,000

Action Plan (3.3.10)	Total Budget (x IDR 1000)				
	II	III	IV	V	VI
6. Establishment of PCBs destruction facility according to BAT/BEP				see 3.3.4.5	see 3.3.4.5
7. Monitoring and evaluation	see 3.3.1.6	see 3.3.1.6	see 3.3.1.6	see 3.3.1.6	see 3.3.1.6

** including technical assistance, excluding budget for experts

3.3.13 Strategy: Identification of Contaminated Sites (Annex A, B, C) and Remediation in An Environmentally Sound Manner

Obligation

Obligations of Indonesia to manage stockpiles and disposal of used equipment have been mentioned in subchapter 3.3.10.

Present Condition

- (1) Maximum residue limits of pesticide in Annex A is regulated in the Joint Decree of the Ministry of Health No. 881/Menkes/SKB/VIII/1996 and the Ministry of Agriculture No. 711/Kpts/TP.270/8/96, for vegetables, fruits, and meat. The maximum limits, among others are: aldrin 0.006-0.1 mg/kg, DDT 0.05-1 mg/kg, dieldrin 0.006-0.2 mg/kg, endrin 0.0008-0.2 mg/kg, chlordane, 0.002-0.1 mg/kg, mirex in meat 0.1 mg/kg, PCBs in meat 0.2 mg/kg, toxaphene in meat 7 mg/kg, and heptachlor 0.01-0.2 mg/kg. In accordance with Basel Technical Guidelines for POPs waste, the maximum limit of releases in solid waste is 50 mg/kg.
- (2) Survey in 2003 revealed that high residue concentration was found around ex-warehouses owned by the Health Service in Malang and in the old DDT factory in Bogor; some agricultural lands were contaminated by DDT residues up to 2214 ng/g (see also subchapter 2.3.5).

Action Plans

- (1) As stated in Article 6 paragraph 1 point (d), Indonesia must develop the right strategy to identify lands contaminated by POPs and carry out remediation. Regulation regarding control on soil damage for biomass production (GR No. 150/2000) should be reviewed to comply with the Stockholm Convention. Coordinator and Coordination: see subchapter 3.3.3.2. Object of monitoring & evaluation is the performance indicator, i.e. the availability of strategy for polluted site identification and remediation. Monitoring and evaluation should be carried out at the middle and at the end meetings to discuss the effectiveness strategy in identification of POPs contaminated sites.
- (2) Survey on Contaminated Sites. Pollution caused by POPs must be seriously addressed because the negative impacts on human health and environment. Based on the inventory in 2003, some DDT contaminated areas have been identified and to some extent contaminated by PCBs. Polluted soil can decontaminated in accordance with ESM by site remediation and bioremediation. The selected method must not leave residue, relatively low cost, quick, safe, and environmentally safe.

Without remediation of the contaminated land, DDT residues will be transported to river sediment and finally enter the food chain. DDT bioaccumulation has been proved in aquatic environment, from 0.016 ng DDT/l sea water to 520 µg/kg in fish and 181 µg/kg in molluscs.

A logical step to be undertaken is collecting samples simultaneously from all old warehouses in all provinces and regencies in 2008, followed with selecting appropriate techniques. ESM, site remediation, bioremediation, or other techniques. For bioremediation, potential microbes must be screened. Old DDT warehouses can be found in 17 provinces: in Java (West Java, Central Java, Yogyakarta, East Java, and Jakarta) and other islands (Bandarlampung, West Sumatra, North Sumatra, South Kalimantan, Central Kalimantan, North Sulawesi, South Sulawesi, Maluku, NTT, NTB, Bali, and Jayapura). In addition, inventory can also be conducted in regions of malarial endemic suspected to be contaminated as caused by DDT spraying in the past, as well as an environmental audit on owners of contaminated land. The results should be reviewed and the prioritized land should be designated for remediation. The Ministry of Health should be responsible for initiating this action plan, and the owners of the contaminated land should be responsible for remediation their properties. PCB remediation should be limited to research activity since the PCBs contaminated lands are not considered serious.

The first action should be remediation of old warehouse in Malang, as a pilot project. The level of contamination is considered high. Remediation of PCBs-contaminated land should be in Semarang with the level of contamination of 263±371 µg/kg, which is for research purpose.

From the field inventory, priorities for remediation should be given based on level of DDT residues. The prioritization should be based on the following criteria.

- (a) Priority I is for concentration level far higher than the threshold of the permitted level. Lands fall into this priority must be restored to prevent negative impact to health and environment.
- (b) Priority II is for land with concentration around the threshold. The action should be implemented after the completion of priority I.
- (c) Priority III is for land with residue concentration below the permitted threshold. Lands fall in this priority should not be restored and let the natural the biodegradation takes place.

Coordinator and Coordination: see subchapter 3.3.3.2. Object of monitoring & evaluation is the performance indicator, i.e. the availability of data regarding land contaminated by DDT and PCBs. Monitoring and evaluation should be done through meetings to evaluate the survey strategy.

- (3) Remediate contaminated sites. Technology to restore contaminated sites may include on-site (*in-situ*) and off-site (*ex-situ*) by using relatively simple equipment. However, remediation is not the only solution for all environmental problems. The solution should depend on chemical constituents to be degraded, condition of the polluted land, and period of remediation. Remediation is an effective technology in restoring land contaminated by pesticides. Coordinator, coordination, and object of monitoring & evaluation: see subchapter 3.3.5.4. Monitoring and evaluation should be done every 6 months through field visits, sampling and analysis of samples to evaluate effectiveness of the used method in the remediation.

Timetable for Identification of Contaminated Sites (Annex A, B, C) and Remediation in an Environmentally Sound Manner

Action Plan (3.3.11)	II	III	IV	V	Stakeholder*	Funding Source
1. Development of right strategy for identification and remediation polluted sites by POPs					MoH, MoE, MoA, MoF,	MoH, MoE, MoA, MoF, Donor and other financial resources
2. Survey on contaminated sites					MoH, MoE, MoA,	MoH, MoE, MoA, MoF,

Action Plan (3.3.11)	II	III	IV	V	Stakeholder*	Funding Source
					MoF,	Donor and other financial resources
3. Remediate polluted sites					MoH, MoE, MoA, MoF, related institutions,	MoH, MoE, MoA, MoF, Donor and other financial resources, related institutions, <i>polluters</i>
4. Monitoring and evaluation					MoE, related institutions	MoE, MoA, MoH, MoE&M, MoTransp, MoNE, MoDef, MoC&I, MoF, BPPT, BPOM, MoI, MoT, BSN, MoHA, DGC, Pusarpe-dal, regional laboratories, related institutions, donor and other financial resources

* The first listed institution will act as coordinator

Budget for Identification of Contaminated Sites (Annex A, B, C) and Remediation in An Environmentally Sound Manner

Action Plan (3.3.11)	Total Budget (x IDR 1000)			
	II	III	IV	V
1. Develop of right strategy for identification and remediation polluted sites by POPs		see 3.3.3.2	see 3.3.3.2	
2. Survey on contaminated sites	see 3.3.3.2	see 3.3.3.2		
3. Remediate polluted sites			see 3.3.5.4	see 3.3.5.4
4. Monitoring and evaluation	see 3.3.1.6	see 3.3.1.6	see 3.3.1.6	see 3.3.1.6

3.3.12. Activity: Facilitating or Undertaking Information Exchange and Stakeholder Involvement

Obligation (Article 9: Information Exchange)

- (1) Facilitate or undertake the exchange of information relevant to:
 - (a) The reduction or elimination of the production, use, and release of POPs; and
 - (b) Alternatives to POPs, including information relating to their risks as well as to their economic and social costs.
- (2) Exchange the information referred to paragraph (1) directly or through the Secretariat.
- (3) Designate a national focal point for the exchange of such information.
- (4) The Secretariat should serve as a clearing house mechanism for information on POPs, including information provided by Parties, intergovernmental organisations, and non-governmental organisations.
- (5) For the purposes of this Convention, information on health and safety of human and the environment should not be regarded as confidential. Parties that exchange other information pursuant to this Convention should protect any confidential information as mutually agreed.

Present Condition

- (1) In disseminating information, the MoE provides information boards for information regarding environment.
- (2) There is a network for information and data exchange directly between MoE in Jakarta and BPLH/Bapedal/Provincial Environment Service in 7 provinces and 14 regencies/cities.
- (3) Regional PPLH are located in Pekanbaru (Sumatra), Denpasar (Balinusra), Makassar (Sumapapua), Yogyakarta (Java), and Balikpapan (Kalimantan).

- (4) Policy of the MoE (Proper program) in ranking the environmental performance of to industries.

Action Plans

- (1) Prepare the establishment of B3 Committee within MoE (stipulated in GR No. 74/2001) and the POPs Unit will be in this B3 Committee to ensure continuous process in complying with the Convention; B3 Committee should also be a centre for disseminating POPs information. The activities in the preparation step should include
 - (a) Prepare a network among stakeholders,
 - (b) Form working groups of pesticide, PCBs, and UPOPs, and
 - (c) Public hearings and consultations.

Coordinator, Coordination, and Object of monitoring & evaluation: see subchapter 3.3.1.1. Monitoring and evaluation should be done through meetings to monitor the establishment of B3 Committee and to evaluate the effectiveness of the networking.

- (2) Coordinate application of alternative techniques and use of alternative pesticides. A number of natural pesticides have been applied in Indonesia, but due to lack and incomplete scientific proves, uncertainties in the use of these alternative pesticides are high. Consequently, the community is not interested to use them. In this respect, a number of researches are needed to analyze the cost and benefit of using natural pesticides as compared with POPs pesticides. Coordinator: MoA. Coordination through consultative meetings with experts to discuss the application of alternative techniques in using pesticides and the results of applying the techniques. Object of monitoring & evaluation is the performance indicator, i.e. the availability of techniques for applying alternative pesticides. Monitoring and evaluation should be done through meetings at the middle and at the end of the year to evaluate progress of the alternative techniques and the alternative pesticides.
- (3) Coordinate alternative techniques for various applications (open, semi-closed, closed) of PCBs and in many sectors to reduce UPOPs releases, including
 - (a) Reduce gradually the use of disposable goods potential to release UPOPs if the disposal is not handled in accordance with ESM by efficiently use the concept of reduce-reuse-recycle, at domestic level, hospitals, and industries.
 - (b) Use the best alternative materials and the best technique in industries to minimize UPOPs releases.
 - (c) Apply management and techniques in destruction of domestic waste without releasing UPOPs to the environment.

Coordinator: Mol. Coordination through consultative meetings with experts to

discuss application of alternative techniques in using substitute chemicals in various open system and the results of applying them. Object of monitoring & evaluation is the performance indicator, i.e. the availability of alternative techniques for various applications of PCBs. Monitoring and evaluation should be done every 6 months through field visits to evaluate the effectiveness of the alternative techniques in reducing UPOPs releases.

- (4) Coordinate determination of POPs regulatory limits, namely

- (a) Determine maximum level of POPs residues in the environmental system based on ecotoxicological studies;
- (b) Determine criteria of intervention/trigger values and target values for POPs in soil and sediment to protect the relevant ecological systems and the environmental functions, by considering interactions between environmental compartments; and
- (c) Decide maximum level of UPOPs in food and food stuffs based on toxicological studies.

Coordinator: MoE. Coordination through discussion with experts regarding

regulatory limits of POPs releases to be taken into consideration in preparing SNI

and maximum residue levels of POPs in food and feed. Object of monitoring &

evaluation is the performance indicator, i.e. the availability of regulatory limits for

POPs releases. Monitoring and evaluation should be done through meetings every 6

months to evaluate the progress in preparing regulatory limits of POPs until the

publication of SNI.

- (5) Increase stakeholders' participation in reducing and eliminating POPs. The stakeholders fall into 6 target groups:

- (a) General community, farmers, and farmer groups

- Give effective information for policy makers regarding reducing and elimination of POPs pesticides;
- Take a lead in effective environment management to eradicate disease vectors;
- Take a role in reducing UPOPs release to the environment;
- Contribute to occupational health by prioritizing IPM and IVM applications.

- (b) Industries

- In pesticide industries, environment-safe pesticides must be prioritized, assurance that the users are knowledgeable on the risk of using the pesticides, including the procedure in the application, storage, and disposal;
- Activities and industries that have been identified in the previous inventory (using the Standardized Toolkit) as primary sources of UPOPs emission in Indonesia, namely open burning of biomass, textile, paper, iron & steel, and aluminium industries, must apply BAT/BEP;
- Industries that use POPs materials as additives in enhancing the product's performance must find the right substitutes.

- (c) Various sectors at central government and local governments should be able to:

- Enforce national regulations and legislation to support alternative techniques that are environmentally safe;
- Support and facilitate activities carried out by the community, farmers, and medical workers to reduce and eliminate POPs, through information exchange, training, and funding;
- Implement international agreement by controlling trade, reducing use of POPs chemicals, improving facilities in testing units, and retrieving stockpiles of POPs.

(d) NGOs and other multilateral organisations

- Encourage implementation of the Convention in the right way.

(e) National and international research institutions

- Develop integrated research regarding techniques and alternative materials for POPs;
- Analyze cost and benefit for every management options.

(f) Consumer protection institutions

- Emphasize the importance of POPs-free products.

Coordinator: MoC&I. Coordination through workshops to collect inputs and

disseminate information about reducing and eliminating POPs to stakeholders.

Object of monitoring & evaluation is the performance indicator, i.e. the increased

participation of stakeholders. Monitoring and evaluation should be done through field

visit every 6 months to evaluate the effectiveness of dissemination.

(6) Increase capability in information exchange regarding POPs at national and international levels through participation of Indonesia in clearing house mechanism. In implementing Stockholm protocols, open information is needed in the aspects of

- Quantity of POPs pesticides entering Indonesian territory, including data regarding production and import, stockpiles, export, domestic consumption, and quantity to be incinerated;
- Results of monitoring on POPs pesticides residues in the environment and their impacts on health as observed in the community and in the environment;
- Research results concerning fate and distribution of POPs pesticides in the environmental system in Indonesia;
- Research results regarding alternative pesticide or alternative technique, and the results of cost and benefit analysis by using the available alternatives.
- Use of economic instruments to promote and facilitate ESM of POPs;
- Develop options of POPs management and analysis of cost effectiveness.

The information should be accessible nationally and internationally so that other

regions or other countries with the same condition with Indonesia may use the

information or, the international institutions may give support in addressing the

existing problems. Coordinator: MoE. Coordination through discussion with experts

and resource persons from related institutions. Object of monitoring & evaluation is

performance indicator, i.e. the increasing information exchange from in-country and

abroad. Monitoring and evaluation should be done through meetings at the middle and at the end of the year to evaluate the effectiveness of information media that is used for disseminating information on POPs.

(7) Increase capability to control and evaluate programs regarding reduction and elimination of POPs.

- The control may be successful if supported by effective regulations. When the regulations in controlling reduction and elimination of POPs to fulfil the regulatory limit and the target values have been determined, then the effectiveness of the implementation should be better.
- Only with support of accurate, valid, and reliable scientific data, the government can make fair decision, in other words, effective regulations. In line with this, strengthening performance of testing laboratories and their professional personnel should be a requirement to improve the effectiveness of implementation of regulation, control, and evaluation programs in the reduction and elimination of POPs.

Coordinator: MoE. Coordination with experts and resource persons to disseminate regulation, implement TOT for human resources in laboratories, and the follow-ups in the subsequent years by taking into account the results of monitoring and evaluation. Object of monitoring & evaluation is the performance indicator, i.e. the increasing ability on management and evaluation for reducing/ eliminating POPs. Monitoring and evaluation should be done through field visit to evaluate the effectiveness of regulation dissemination and TOT for human resource in the laboratories.

(8) Review all regulations regarding POPs. In this respect, function of all sectors must be clear and every regulation must be harmonious and in accordance one to another, at national and at local government levels. Besides, regulations in environmental monitoring such as incinerator operation, Proper Program, and encouragement to implement 'clean production' must also include UPOPs parameters. These regulations must be formulated by using economic approach, for example, approach of 'profit privatisation and cost socialisation'. Coordinator, Coordination, and Object of monitoring & evaluation: see subchapter 3.3.1.4. Monitoring and evaluation will be done through meetings at the end and at the end of the year to evaluate whether all regulations regarding environment monitoring have included effort to eliminate POPs and to reduce UPOPs.

Timetable for Activity on Facilitating or Undertaking Information Exchange and Stakeholder Involvement

Action Plan (3.3.12)	I	II	III	IV	Stakeholder*	Funding Source
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Action Plan (3.3.12)	I	II	III	IV	Stakeholder*	Funding Source
1. Establishment of B3 Committee to ensure sustainability in compliance to Convention					MoE	MoE
2. Coordinate the implementation of alternative techniques and use of alternative pesticides					MoA, MoI, MoE&M	MoA, MoI, MoE&M, Donor and other financial resources
3. Coordinate the implementation of various techniques in using PCBs and in various sectors to reduce release of UPOPs					MoI, MoE&M	MoI, MoE&M, Donor and other financial resources
4. Coordinate regulatory limit for POPs release					MoE	MoE
5. Increase stakeholder participation in reducing and eliminating POPs, e.g. participation of general public, farmers, industries, various sectors in central and local government levels, NGO, multilateral organizations, national and international research institutions, and consumer's protection agencies					MoC&I, MoA, MoI, MoHA, MoT, NGO, research institution, MoNE/universities, BPPT	MoC&I, MoA, MoI, MoHA, MoT, MoNE, Donor and other financial resources
6. Increase ability in information exchange regarding POPs at national and international levels					MoE, related institutions	MoE, related institutions, Donor and other financial resources
7. Increase ability in management and evaluation program regarding reducing and eliminating POPs					MoE, MoA, MoF, MoI, MoE&M, related institutions	MoE, MoA, MoF, MoI, MoE&M, related institutions, Donor and other financial resources
8. Review all regulation concerning POPs					MoE, MoA, BPOM, MoI, MoT, MoHA, related institutions	MoE, MoA, BPOM, MoI, MoT, MoHA, related institutions

Action Plan (3.3.12)	I	II	III	IV	Stakeholder*	Funding Source
9. Monitoring and evaluation					MoE, related institutions	MoE, MoA, MoH, MoE&M, MoTransp, MoNE, MoDef, MoC&I, MoF, BPPT, BPOM, Mol, MoT, BSN, MoHA, DGC, Pusarpedal, regional laboratories, related institutions, donor and other financial resources

* The first listed institution will act as coordinator

Budget for Activity on Facilitating or Undertaking Information Exchange and Stakeholder Involvement

Action Plan (3.3.12)	Total Budget (x IDR 1000)			
	I	II	III	IV
1. Establishment of B3 Committee to ensure sustainability in compliance to Convention	see 3.3.1.1			
2. Coordinate the implementation of alternative techniques and use of alternative pesticides			1,452,000	1,573,000
3. Coordinate the implementation of various techniques in using PCBs and in various sectors to reduce release of UPOPs		1,331,000	1,452,000	1,573,000
4. Coordinate regulatory limit for POPs release			1,261,247	1,366,351
5. Increase stakeholder participation in reducing and eliminating POPs, e.g. participation of general public, farmers, industries, various sectors in central and local government levels, NGO, multilateral organizations, national and international research institutions, and consumer's protection agencies			1,155,000	1,251,250
6. Increase ability in information exchange regarding POPs at national and international levels			1,918,396	2,078,262
7. Increase ability in management and evaluation program regarding reducing and eliminating POPs			2,263,800	2,002,000
8. Review all regulations concerning POPs	see 3.3.1.4	see 3.3.1.4		
9 Monitoring and evaluation	see 3.3.1.6	see 3.3.1.6	see 3.3.1.6	see 3.3.1.6

3.3.13 Activity: Public Awareness, Information, and Education

Obligation (Article 10)

- (1) Promote and facilitate:
 - (a) Awareness among its policy and decision makers with regard to POPs;
 - (b) Provision to the public of all available information on POPs, taking into account Article 9 paragraph (5);
 - (c) Development and implementation, especially for women, children, and the least educated, of education and public awareness programs on POPs, as well as on their health and environmental effects and on their alternatives;
 - (d) Public participation in addressing POPs and their health and environment effects and developing adequate responses, including opportunities for providing input at the national level regarding implementation of this Convention;
 - (e) Training of workers, scientists, educators, and technical and managerial personnel;
 - (f) Development and exchange of educational and public awareness materials at the national and international levels; and
 - (g) Development and implementation of education and training programs at the national and international levels.
- (2) Ensure that the public has access to the public information referred to paragraph (1) and that information is kept up-to-date.
- (3) Encourage industry and professional users to promote and facilitate the provision of the information referred to in paragraph (1) at the national level and, as appropriate, subregional, regional, and global levels.
- (4) In providing information on POPs and their alternatives, Indonesia may use safety data sheets, reports, mass media, and other means of communication, and may establish information centres at national and regional levels.
- (5) Give sympathetic consideration to developing mechanisms, such as pollutant release and transfer registers, for the collection and dissemination of information on estimates of the annual quantities of the POPs that are released or disposed of.

Present Condition

The community in general has little awareness of POPs. The Enabling Activities Project began in 2003. Some institutions, officials, and individuals were invited to the workshops and participated in the surveys. They were very limited in number as compared to the number of population exposed to and threatened by POPs. The information is inadequate and access to the information is relatively low when the educational background of the community in general is considered.

Action Plans

- (1) Gather and disseminate information obtained from overseas and in-country regarding POPs to the stakeholders and to the general community through website, leaflet, newsletter, and through newspaper and television programs. The information includes general knowledge regarding POPs, impacts of POPs on health and environment, how to eliminate POPs and reduce UPOPs, and BAT/BEP in addressing the release of POPs. Coordinator: MoE. Coordination through consultative meetings with experts and resource person to plan mechanism in gathering the required data. Object of monitoring & evaluation is the performance indicator, i.e. the availability of leaflet and web concerning POPs. Monitoring and evaluation should be carried out every 6 months to evaluate the availability of information and effectiveness of the POPs dissemination means.
- (2) Determine and nurture the information targets in accordance with the following categories:
 - (d) High school students and university students;
 - (e) Workers (including supervisors in factories) handling and dealing with POPs, particularly who operate transformers and capacitors containing PCBs still in use and no longer in use;

- (f) Workers in closed connection with UPOPs emission, for example, workers in open burning of biomass, workers in textile, pulp and paper, iron and steel, and aluminium industries, and those who are handling the incineration of medical wastes;
- (g) Associations of industry;
- (h) NGOs; and
- (i) Community in general.

In the short term, the target b and c should be prioritized (highest risk groups).

Coordinator: MoC&I. Coordination through meetings with experts to ensure that the information targets can be designated correctly and relevant information can be prepared accurately. Object of monitoring & evaluation is the performance indicator, i.e. the correctness of targets for information dissemination regarding POPs. Monitoring and evaluation should be carried out every 6 months through meetings to evaluate strategy in determining information targets and methods to nurture the information targets.

- (3) Prepare relevant information in accordance with the target groups. The important issues are
- (a) Reduce open burning for domestic waste and encourage the use of proper stoves;
 - (b) Increase education and support for awareness on the strategies, consist of (a) community capacity building, (b) campaign and education, (c) increase community awareness through open discussions in newspaper, radio and television broadcasting, (d) give opportunities to help community in industries, cities, etc. and (e) increase information regarding application of BAT/BEP.
 - (c) Provide accurate information to the community and increase information discoveries.
 - (d) Use of accurate economic instruments to promote and facilitate ESM of POPs.
 - (e) Develop options in POPs management and analysis of cost effectiveness.

Coordinator: MoE&M. Coordination with experts and related institutions to prepare publication materials relevant to the target groups. Object of monitoring & evaluation is the performance indicator, i.e. the availability of relevant information for each target. Monitoring and evaluation should be carried out through meetings to evaluate the effectiveness of information for each target group and for the field checking.

- (4) Include awareness on POPs as teaching and educational materials. Education is a good means to disseminate information. Information regarding POPs can be included in teaching materials in biology, chemistry, or other relevant subjects, starting from the junior high school to the university levels. The syllabi of these subjects should be consulted with the Ministry of Education and the MoE. Coordinator: MoNE. Coordination through meetings in preparing teaching materials and workshops, and the evaluating the results for the implementation in the following year. Object of monitoring & evaluation is the performance indicator, i.e. materials regarding POPs that have been integrated in the curriculum. Monitoring and evaluation should be done through meetings to evaluate the effectiveness of teaching and education materials and how to check it in the field.

- (5) Coordinate public education to enhance awareness and care in the reduction and elimination of POPs, through
- Giving information regarding negative impacts of POPs pesticides in agricultural and health sectors, and households, and benefit of using alternative materials and BAT/BEP which are safe for human and environment. This type of education is mainly directed to women and children since there are the vulnerable targets in terms of long term exposure of POPs;
 - Giving information regarding formation of UPOPs, the risk of exposure, and effort to prevent the formation and emission to the environment.
 - Encourage participation of partners/strategic public groups (NGOs, students, etc.) through focused group discussions, workshops, seminars, and cultural events.

Coordinator: MoC&I. Coordination through consultation with experts and resource person and socialization to regions. The results will be evaluated for the follow-up in the subsequent years. Object of monitoring & evaluation is the performance indicator, i.e. the coordinated public education. Monitoring and should be done through visits to regions to evaluate

effectiveness in coordination with stakeholders in increasing awareness and concern on reducing and eliminating POPs.

- (6) Provide training for stakeholders. Information to stakeholders can be given through seminars and workshops on the potential harm of POPs and safe handling, especially to workers. The workshops should be focused in 12 industrial zones, namely Lhokseumawe, Medan, Palembang, Batam, Cilegon and the vicinity, Jababeka, Cikarang, Kawasan PT Pupuk Kujang, Cilacap, Kawasan PT Pupuk Kaltim, Petrokimia Gresik, and Rungkut/Surabaya. The MoE and the Ministry of Industry should organise these activities. Coordinator: Mol. Coordination with the local industry service through meetings to discuss plan and results in implementing TOT especially for the incinerator's operators in industrial zones. Object of monitoring & evaluation is the performance indicator, i.e. the implemented trainings for workers having high risks in POPs exposure. Monitoring and evaluation should be done every 6 months through meetings and visits to evaluate effectiveness of the seminar and trainings for the stakeholders.
- (7) Provide awards or incentives for establishments or individuals capable in reducing or eliminating POPs in their working areas. Awards can be given to establishments or individuals capable in good management of chemicals and POPs waste. Awards and incentives should be given based on criteria, regulation, evaluation, and monitoring carried out by the MoE (Proper Program) and the Ministry of Industry. Coordinator: MoE. Coordination with Mol regarding the preparation of criteria for granting award, guidelines to select winners, and strategy in finding nominees for the award. Object of monitoring & evaluation is the performance indicator, i.e. the availability of incentive for the individuals/working units that are successful in reducing/eliminating POPs. Monitoring and evaluation should be done through annual meetings to evaluate the selection and effect of granting award in the effort of reducing /eliminating POPs.
- (8) Conduct exchange of educational materials at national and international levels. Coordinator: MoE. Coordination through meetings and workshops with MoNE so that information concerning POPs elimination/reduction can be integrated with teaching materials in schools and universities. Object of monitoring & evaluation is the performance indicator, i.e. the availability of teaching materials as the results of information exchange at national and international levels. Monitoring and evaluation should be carried out through meetings to evaluate the effectiveness of mechanism in exchanging educational materials at national and international levels.
- (9) Increase community participation in addressing POPs that affect health and environment and in develop adequate responses, including opportunities to give inputs at national level regarding the implementation of Stockholm Convention. Coordinator: MoC&I. Coordination through meetings with experts, workshops for regional institutions, and socialisation to regions. Results of these activities should be discussed, evaluated, and followed-up in the subsequent years. Object of monitoring & evaluation is the performance indicator, i.e. the increasing community participation. Monitoring and evaluation should be done through visits to regions every 6 months to evaluate community participation in addressing POPs, especially in giving advises for the implementation of Stockholm Convention.

Timetable for Activity on Public Awareness, Information, and Education

Action Plan (3.3.13)	II	III	IV	V	VI	Stakeholder*	Funding Source
1. Collecting and disseminating information from abroad and in-country regarding POPs to stakeholders and general public						MoE, MoC&I, related institutions	MoE, MoC&I, related institutions, Donor and other financial resources
2. Determine and nurture target of information						MoC&I, MoE, MoE&M, MoNE, Mol, BPOM	MoC&I, MoE, MoE&M, MoNE, Mol, BPOM,
3. Prepare relevant information for each target groups						MoE&M, MoE, MoNE, Mol, BPOM, MoC&I	MoE&M, MoE, MoNE, Mol, BPOM, MoC&I, Donor and other financial resources
4. Integrate awareness of POPs in education and teaching						MoNE, MoE, MoC&I	MoNE, MoE, MoC&I
5. Coordinate public education to increase awareness and concern in reducing and eliminating POPs						MoC&I, MoE, MoA, Mol, BPOM	MoC&I, MoE, MoA, Mol, BPOM, Donor and other financial resources
6. Provide training for stakeholder regarding hazard potential of POPs and safe handling, especially in industrial zones						Mol, MoE, MoE&M, MoA, BPOM	Mol, MoE, MoE&M, MoA, Donor and other financial resources
7. Provide incentives for individual/working units that are successful in reducing/eliminating POPs						MoE, Mol	MoE, Mol
8. Carry out exchange in educational materials at national and international levels						MoE, MoNE	MoE, MoNE, Donor and other financial resources
9. Increase participation of public in addressing POPs and develop adequate response (including opportunity to give inputs at national						MoC&I, MoE	MoC&I, MoE, Donor and other financial resources

Action Plan (3.3.13)	II	III	IV	V	VI	Stakeholder*	Funding Source
level regarding the implementation of Convention)							
10. Monitoring and evaluation						MoE, related institutions	MoE, MoA, MoH, MoE&M, MoTransp, MoNE, MoDef, MoC&I, MoF, BPPT, BPOM, Mol, MoT, BSN, MoHA, DGC, Pusarpedal, regional laboratories, related institutions, donor and other financial resources

* The first listed institution will act as coordinator

Budget for Activity on Public Awareness, Information, and Education

Action Plan (3.3.13)	Total Budget (x IDR 1000)				
	II	III	IV	V	VI
1. Collecting and disseminating information from abroad and in-country regarding POPs to stakeholders and general public	1,064,800	1,161,600	1,258,400	1,355,200	1,452,000
2. Determine and nurture target of information	556,056	606,606	657,157		
3. Prepare relevant information for each target groups	484,000	528,000	572,000		
4. Integrate awareness of POPs in education and teaching		660,000	1,144,000	1,270,500	
5. Coordinate public education to increase awareness and concern in reducing and eliminating POPs	1,517,159	1,655,082	1,793,006	1,930,929	2,068,853
6. Provide training for stakeholder regarding hazard potential of POPs and safe handling, especially in industrial zones	1,058,750	1,155,000	1,251,250	1,347,500	1,443,750
7. Provide incentives for individual/working units that are			1,808,757		2,087,027

Action Plan (3.3.13)	Total Budget (x IDR 1000)				
	II	III	IV	V	VI
successful in reducing/eliminating POPs					
8. Carry out exchange in educational materials at national and international levels			1,251,250	1,347,500	1,443,750
9. Increase participation of public in addressing POPs and develop adequate response (including opportunity to give inputs at national level regarding the implementation of Convention)			1,258,400	1,355,200	1,452,000
10. Monitoring and evaluation	see 3.3.1.6	see 3.3.1.6	see 3.3.1.6	see 3.3.1.6	see 3.3.1.6

3.3.14 Activity: Effectiveness Evaluation

Obligations (Article 16)

- (1) Commencing four years after the date of entry of this Convention, and periodically thereafter at intervals to be decided by the COP, the Conference should evaluate the effectiveness of this Convention.
- (2) To facilitate such evaluation, the COP shall, at its first meeting, initiate the establishment of arrangements to provide itself with comparable monitoring data on the presence of POPs as well as their regional and global environmental transport. These arrangements:
 - (a) Should be implemented by Indonesia on regional basis when appropriate, in accordance with the technical and financial capabilities, using existing monitoring programs and mechanisms to the extent possible and promoting harmonization of approaches;
 - (b) Maybe supplemented where necessary, taking into account the differences between regions and their capabilities to implement monitoring activities; and
 - (c) Should include reports to the COP on the results of the monitoring activities on a regional and global basis at intervals to be specified by the COP.
- (3) The evaluation described in paragraph (1) should be conducted on the basis of available scientific, environmental, technical, and economic information, including
 - (a) Reports and other monitoring information provided pursuant to paragraph (2);
 - (b) National reports submitted pursuant to Article 15; and
 - (c) Non-compliance information provided pursuant to the procedures established under Article 17.

Action Plans

Indonesia is expected to be a party of the Convention in 2008, meaning that an evaluation should be carried out in 2012. The evaluation should include national report and non-compliance, and for those purposes, a guideline should be prepared by the COP.

- (1) To facilitate the evaluation by the COP, the Government of Indonesia should gather monitoring data on chemicals listed in Annexes A, B, and C, and transport in the environment at regional and global levels. Coordination with experts to develop dynamic database system. Object of monitoring & evaluation is the performance indicator, i.e. the compiled monitoring data in one dynamic database system. Monitoring and evaluation every 6 months to be carried out through meetings in the central and in regional government to evaluate the effectiveness of the developed information system.
- (2) Monitoring based on the Global Network for the Monitoring of Chemicals in the Environment should be acceptable by the Government of Indonesia. By using this basis and some kind of harmonized methodologies, the monitoring data on the existing POPs and their transport in the regional and global environments should be comparable. Coordinator: MoE. Coordination with experts and researchers to select harmonized methodology to be used in accessing POPs transport in regional and global environment. Object of monitoring & evaluation is the performance indicator, i.e. the availability of data comparable with the harmonized methodologies. Monitoring and evaluation should be performed every 6 months through meetings with experts to evaluate implementation plan in eliminating/reducing new POPs compounds.
- (3) Monitoring should be focused at 12 types of POPs and there will be possibility to add the list of POPs in the future. Coordinator: MoE. Coordination with experts to anticipate additional POPs and results of this study will be disseminated to relevant institutions. Object of monitoring & evaluation is the performance indicator, i.e. monitoring data of the twelve POPs. Monitoring and evaluation should be done through annual meetings to evaluate plan of the implementation of regulation on transboundary movement.
- (4) In evaluating transport at regional environment, POPs problems in Indonesia will be related to other countries, namely Malaysia, Singapore, Brunei Darussalam, and the Philippines. Coordinator: MoE. Coordination with experts to analyse POPs transport in ASEAN environment based on data gathered in this regions. Results of the analysis should be disseminated to other ASEAN countries. Object of monitoring & evaluation is the performance indicator, i.e. the availability of report on evaluation of POPs transport in regional areas. Monitoring and evaluation should be carried out to evaluate implementation plan for transboundary movement.

Timetable for Activity on Effectiveness Evaluation

Action Plan (3.3.14)	I	II	III	IV	V	VI	Stakeholder*	Funding Source
1. Develop information system Collect monitoring data on chemicals listed in Annex A, B, and C, and their transport in the regional and global environment and prepare reports.							MoE, related institutions	MoE, related institutions, Donor and other financial resources
2. Monitoring based on <i>Global Network for</i>							MoE, BPOM, related	MoE, BPOM, related institutions, Donor and other financial

Action Plan (3.3.14)							Stakeholder*	Funding Source
	I	II	III	IV	V	VI		
<i>the Monitoring of Chemicals in the Environment</i> in order to obtain equivalent data through harmonized methods regarding the existence of POPs and its transport in the regional & global environment.							institutions	resources
3. Monitor POPs and review any possibility of additional POPs							MoE, MoA, BPOM, MoNE/ universities, BPPT	MoE, MoA, BPOM, BPPT, MoNE, Donor and other financial resources
4. Evaluate transport of POPs in regional environment related to Malaysia, Singapore, Brunei Darussalam, and the Philippines							MoE, related institutions	MoE, related institutions, Donor and other financial resources
5. Monitoring and evaluation							MoE, related institutions	MoE, MoA, MoH, MoE&M, MoTransp, MoNE, MoDef, MoC&I, MoF, BPPT, BPOM, MoI, MoT, BSN, MoHA, DGC, Pusarpedal, regional laboratories, related institutions, donor and other financial resources

* The first listed institution will act as coordinator

Budget for Activity on Effectiveness Evaluation

Action Plan (3.3.14)	Total Budget (x IDR 1000)				
	II	III	IV	V	VI
1. Develop information system Collect monitoring data on chemicals listed in Annex A, B, and C, and their transport in the regional and global environment and prepare reports.	2,516,800	2,745,600	2,974,400	3,203,200	3,432,000
2. Monitoring based on <i>Global Network for the Monitoring of Chemicals in the Environment</i> in order to obtain equivalent data through harmonized methods regarding the	3,444,114	3,757,215	4,070,316	4,383,418	

Action Plan (3.3.14)	Total Budget (x IDR 1000)				
	II	III	IV	V	VI
existence of POPs and its transport in the regional & global environment.					
3. Monitor POPs and review any possibility of additional POPs	2,916,342	3,181,464	3,446,586	3,711,708	
4. Evaluate transport of POPs in regional environment related to Malaysia, Singapore, Brunei Darussalam, and the Philippines		1,274,242	1,380,429	1,486,616	1,592,803
5. Monitoring and evaluation	see 3.3.1.6	see 3.3.1.6	see 3.3.1.6	see 3.3.1.6	see 3.3.1.6

3.3.15 Activity: Reporting

Obligations (Article 15)

- (1) Each party should report to the COP on the measures it has taken to implement the provisions of this Convention and on the effectiveness of such measures in meeting the objectives of the Convention.
- (2) Each party should provide to the Secretariat:
 - (a) Statistical data on its total quantities of production, import and export of each of chemicals listed in Annex A and Annex B or a reasonable estimate of such data; and
 - (b) To the extent practicable, a list of the States from which it has imported such substances and the States to which it has exported each such substance.
- (3) Such reporting should be periodic intervals and in a format to be decided by the COP at its first meeting.
- (4) The report also includes effort in withdrawal of PCBs-containing equipment in every five years, report on the releases of Annex C POPs, report on the use of DDT, etc.

Present Condition

- (1) Indonesia has the obligation to report its activity after the Stockholm Convention has been ratified by the Government of Indonesia
- (2) The obligation requires cooperation among ministries and good cooperation with various institutions including NGOs, which does not exist to date.

Action Plan

- (1) Gather monitoring data on chemicals listed in Annex A, B, and C, and its movements in the environment. Coordinator: MoE. Coordination with all stakeholders and emphasize results of annual monitoring and evaluation from all plans and results of the activities. Object of monitoring & evaluation is the performance indicator, i.e. the compiled monitoring data on POPs comprehensively. Monitoring and evaluation should be done every 6 months through meetings to evaluate the rate of eliminating/reducing POPs and their movement to the environment.

- (2) Reporting to COP by MoE regarding the implementation of Convention, from the aspects of policy and technical (based on the results of B3 Committee' work).

Coordinator: MoE. Coordination through meetings on results of activities stated in point (1). Object of monitoring & evaluation is the performance indicator, i.e. the submitted implementation report to the COP. Monitoring and evaluation should be carried out through meetings to evaluate appropriateness of the report as required by the COP.

Timetable for Activity on Reporting

Action Plan (3.3.15)	≥	>	≠	×	XX	XX	XXIV	XXV	Stakeholder*	Funding Source
1. Collect monitoring data on chemicals listed in Annex									MoE, related institutions, MoNE/ universities,	MoE, MoNE, related institutions, Donor and other financial resources

Action Plan (3.3.15)	Total Budget (x IDR 1000)								Stakeholder*	Funding Source
	IV	V	IX	X	XIX	XX	XXIV	XXV		
A, B, and C, and their transport in the environment									BPPT	
2. Report to the COP by MoE regarding implementation of the Convention, from the policy and technical aspects (based on results of B3 Committee's work)									MOE, related institutions	MOE, related institutions
3. Monitoring and evaluation									MoE, related institutions	MoE, MoA, MoH, MoE&M, MoTransp, MoNE, MoDef, MoC&I, MoF, BPPT, BPOM, Mol, MoT, BSN, MoHA, DGC, Pusarpe-dal, regional laboratories, related institutions, donor and other financial resources

* The first listed institution will act as coordinator

Budget for Activity on Reporting

Action Plan (3.3.15)	Total Budget (x IDR 1000)							
	IV	V	IX	X	XIX	XX	XXIV	XXV
1. Collect monitoring data on chemicals listed in Annex A, B, and C, and their transport in the environment	796,010		√		√		√	
2. Report to the COP by MoE regarding implementation of the Convention, from the policy and technical aspects (based on results of B3 Committee's work)		462,308		√		√		√

Action Plan (3.3.15)	Total Budget (x IDR 1000)								
	IV	V	IX	X	XIX	XX	XXIV	XXV	
3. Monitoring and evaluation	see 3.3.1.6	see 3.3.1.6	see 3.3.1.6	see 3.3.1.6	see 3.3.1.6	see 3.3.1.6	see 3.3.1.6	see 3.3.1.6	see 3.3.1.6

√ = cannot be calculated yet based on inflation rate

3.3.16 Activity: Research, Development, and Monitoring (Article 11)

Obligations (Article 11)

- (1) Encourage and/or undertake appropriate research, development, monitoring, and cooperation pertaining to POPs and, where relevant, to their alternatives and to candidate POPs, including on their
 - (a) Sources and releases into the environment;
 - (b) Presence, levels, and trends in humans and the environment;
 - (c) Environmental transport, fate, and transformation;
 - (d) Effects on human health and the environment;
 - (e) Socio-economic and cultural impacts;
 - (f) Release reduction and/or elimination; and
 - (g) Harmonized methodologies for making inventories of generating sources and analytical techniques for the measurement of releases.
- (2) In undertaking action:
 - (a) Support and further develop, as appropriate, international programs, networks, and organisations aimed at defining, conducting, assessing, and financing research, data collection and monitoring, taking into account the need to minimize duplication of effort;
 - (b) Support national and international efforts to strengthen national scientific and technical research capabilities, particularly in developing countries with economies in transition, and to promote access to, and the exchange of data and analysis;
 - (c) Take into account the concerns and needs, particularly in the field of financial and technical resources, of developing countries and countries with economies in transition and cooperate in improving their capability to participate in the efforts referred to in subparagraph (a) and (b);
 - (d) Undertake research work geared towards alleviating the effects of POPs on reproductive health;
 - (e) Make the results of their research, development, and monitoring activities accessible to the public on a temporal and regular basis; and
 - (f) Encourage and/or undertake cooperation with regard to storage and maintenance of information generated from research, development, and monitoring.

Present Condition

Research on POPs compounds, development of POPs management, and monitoring on POPs releases to environment have been carried out by various institutions individually and not integratedly.

Action Plans

- (1) Research, development, and monitoring should involve universities and other research institutions in-country. Good practices have been done by the Directorate General for Higher Education (the Ministry of National Education) and the National Research Board (DRN). The practices of these institutions are good models to be followed by the B3 Committee. B3 Committee should establish independent committee responsible for developing mechanism to invite research proposals and select the proposal on competitive based at national level.

In implementing the competition, the B3 Committee should develop guidelines for selection, monitoring, and dissemination of the research results. This strategy would minimize research duplication and encourage establishment of networking among researchers in-country and overseas. The results of research and development should be part of information for exchange through the B3 Committee.

Topics of research and development related to reduction and elimination of POPs and UPOPs among others are

- (a) Research on remediation of land contaminated by POPs
- (b) Cost and benefit analysis in application of BAT/BEP
- (c) Impact of open burning of biomass on level of UPOPs release
- (d) Impact of burning in traditional practices on UPOPs releases
- (e) Impact of power plants and motor vehicles on UPOPs releases
- (f) Sources and release of new POPs to the environment
- (g) Fate of POPs in the tropical environment
- (h) Dynamics (transport, fate, and transformation) of POPs from sediment to food chain
- (i) Rapid estimation for PCDDs/Fs releases
- (j) Noncombustion technology for PCBs destruction
- (k) Impact on socio-economic and culture caused by reduction or prohibition use of POPs chemicals
- (l) Impact on community health cause by POPs release to environment, especially which related to health reproduction.
- (m) Use of economic instruments to increase and facilitate ESM in POPs;
- (n) Develop options for POPs management and analysis on cost effectiveness;
- (o) Application of BAT/BEP in various sectors;
- (p) Biopesticides in Indonesia and its cost-benefit analysis compared to POPs pesticides;
- (q) Alternative of POPs used in pulp & paper industries and Land remediation; and cost-benefit analysis;
- (r) Land remediation; and
- (s) Alternatives for open burning.

Coordinator: MoE. Coordination through discussion especially with MoNE and BPPT to prepare strategic plans and to monitor the research results. Object of monitoring & evaluation is the performance indicator, i.e. the proposals of research and development to be followed-up. Monitoring and evaluation should be carried out in 6 months through meetings with research institution to evaluate the strategy and effectiveness of the research results.

- (2) In implementing the activities, researchers should be free to work with other researchers from in-country and overseas since these practice will strengthen scientific research and applied research as well as national capability.

Coordinator: MoE. Coordination through with related institutions in workshop to disseminate research results to be followed-up and applied by the communities. Object of monitoring & evaluation is the performance indicator, i.e. the known existence, use, and effort to reduce/eliminate in various sectors. Monitoring and evaluation should be carried out every 6 months through meetings and visits to regions for evaluating the rate of presence, use, and increasing effort in POPs elimination.

- (2) Monitoring on the existence, use, and effort to reduce/eliminate POPs in various sectors in Indonesia. Coordinator: MoE. Coordination with relevant institutions in workshops to disseminate research results so that they can be applied by the communities. Object of monitoring & evaluation is the performance indicator, i.e. the known existence, use, and efforts to reduce/eliminate POPs in various sectors. Monitoring & evaluation should be done every 6 months through meetings and site visits to regions to evaluate the rate of diminishing existence, use, and increase of effort in POPs destruction.
- (3) Implement research through collaboration with researchers from in-country and abroad in selecting, field work, seminar, and reporting. In implementing these activities, the Indonesian researchers should be permitted to collaborate with others in order to strengthen scientific and applied research and the national capacities. Coordinator: MoNE.

Coordination with research institutions in-country and overseas in planning the studies based on the recent science and technologies. Results of the studies should be disseminated globally. Object of monitoring & evaluation is the performance indicator, i.e. the research reports to be followed-up. Monitoring and evaluation through meetings to evaluate the effectiveness of collaborative research.

- (4) Monitoring of POPs in various media. Coordinator and Coordination: see subchapter 3.3.2.9. Object of monitoring & evaluation is the performance indicator, i.e. the availability of monitoring results on POPs in various environment media. Monitoring and evaluation should be done every 6 months through meetings and field visits to evaluate the rate of POPs reduction in various environment media.
- (5) Monitoring of UPOPs in various media. Coordinator, and Coordination: see subchapter 3.3.7.2. Object of monitoring & evaluation is the performance indicator, i.e. the availability of monitoring results on UPOPs in various environment media. Monitoring and evaluation should be done every 6 months through meetings and field visits to evaluate the rate of UPOPs reduction in various environment media.

Timetable for Activity on Research, Development, and Monitoring (Article 11)

Action Plan (3.3.16)	II	III	IV	V	Stakeholder*	Funding Source
1. Plan of research, development, and monitoring: development of selection criteria and mechanisms					MoE, MoNE, BPPT	MoE, MoNE, BPPT
2. Monitor the existence, use, and effort to reduce/eliminate POPs in various sectors in Indonesia.					MoE, related institutions	MoE, related institutions, Donor and other financial resources
3. Implement research through cooperation with researchers and institutions from overseas and in-country: selection, field work, seminar, reporting					MoNE, universities, research institution, BPPT, MoE	MoNE, MoE, Donor and other financial resources
4. Monitor POPs in various media					MoE	MoE, Donor and other financial resources
5. Monitor UPOPs in various media					MoE	MoE, Donor and other financial resources
6. Monitoring and evaluation					MoE, related institutions	MoE, MoA, MoH, MoE&M, MoTransp, MoNE, MoDef, MoC&I, MoF, BPPT, BPOM, MoI, MoT, BSN, MoHA, DGC, Pusarpedal, regional laboratories, related institutions, donor and other financial resources

* The first listed institution will act as coordinator

Budget for Activity on Research, Development, and Monitoring (Article 11)

Action Plan (3.3.16)	Total Budget (x IDR 1000)			
	II	III	IV	V
1. Plan of research, development, and monitoring: development of selection criteria and mechanisms	456,654			
2. Monitor the existence, use, and effort to reduce/eliminate POPs in various sectors in Indonesia.	1,058,750	1,804,321	1,251,250	2,105,041
3. Implement research through cooperation with researchers and institutions from overseas and in-country: selection, field work, seminar, reporting**		14,361,600	15,558,400	16,755,200
4. Monitor POPs in various media	see 3.3.2.9	see 3.3.2.9	see 3.3.2.9	see 3.3.2.9
5. Monitor UPOPs in various media		see 3.3.7.2	see 3.3.7.2	21,560,000**
6. Monitoring and evaluation	see 3.3.1.6	see 3.3.1.6	see 3.3.1.6	see 3.3.1.6

** including technical assistance, excluding budget for experts

3.3.17 Activity: Technical and Financial Assistance

Obligation (Article 12 and 13)

- (1) The Parties recognize that rendering of timely and appropriate technical assistance in response to requests from developing country Parties and Parties with economies in transition is essential to the successful implementation of this Convention.
- (2) The Parties should cooperate to provide timely and appropriate technical assistance, particularly to develop and strengthen their capacity to implement their obligations under this Convention.
- (3) Technical assistance should include capacity building and transfer of technology.
- (4) The Parties ensure to provide, within its capabilities, financial support and incentives in respect of those national activities that are intended to achieve the objective of the Convention in accordance with its plans, priorities, and programs.
- (5) The fact that sustainable economic and social development and eradication of poverty are the first and overriding priorities of the developing country Parties will be taken fully into account, giving due consideration to the need for the protection of human health and the environment.
- (6) Guidelines and mechanisms to obtain technical and financial assistance should be issued by the COP.

Present Condition

- (1) To date, Indonesia is a developing country and just recovered from financial crisis.
- (2) The proposed action plans for fulfilling the obligation of the Convention are relatively complex and need high expertise and substantial funds.

Action Plan

- (1) Technical assistance in some aspects, namely laboratory facilities, application of BAT/BEP in various sectors, land remediation, establishment of facility in accordance with ESM to

destroy POPs chemicals. Coordinator: MoE. Coordination through regular meetings with experts. Monitoring and evaluation should be done every 3 months through meetings to evaluate the effectiveness of technical assistance.

- (2) Necessary funding to implement action plans that need substantial funds, for example, for HCB and PCB inventories, finding substitutes for POPs, finding technology to destroy POPs according to ESM, implement various research program, management for POPs in various environment media, selecting remediation strategies for land remediation and strategies for IPM and IVM. Coordinator: MoE. Coordination through regular meetings with experts. Monitoring and evaluation should be done every 6 months to evaluate the effectiveness of financial assistance in reducing/eliminating POPs.

Upon the completion of NIP and the ratification of Stockholm Convention by the government of Indonesia, the required budget will be managed by Bappenas, and funding will be provided by the corresponding institutions involved in the action plan. For technical and financial assistances from the donor, the MoE will submit proposals to relevant donors and other funding sources, for example, GEF, bilateral funds, UNIDO, EU, ADB, World Bank, SAICM, JICA, USAIDS, NGO, private companies, and other alternative funding sources. Upon the ratification of the Stockholm Convention by the Government and the approval of NIP by the COP, the MoE will be able to access funding sources to implement the Convention.

For the activities in 5 years (2008-2012) 3 international experts will be needed, i.e. for the field of POPs pesticides, PCBs, and UPOPs, respectively. For each international expert, a counterpart will be provided.

Timetable for Technical and Financial Assistance

Action Plan (3.3.17)	II	III	IV	V	VI	Stakeholder*	Funding Source
1. Technical assistance, e.g. in selecting/implementing BAT/BEP in various sectors, remediating contaminated sites, management of POPs according to ESM, and strengthening infrastructure						MoE, MoI, MoE&M, MoA, MoF, MoH, BPOM, Pusarpedal, accredited regional laboratories	Donor and other financial resources
2. Financial assistance to implement action plans that need substantial funding, e.g. procurement of laboratory facility, implementation of BAT/BEP in various sectors, management of POPs according to ESM, remediation of contaminated sites, and establishment of POPs destruction facilities						MoE, MoI, MoE&M, MoA, MoF, MoH, BPOM, Pusarpedal, accredited regional laboratories	Donor and other financial resources
3. Monitoring and evaluation						MoE, related institutions	MoE, MoA, MoH, MoE&M,

Action Plan (3.3.17)	II	III	IV	V	VI	Stakeholder*	Funding Source
							MoTransp, MoNE, MoDef, MoC&I, MoF, BPPT, BPOM, MoI, MoT, BSN, MoHA, DGC, Pusarpedal, regional laboratories, related institutions, donor and other financial resources

* The first listed institution will act as coordinator

Budget for Technical and Financial Assistance

Action Plan (3.3.17)	Total Budget (x IDR 1000)				
	II	III	IV	V	VI
1. Technical assistance, e.g. in selecting/implementing BAT/BEP in various sectors, remediating contaminated sites, management of POPs according to ESM, and strengthening infrastructure***	53,532,820	101,399,440	120,496,060	75,052,680	20,299,300
2. Financial assistance to implement action plans that need substantial funding, e.g. procurement of laboratory facility, implementation of BAT/BEP in various sectors, management of POPs according to ESM, remediation of contaminated sites, and establishment of POPs destruction facilities	65,581,958	144,919,453	185,156,333	134,192,178	33,286,992
3. Monitoring and evaluation	see 3.3.1.6	see 3.3.1.6	see 3.3.1.6	see 3.3.1.6	see 3.3.1.6

*** including budget for technical assistance and technology procurement

3.4 Development and Capacity-Building Proposals and Priorities

The Government of Indonesia has implemented some obligations to reduce, restrict, and prohibit production of POPs since 1973. Some POPs compounds detected in the environment showed that implementation of the regulations must be improved. In addition to it, improvement on the limited infrastructure and human resources are also needed.

General problems regarding to POPs that have been identified are as follows:

- (1) The community in general does not comprehend the risks of using POPs compounds, because the effects are not immediately manifested. This resulted in ignorance of the community towards those chemicals which have delayed risks that should be faced by the next generations.
- (2) Lack of regulatory limits for POPs compounds in water, soil/sediment, and air, and in fatty food/feed as the basis of POPs management results in ineffectiveness of the programs in reducing and elimination of POPs.
- (3) Level of education and level of socio-economy of the community that are generally low, which encourages farmers to use POPs pesticides illegally, although some other farmers know that use of alternative technique and pesticides should be more beneficial in the long term.
- (4) Lack of laboratory capacity in testing all POPs compounds and lack of professional personnel to support the performance of testing laboratories, which results in unreliable data policies and for control on programs in reduction and elimination of POPs in Indonesia.
- (5) To evaluate progress and success of reduction and elimination programs on POPs, an integrated monitoring on exposure in every environmental compartment, bioindicators, and obvious toxic effect, spatial and temporal are needed. Due to high cost, monitoring of POPs residues was rarely conducted.
- (6) Research regarding alternative techniques, except IPM, are rarely carried out in Indonesia. Therefore, the best available technique that can be applied as alternative technique in using POPs pesticides in agricultural sector is IPM, and in health sector is IVM, that has been successful in other developing countries such as Mexico.

Based on the identified problems, actions to be carried out to reduce and eliminate POPs compounds are

- (1) Ensure political will and commitment of the government to reduce and eliminate POPs pesticides. Because the program is integrated, coordination among ministries/government sectors and between the government and other stakeholders is necessary.
- (2) Increase public awareness regarding to the dangers of POPs compounds.
- (3) Advance the application of alternative ways that more supportive to sustainable development, in terms of economic and ecological aspects.
- (4) Involve community and stakeholders to take part in reducing and eliminating POPs.
- (5) Increase infrastructure and human resource capacities to be able to implement protocols of the Stockholm Convention. The availability of accredited laboratories for POPs analysis (at least 5 laboratories for POPs pesticides and PCBs and 1 for UPOPs at the first stage) are needed to be able to provide valid and reliable data.
- (6) Carry out integrated monitoring by doing the following activities:
 - (a) Training on performing integrated monitoring on exposure of POPs, evaluation, and reporting.
 - (b) Coordinate monitoring on POPs in high risk areas by involving all stakeholders.
 - (c) Coordinate studies regarding fate and distribution of POPs in tropical condition by involving all stakeholders.
- (7) Implement risk analysis through the following activities
 - (a) Training for assessors for risk analysis on environment, ecology, and human health caused by POPs exposures by involving all stakeholders.
 - (b) Coordinate risk analysis on environment, ecology, and human by involving all stakeholders.
- (8) Determine regulatory limit, level of disturbance, and target level for POPs compounds in water, soil/sediment and air, and fatty food/feed (regulatory limit in each environment compartment)

- (9) Increase effectiveness of existing laws and orders;
 (10) Endeavour to retrieve quantitative information regarding POPs pesticides produced, imported, distributed, stored, exported, and disposed of.

The priority action plans to be implemented are based on POPs categories described in Subchapter 3.1.1. The activities will be commenced in 2007 when the Stockholm Convention has been ratified by the government. Funding estimated in this document is only for the next 5 years.

Deadlines for PCBs elimination begins in 2008 by inventory in extended activities, including registration, labelling, and database establishment. In 2015, use of equipment containing PCBs more than 10% PCBs and volume more than 5 liters should be terminated. In 2018, use of equipment containing more than 0.05% PCBs and volume more than 5 liters should be terminated, and in 2020 use of equipment containing more than 0.005% PCBs and volume more than 0.05 liters should be terminated.

Effort to reduce UPOPs releases should be commenced by strengthening laboratory capacities in the country, which begins in 2008. Without laboratory capacity strengthening, it will be difficult to monitor the reducing releases. Furthermore, new industries must apply BAT/BEP with processing technology, characterized by minimum UPOPs releases starting in 2011. For the existing industries, the application of BAT/BEP should be started at least in 2016.

3.5 Timetable of Implementation and Performance Indicators (see also Subchapter 3.2)

Subchapter	Activity	Performance Indicator	Implementation	Stakeholder*
3.3.1	Institutional and regulatory strengthening measures	<ul style="list-style-type: none"> - B3 Committee is established - Network of stakeholders is established - Stockholm Convention is ratified - Comprehensive regulations on POPs are available and disseminated - Capacity building is initiated 	<ul style="list-style-type: none"> - I - I - I - I, II - II-IV 	<ul style="list-style-type: none"> - MoE - MoE, related institutions - MoE - MoE, MoA, BPOM, Mol, MoT, MoHA, related institutions - Pusarpedal, accredited regional laboratories, BSN, BPOM, related institutions
3.3.2	Measures to reduce or eliminate releases from intentional production and use	<ul style="list-style-type: none"> - Technical guidelines for controlling and preventing POPs distribution is available - Results of HCB inventory industries is available - Results of PCBs inventory is available - Regulations for transformer and capacitors are available and information about PCBs-containing articles are disseminated - Alternatives/substitutes for POPs are available - Destruction technology for POPs based on ESM is 	<ul style="list-style-type: none"> - II-IV - III-IV - II-III - II-III - II-V - III-V - III-V - II-IV - II-≥V 	<ul style="list-style-type: none"> - MoA, DGC, MoT, Mol, MoH, MoE - Mol, MoA, DGC, MoE - MOE&M, Mol, MoTransp, MoNE, MoDef, universities, MoE - MoE&M, MoE, DGC, Mol, MoTransp, MoNE, MoDef - Mol, MoA, MoE&M, MoE, research institutions, MoNE/universities, BPPT

Subchapter	Activity	Performance Indicator	Implementation	Stakeholder*
		<ul style="list-style-type: none"> found - Access to technology and its transfer increasing - Use of POPs is decreasing - Database on monitoring of POPs in various media is available 		<ul style="list-style-type: none"> - Mol, MoNE/universities, research institutions, BPPT - Mol, MoNE, universities, research institutions, BPPT - MoE, Mol, MoA - MoE
3.3.3	Production, import and export, use, stockpiles and wastes of Annex A, Part 1 Chemicals	<ul style="list-style-type: none"> - No production, export and import of chemicals listed in Annex A, Part 1 - Results of inventory on contaminated sites - IPM and IVM are practiced - TOT for IPM extension to other provinces are provided - IPM on smallholder plantation are practiced - IVM is practiced according to ESM - Results on POPs pesticides monitoring - Monitoring capacity increasing and regulations regarding use of POPs products intersector are enforced 	<ul style="list-style-type: none"> - II-IV - II-IV - IV-V - IV-V - IV-V - IV-V - II-IV - IV-V 	<ul style="list-style-type: none"> - DGC, MoT, MoA, Mol, MoH, MoE, MoC&I - MoH, MoA, MoF, MoE, MoNE/universities, research institutions, BPPT - MoA, MoH, MoF - MoA - MoA - MoH - MoE, MoA, MoF, MoH - MoE, MoHA, MoA, MoH
3.3.4	Production, import and export, use, identification, labelling, removal, storage and disposal of PCBs and equipment containing PCBs (Annex A Part II Chemicals)	<ul style="list-style-type: none"> - Accredited laboratories and competent human resources are available - Regulations on PCBs are available - Inventory data of PCBs is expanded - PCBs and equipment containing PCBs are well managed - PCBs are destroyed according to ESM - Training are implemented, awareness is growing 	<ul style="list-style-type: none"> - II-IV - I-II - II-III - III-IV - IV-VI - III-VI 	<ul style="list-style-type: none"> - Pusarpedal, accredited regional laboratories, BSN, BPOM, related institutions - MoE&M, MoE, MoA, BPOM, Mol, MoT, MoHA - MoE&M, Mol, MoTransp, MoNE, MoDef, MoNE/universities, MoE - MoE&M, MoE, Mol - MoE&M, Mol, universities, research institutions, BPPT, MoE - MoC&I, MoE&M, MoE, Mol
3.3.5	Production, import and export, use, stockpiles and wastes of DDT (Annex B Chemicals)	<ul style="list-style-type: none"> - No production, import and export of DDT - Data on DDT stockpiles and polluted sites are available 	<ul style="list-style-type: none"> - II-IV - II-III - II-IV - IV-V 	<ul style="list-style-type: none"> - DGC, BPOM, MoA, MoT, Mol, MoH, MoE - MoH, MoA, MoE - MoH, MoA, MoE

Subchapter	Activity	Performance Indicator	Implementation	Stakeholder*
		<ul style="list-style-type: none"> - Levels of DDT residues are determined - Polluted sites are remediated 		<ul style="list-style-type: none"> - MoH, MoA, MoF, MoE, related institutions
3.3.6	Register for specific exemptions and the continuing need for exemptions	No intention to register for exemption		
3.3.7	Measures to reduce releases from unintentional production	<ul style="list-style-type: none"> - Regulation and standard quality regarding UPOPs are available - Data on releases in industrial and populated areas are available - Release of UPOPs by public and private sectors are reported - Blue Sky Program in industrial and populated areas is implemented - BAT/BEP are practiced in industries - Open burning that can cause release of POPs decreasing (better waste incineration, decreasing forest fire, shift of using fire wood to other fuels) - Substitute materials that can cause release of UPOPs are used - Research on power generating and transportation to reduce release of UPOPs is implemented - Education materials for public are available and disseminated - Strategy for pollution prevention are prepared - <i>Mass concentration</i> of PCDDs/Fs. HCB, PCBs are known 	<ul style="list-style-type: none"> - I-II - III-IV - V - IV-V - II-V - II-V - III-V - III-V - II-V - III-V - III-V 	<ul style="list-style-type: none"> - Mol, MoE, MoHA - MoE, MoNE/universities, BPPT - MoE, Mol, MoHA - Mol, MoHA, MoE&M, MoE - Mol, MoHA, MoH, MoE - MoC&I, Pemda, MoE&M, Mol, MoE, MoA, MoF, related institutions, local government - Mol, MoA, MoE&M, research institutions, universities, BPPT, MoE - Research institutions, universities, BPPT, MoE - MoC&I, MoNE, universities, Mol, MoE&M, BPOM, MoA, NGO, MoE - MoE, universities, research institutions, BPPT - MoE, Mol
3.3.8	Measures to reduce releases from stockpiles and wastes	<ul style="list-style-type: none"> - Accredited laboratories and competent human resources are available - Results of study on impact of POPs on human health - Contaminated sites are remediated 	<ul style="list-style-type: none"> - II-IV - III-VI - IV-VI 	<ul style="list-style-type: none"> - Pusarpedal, accredited laboratories, BSN, BPOM, MoNE/universities, BPPT, research institutions, related institutions - MoH, related institutions - MoH, MoA, MoF,

Subchapter	Activity	Performance Indicator	Implementation	Stakeholder*
				MoE, related institutions
3.3.9	Strategy: Identification of stockpiles, articles in use and wastes	<ul style="list-style-type: none"> - Stockpiles and waste of POPs are identified - Results of inventory on HCB - Results of additional inventory on PCBs 	<ul style="list-style-type: none"> - II-IV - II-IV - II-III 	<ul style="list-style-type: none"> - MoA, MoE, Mol, MoH - Mol, MoE, MoA, universities - MoE&M, Mol, MoTransp, MoNE, MoDef, universities, MoE
3.3.10	Manage stockpiles and appropriate measures for handling and disposal of articles in use	<ul style="list-style-type: none"> - Guidelines for management of POPs stockpiles are available - Agency to control <i>safe storage and disposal</i> is established - Destruction techniques for PCBs according to ESM are provided - Regulation for handling, collecting, disposing of PCBs according to ESM are available - PCBs waste can be destroyed according to ESM - Facilities for PCBs destruction according to ESM are available 	<ul style="list-style-type: none"> - III-IV - II-III - IV-VI - III-IV - IV-VI - V-VI 	<ul style="list-style-type: none"> - MoE, Mol, MoE&M, MoA, MoF, BPOM - MoA, Mol, BPOM, MoE - MoE&M, Mol, MoNE/universities, research institutions, BPPT - MoE&M, MoE, Mol, MoA - MoE, related institutions - MoE&M, Mol, MoE
3.3.11	Strategy: Identification of contaminates sites (Annex A, B, C) and remediation in an environmentally sound manner	<ul style="list-style-type: none"> - Strategy for identification and remediation of polluted land are provided - Data on contaminated land by DDT and PCBs are available - Contaminated sites have been remediated 	<ul style="list-style-type: none"> - III-IV - II-III - IV-V 	<ul style="list-style-type: none"> - MoH, MoE, MoA, MoF - MoH, MoE, MoA, MoF - MoH, MoE, MoA, MoF, related institutions
3.3.12	Facilitating or undertaking exchange and stakeholder involvement	<ul style="list-style-type: none"> - B3 Committee is established - Techniques to use alternative pesticides are available - Techniques to use alternatives for PCBs in various applications are available - Standard quality for POPs releases are available - Involvement of stakeholder increasing - Exchange of information in-country and abroad increasing - Ability in management and evaluation on reducing/eliminating POPs increasing - All regulations regarding POPs have been reviewed 	<ul style="list-style-type: none"> - I - III-IV - II-IV - III-IV - II-IV - III-IV - III-IV - III-IV - I-II 	<ul style="list-style-type: none"> - MoE - MoA, Mol, MoE&M - Mol, MoE&M - MoE - MoC&I, MoA, Mol, MoHA, MoT, NGO, research institutions, MoNE/universities, BPPT - MOE, related institutions - MoE, MoA, MoF, Mol, MoE&M, related institutions - MoE, MoA, MoH, BPOM, Mol, MoT, MoHA, related institutions

Subchapter	Activity	Performance Indicator	Implementation	Stakeholder*
3.3.13	Public awareness, information, and education	<ul style="list-style-type: none"> - Leaflet and web regarding POPs are available - Target groups for information have been determined - Relevant information for target groups are available - POPs materials included in the curriculum - Public education materials are coordinated - Trainings for workers with high risk to POPs exposure have been conducted - Incentives available for individuals/working units that have been successful in reducing/ eliminating POPs - Education materials have been exchanged at national and international levels - Community participation is increasing 	<ul style="list-style-type: none"> - II-VI - II-IV - II-IV - III-V - II-VI - II-VI - IV-VI - IV-VI - IV-VI 	<ul style="list-style-type: none"> - MoE, MoC&I, related institutions - MoC&I, MoE, MoE&M, MoNE, MoI, BPOM, - MoE&M, MoE, MoNE, MoI, BPOM, MoC&I - MoNE, MoE - MoC&I, MoE, MoA, MoI, BPOM - MoI, MoE, MoE&M, MoA, BPOM - MoE, MoI - MoE, MoNE - MoC&I, MoE
3.3.14	Effectiveness evaluation	<ul style="list-style-type: none"> - Data from monitoring activities are compiled - Data equivalent to harmonized methodologies are available - 12 POPs are monitored - Report on evaluation of POPs transport in regional areas is available 	<ul style="list-style-type: none"> - II-VI - II-V - II-V - III-VI 	<ul style="list-style-type: none"> - MoE, related institutions - MoE, BPOM, related institutions - MoE, MoA, BPOM, MoNE/ universities, BPPT - MoE, related institutions
3.3.15	Reporting	<ul style="list-style-type: none"> - Data resulted from monitoring are available - Report on implementation is submitted to the COP 	<ul style="list-style-type: none"> - IV, IX, XIX, XXIV - V, X, XX, XXV 	<ul style="list-style-type: none"> - MoE, related institutions, MoNE/ universities, BPPT - MoE, related institutions
3.3.16	Research, development, and monitoring	<ul style="list-style-type: none"> - Research and development proposals are documented - Existence, use, and effort to reduce/eliminate in various sectors are compiled - Research collaboration with institutions in-country and overseas are implemented - POPs in various media are monitored - UPOPs in various media are monitored 	<ul style="list-style-type: none"> - II - II-V - III-V - II-V - III-V 	<ul style="list-style-type: none"> - MoE, MoNE, BPPT - MoE, related institutions - MoNE, MoNE/universities, research institutions, BPPT, MoE - MoE - MoE
3.3.17	Technical and financial assistance	<ul style="list-style-type: none"> - Technical assistance, e.g. in selecting the application of BAT/BEP in 	<ul style="list-style-type: none"> - II-VI 	<ul style="list-style-type: none"> - MoE, MoI, MoE&M, MoA, MoF, MoH,

Subchapter	Activity	Performance Indicator	Implementation	Stakeholder*
		various sectors, remediation of contaminated sites, POPs management in accordance with ESM, and infrastructure strengthening are available - Financial assistance for the application of action plans that need substantial funding, e.g. provision of laboratory facility, application of BAT/BEP in various sectors, management of POPs in accordance with ESM, land remediation, and establishment of POPs destruction facilities	- III-VI	BPOM, Pusarpedal, accredited laboratories - MoE, MoI, MoE&M, MoA, MoF, MoH, BPOM, Pusarpedal, accredited laboratories

CODE	ACTIVITY/SUBACTIVITY/EXPENDITURE/ DETAIL EXPENDITURE	I			II			III			IV	
		Total	GOI		Total	GOI	Donor & OFR	Total	GOI	Donor & OFR	Total	GOI
3.3.10	ACTIVITY ON MANAGE STOCKPILES AND APPROPRIATE MEASURES FOR HANDLING & DISPOSAL ARTICLES IN USE											
	3.3.10.1 Prepare guidelines on management of POPs stockpiles/residue						1,015,575	253,894	761,681	1,886,707	471,677	
	3.3.10.2 Establishment of a body for controlling registration--collecting P			851,598	851,598		929,016	929,016		-		
	3.3.10.3 Research on PCB destruction (see 3.3.4.5)						-			-		
	3.3.10.4 Handling, collecting, and disposing POPs wastes						7,325,736	1,831,434	5,494,302	6,292,000	1,573,000	
	3.3.10.5 Destruction of POPs wastes									1,430,000	357,500	
	3.3.10.6 Establishment of PCB destruction facility(see 3.3.4.5)											
	3.3.10.7 Monitoring & evaluation (see 3.3.1.6)											
3.3.11	IDENTIFICATION & REMEDIATION CONTAMINATED SITES											
	3.3.11.1 Development of right strategy for remediation (see 3.3.3.2)											
	3.3.11.2 Survey on contaminated sites (see 3.3.3.2)											
	3.3.11.3 Remediation of polluted sites (lihat 3.3.5.4)											
	3.3.11.4 Monitoring & evaluation (see 3.3.1.6)											
3.3.12	FACILITATING/UNDERTAKING INFORMATION EXCHANGE AND STAKEHOLDER INVOLVEMENT											
	3.3.12.1 Establishment of B3 Committee (see 3.3.1.1)											
	3.3.12.2 Coordinate the implementation of alternative techniques & pesticides						1,452,000	363,000	1,089,000	1,573,000	393,250	
	3.3.12.3 Coordinate the implementation of various alternative technique			1,331,000	332,750	998,250	1,452,000	363,000	1,089,000	1,573,000	393,250	
	3.3.12.4 Coordinate determination of quality standards for POPs emission						1,261,247	1,261,247		1,366,351	1,366,351	
	3.3.12.5 Increase stakeholder participation to reduce POPs						1,155,000	288,750	866,250	1,251,251	312,813	
	3.3.12.6 Increase ability in information exchange regarding POPs						1,918,396	479,599	1,438,797	2,078,261	519,565	
	3.3.12.7 Increase ability in management & evaluation programs						2,263,800	565,950	1,697,850	2,002,000	500,500	
	3.3.12.8 Review all regulations concerning POPs (see 3.3.1.4)											
	3.3.12.9 Monitoring & evaluation (see 3.3.1.6)											
3.3.13	PUBLIC AWARENESS, INFORMATION, AND EDUCATION											
	3.3.13.1 Collect and disseminate information			1,064,800	266,200	798,600	1,161,600	290,400	871,200	1,258,400	314,600	
	3.3.13.2 Determine and nurture target of information			556,056	556,056		606,606	606,606		657,157	657,157	
	3.3.13.3 Prepare relevant information according to target groups			484,000	121,000	363,000	528,000	132,000	396,000	572,000	143,000	
	3.3.13.4 Integrate awareness of POPs in education & teaching						660,000	660,000		1,144,000	1,144,000	
	3.3.13.5 Coordinate public education			1,517,159	379,290	1,137,869	1,655,083	413,771	1,241,312	1,793,005	448,251	
	3.3.13.6 Provide training for stakeholders			1,058,751	264,688	794,063	1,155,000	288,750	866,250	1,251,251	312,813	
	3.3.13.7 Provide incentives for individual/working units									1,808,757	1,808,757	
	3.3.13.8 Carry out exchange in educational materials									1,251,251	312,813	
	3.3.13.9 Increase public partisipation in addressing POPs									1,258,400	314,600	

CODE	ACTIVITY/SUBACTIVITY/EXPENDITURE/ DETAIL EXPENDITURE	I			II			III			IV	
		Total	GOI		Total	GOI	Donor & OFR	Total	GOI	Donor & OFR	Total	GOI
	3.3.13.10 Monitoring & evaluation (see 3.3.1.6)											
3.3.14	EFFECTIVENESS EVALUATION											
	3.3.14.1 Develop information system			2,516,800	629,200	1,887,600	2,745,600	686,400	2,059,200	2,974,400	743,600	
	3.3.14.2 Monitoring based on Global Network			3,444,113	861,028	2,583,085	3,777,215	959,304	2,817,911	4,070,316	1,017,579	
	3.3.14.3 Monitor POPs & review any possibility of additional POPs			2,916,343	729,086	2,187,257	3,181,464	795,366	2,386,098	3,446,587	861,647	
	3.3.14.4 Evaluate transport of POPs in regional environment						1,274,243	318,561	955,682	1,380,429	345,107	
	3.3.14.5 Monitoring & evaluation (see 3.3.1.6)											
3.3.15	REPORTING											
	3.3.15.1 Collect data & information									796,009	199,002	
	3.3.15.2 Report to COP											
	3.3.15.3 Monitoring & evaluation (see 3.3.1.6)											
3.3.16	RESEARCH, DEVELOPMENT & MONITORING											
	3.3.16.1 Coordinate reserach plan & monitoring			456,654	456,654							
	3.3.16.2 Monitor the existence/use/reduce of POPs			1,058,751	264,688	794,063	1,804,321	451,080	1,353,241	1,251,251	312,813	
	3.3.16.3 Implement research program through cooperation						10,401,600	2,600,400	7,801,200	11,268,400	2,817,100	
	3.3.16.4 Monitor POPs in various media (see 3.3.2.9)											
	3.3.16.5 Monitor UPOPs in various media (see 3.3.7.2 for the year 2009 & 2010)											
	3.3.16.6 Monitoring & evaluation (see 3.3.1.6)											
	Total Budget (only for GOI and activities that require financial assistance)											
		2,394,370	2,394,370	97,143,319	28,261,361	68,881,958	200,636,408	55,716,954	144,919,454	258,310,951	73,154,618	
3.3.17	Technical Assistance & Financial Assistance											
3.3.17.1	Technical Assistance											
3.3.17A	3.3.17.1A International & national experts			3,922,820		3,922,820	4,279,440		4,279,440	4,636,060		
3.3.17B	3.3.17.1B Provision of Technology											
	3.3.15.1 Capacity building (laboratories)			24,200,000	-	24,200,000	26,400,000		26,400,000	21,450,000		
	3.3.2.5 Look for alternative/substitute free of POPs			2,420,000		2,420,000	2,640,000		2,640,000	2,860,000		
	3.3.2.6 Look for destruction technology for POPs			-		-	2,640,000		2,640,000	2,860,000		
	3.3.2.9 Monitoring of POPs in various media			3,630,000		3,630,000	3,960,000		3,960,000	4,290,000		
	3.3.3.2 Inventory and strategy to remediate contaminated sites			7,260,000		7,260,000	10,560,000		10,560,000	2,860,000		
	3.3.4.4 Management on PCB, equipment containing PCB and PCB was			-		-	10,000,000		10,000,000	10,000,000		
	3.3.4.5 Destruction of PCB & waste according to ESM			-		-	-		-	10,000,000		
	3.3.5.4 Remediation on polluted sites			-		-	-		-	8,580,000		
	3.3.7.2 Quantitative measurement of UPOPs in industrial & populated a			-		-	6,600,000		6,600,000	7,150,000		
	3.3.7.5 Implementation of BAT/BEP in various sectors			6,050,000		6,050,000	6,600,000		6,600,000	7,150,000		
	3.3.7.6 Increasing public awareness and usin alternative technology			6,050,000		6,050,000	10,560,000		10,560,000	11,440,000		

CODE	ACTIVITY/SUBACTIVITY/EXPENDITURE/ DETAIL EXPENDITURE	I		II			III			IV	
		Total	GOI	Total	GOI	Donor & OFR	Total	GOI	Donor & OFR	Total	GOI
	3.3.7.8 Research related to power generation & transportation			-			2,640,000		2,640,000	2,860,000	
	3.3.7.11 Determination on mass concentration of PCDD/F, HCB, PCB			-			6,600,000		6,600,000	7,150,000	
	3.3.9.1 Identification and management of POPs stockpiles & wastes			-			-		-	7,150,000	
	3.3.10.4 Handling, collecting, and disposing POPs wastes			-			3,960,000		3,960,000	4,290,000	
	3.3.10.5 Destruction of POPs wastes			-			-		-	1,430,000	
	3.3.16.3 Implement research program through cooperation			-			3,960,000		3,960,000	4,290,000	
	3.3.16.5 Monitor UPOPs in various media (see 3.3.7.2 for the year 2009)			-			-		-	-	
	Subtotal: Provision of Technology			49,610,000		49,610,000	97,120,000		97,120,000	115,810,000	
	Total Budget for Technical Assistance			53,532,820		53,532,820	101,399,440		101,399,440	120,446,060	
	3.3.17.2 Financial Assistance										
	3.3.1.4 Law and regulatory review and evaluation			3,300,000		3,300,000					
	3.3.1.5. Capacity building			5,308,875		5,308,875	6,534,000		6,534,000	4,021,875	
	3.3.1.6 Monitoring & evaluation			1,815,000		1,815,000	1,980,000		1,980,000	2,145,000	
	3.3.2.2 Inventory on HCB			1,815,000		1,815,000	990,000		990,000	536,250	
	3.3.2.3 Inventory on PCB and equipment containing PCB			3,403,125		3,403,125	990,000		990,000	-	
	3.3.2.4 Regulations on transformer, capacitor, and other articles contain			3,750,000		3,750,000	3,750,000		3,750,000		
	3.3.2.5 Look for alternative/substitute free of POPs			3,303,300		3,303,300	3,603,600		3,603,600	3,903,900	
	3.3.2.6 Look for destruction technology for POPs						1,692,900		1,692,900	1,833,975	
	3.3.2.7 Increase access to and transfer of technology, products						1,841,400		1,841,400	1,994,850	
	3.3.2.8 Management for reducing and ultimately eliminate POPs			771,375		771,375	1,683,000		1,683,000	911,625	
	3.3.2.9 Monitoring of POPs in other media			4,537,500		4,537,500	4,950,000		4,950,000	5,362,500	
	3.3.3.2 Inventory and strategy to remediate			4,383,951		4,383,951	6,762,492		6,762,492	2,145,000	
	3.3.3.3 Expansion of IPM and IVM programs						-		-	911,625	
	3.3.3.4 TOT for IPM program in other provinces						-		-	938,438	
	3.3.3.5 IPM program for smallholder plantations						-		-	911,625	
	3.3.3.6 IVM program for reducing the use of chemicals						-		-	911,625	
	3.3.3.7 Monitoring residues for POPs pesticides			2,571,250		2,571,250	2,805,000		2,805,000	3,038,750	
	3.3.4.4 Management on PCB, equipment containing PCB and PCB waste						22,500,000		22,500,000	24,500,000	
	3.3.4.5 Destruction of PCB & waste according to ESM						-		-	30,000,000	
	3.3.4.6 Provide training/awareness for users & vulnerable groups to PCB						765,000		765,000	828,750	
	3.3.5.2 Extension of inventory on ex-DDT w			1,156,346		1,156,346	1,261,468		1,261,468		
	3.3.5.3 Identification & measurement/examination of DDT residue level			1,473,697		1,473,697	1,607,669		1,607,669	1,741,642	
	3.3.5.4 Remediation on polluted sites									3,217,500	
	3.3.7.2 Quantitative measurement of UPOPs in industrial & populated areas						8,910,000		8,910,000	9,652,500	
	3.3.7.3 Program for annual report on PCDD/F releases by public sectors									-	
	3.3.7.4 Expansion of Blue Sky Program in industrial & populated areas									1,454,310	
	3.3.7.5 Implementation of BAT/BEP in various sectors			11,797,500		11,797,500	12,870,000		12,870,000	10,725,000	
	3.3.7.6 Increasing public awareness and using alternative technology			5,808,000		5,808,000	12,523,500		12,523,500	12,870,000	

CODE	ACTIVITY/SUBACTIVITY/EXPENDITURE/ DETAIL EXPENDITURE	I		II			III			IV	
		Total	GOI	Total	GOI	Donor & OFR	Total	GOI	Donor & OFR	Total	GOI

* Donor & OFR (Donor and other financial sources): Funding sources other than that from GOI, such as GEF, bilateral fund, EU, SAICM, JICA, USAID, NGO, private companies

Donor & OFR	V			VI		
	Total	GOI	Donor & OFR	Total	GOI	Donor & OFR
24,500,000						
30,000,000	40,000,000	10,000,000	30,000,000	23,000,000	5,750,000	17,250,000
828,750	1,190,000	297,500	892,500			
1,741,642						
3,217,500	4,620,000	1,155,000	3,465,000			
9,652,500						
	1,607,052	401,763	1,205,289			
1,454,310	2,188,240	522,060	1,666,180			
10,725,000	15,400,000	3,850,000	11,550,000			
12,870,000	16,555,000	4,138,750	12,416,250			
	-					
2,145,000	3,080,000	770,000	2,310,000			
911,625	1,309,000	327,250	981,750			
1,501,500	1,309,000	327,250	981,750			
6,971,250	10,010,000	2,502,500	7,507,500			
2,445,300	3,126,200	781,550	2,344,650	1,897,500	474,375	1,423,125
8,631,480						

Donor & OFR	V			VI		
	Total	GOI	Donor & OFR	Total	GOI	Donor & OFR
1,415,030						
4,719,000						
1,072,500	1,540,000	385,000	1,155,000	3,300,000	825,000	2,475,000
1,179,750						
1,179,750						
938,438						
1,558,696						
1,501,500						
943,800	1,555,200	338,800	1,216,400	1,452,000	363,000	1,089,000
	-			-		
429,000	-			-		
	1,270,500	1,270,500		-		
1,344,754	1,930,929	482,732	1,448,197	2,068,852	517,213	1,551,639
938,438	1,347,500	336,875	1,010,625	1,443,751	360,938	1,082,813
	-			2,087,027	2,087,027	
938,438	1,347,500	336,875	1,010,625	1,443,751	360,938	1,082,813
943,800	1,355,200	338,800	1,016,400	1,452,000	363,000	1,089,000

Donor & OFR	V			VI		
	Total	GOI	Donor & OFR	Total	GOI	Donor & OFR
	-			-		
	-			-		
	-			-		
2,230,800	3,203,200	800,800	2,402,400	3,432,000	858,000	2,574,000
3,052,737	4,383,417	1,095,854	3,287,563	-		
2,584,940	3,711,708	927,927	2,783,781	-		
1,035,322	1,486,616	371,654	1,114,962	1,592,803	398,201	1,194,602
597,007						
	462,308	462,308				
938,438	2,105,041	526,260	1,578,781			
8,451,300	12,135,200	3,033,800	9,101,400			
	-					
	13,860,000	3,465,000	10,395,000			
185,156,333	182,994,771	48,802,593	134,192,178	46,469,684	13,182,692	33,286,992
4,636,060	4,992,680		4,992,680	5,349,300		5,349,300
21,450,000						
2,860,000	3,080,000		3,080,000			
2,860,000	3,080,000		3,080,000			
4,290,000	4,620,000		4,620,000			
2,860,000	-					
10,000,000	-					
10,000,000	10,000,000		10,000,000	10,000,000		10,000,000
8,580,000	9,240,000		9,240,000			
7,150,000	-					
7,150,000	7,700,000		7,700,000			
11,440,000	7,700,000		7,700,000			

Donor & OFR	V			VI		
	Total	GOI	Donor & OFR	Total	GOI	Donor & OFR
2,860,000	3,080,000		3,080,000			
7,150,000	7,700,000		7,700,000			
7,150,000	-					
4,290,000	-					
1,430,000	1,540,000		1,540,000	4,950,000		4,950,000
4,290,000	4,620,000		4,620,000			
	7,700,000		7,700,000			
115,810,000	70,060,000		70,060,000	14,950,000		14,950,000
120,446,060	75,052,680		75,052,680	20,299,300		20,299,300
4,021,875						
2,145,000	2,310,000		2,310,000	2,475,000		2,475,000
536,250						
3,903,900	4,204,200		4,204,200			
1,833,975	1,975,050		1,975,050			
1,994,850	2,148,300		2,148,300			
911,625	-					
5,362,500	5,775,000		5,775,000			
2,145,000						
911,625	981,750		981,750			
938,438	1,010,625		1,010,625			
911,625	981,750		981,750			
911,625	1,963,500		1,963,500			
3,038,750	-					
24,500,000						
30,000,000	30,000,000		30,000,000	17,250,000		17,250,000
828,750	892,500		892,500			
1,741,642						
3,217,500	3,465,000		3,465,000			
9,652,500						
	1,205,289		1,205,289			
1,454,310	1,666,180		1,666,180			
10,725,000	11,550,000		11,550,000			
12,870,000	12,416,250		12,416,250			

Donor & OFR	V			VI		
	Total	GOI	Donor & OFR	Total	GOI	Donor & OFR
2,145,000	2,310,000		2,310,000			
911,625	981,750		981,750			
1,501,500	981,750		981,750			
6,971,250	7,507,500		7,507,500			
2,445,300	2,344,650		2,344,650	1,423,125		1,423,125
8,631,480						
1,415,030						
4,719,000						
1,072,500	1,155,000		1,155,000	2,475,000		2,475,000
1,179,750						
1,179,750						
938,438						
1,558,696						
1,501,500						
943,800	1,216,400		1,216,400	1,089,000		1,089,000
429,000	-			-		
1,344,754	1,448,197		1,448,197	1,551,639		1,551,639
938,438	1,010,625		1,010,625	1,082,813		1,082,813
938,438	1,010,625		1,010,625	1,082,813		1,082,813
943,800	1,016,400		1,016,400	1,089,000		1,089,000
2,230,800	2,402,400		2,402,400	2,574,000		2,574,000
3,052,737	3,287,563		3,287,563	-		
2,584,940	2,783,781		2,783,781	-		
1,035,322	1,114,962		1,114,962	1,194,602		1,194,602
597,007						
938,438	1,578,781		1,578,781			
8,451,300	9,101,400		9,101,400			
	10,395,000		10,395,000			
185,156,333	134,192,178		134,192,178	33,286,992		33,286,992
305,602,393	258,047,451	48,802,593	209,244,858	66,768,984	13,182,692	53,586,292

	V			VI		
Donor & OFR	Total	GOI	Donor & OFR	Total	GOI	Donor & OFR

s, and other funding alternatives.

Annex 1:

Endorsement of Priority Setting on Addressing POPs by the Steering Committee
Bogor, 30 March 2005

On behalf of the Steering Committee for preparation of the National Implementation Plan (NIP) on Reduction and Elimination of Persistent Organic Pollutants (POPs) (according to SK MENLH o. 91/2002), I herewith endorse the following *priority setting* in relation to reduction and elimination of POPs that have been agreed by the Steering Committee in Bogor, dated 30 March 2005

- 1 **All participants agreed on the content of the draft of Technical Report No. 3, entitled Setting Priorities for Reduction and Elimination of Persistent Organic Pollutants in Indonesia, Technical Report No. 3, with a number of modifications.**
 - (1) Correction from the Ministry of Health regarding the responsibility of the ministry. It should say: that the Ministry of Health is responsible on the impact caused by POPs, because the management of POPs must be undertaken by all concerned sectors hand-in-hand.
 - (2) Regarding the financial mechanism for strengthening laboratories and the respective human resource, it is unclear whether individual sector would be able to access the financial donor or must be coordinated by the KLH. Information from COP1 would verify this matter.
 - (3) Legislations on POPs were not followed by good control and enforcement. Thus, it might necessary to establish proper infrastructure to ensure that the regulations are effectively implemented.
 - (4) The NIP is an agreement that must be complied; there will be no penalty for plans that are not yet implemented. However, the government must do all the best, and progress must be made in all steps. The NIP would also serve as a guideline for decision making at national and regional levels.
 - (5) PLN suggested that the Ministry of Justice and the Police Department must be involved in the decision making because many developed countries are using POP materials and send the wastes to Indonesia.
 - (6) It necessary to take action at the primary source such as Pertamina, who produce fuel oils that might contain UPOPs precursor in addressing the knocking phenomenon in automotive.
 - (7) PLN requested not to be involved as structural entity in POPs implementation.
 - (8) Regarding the open burning, it is anticipated to have a constraint because the communities are accustomed to burn their domestic waste in the yard and the harvest residues on their agricultural land.
 - (9) Addition of legislation in Table 3.8: SK Bersama Menkes No. 881/1996 and SK Mentan No. 711/1996 (common decree).
 - (10) Management of PCB must also include members of the Association of Paint Industries and textile industries.
 - (11) In the management of POPs waste, it may need to treat differently the industries located in Java Island and those located outside Java, due to high cost to transport the waste to Java. Also, it might need to have a special treatment to small-scale industries that are using POPs materials so they can afford the cost of waste disposal in proper manner.
 - (12) It might necessary to establish a large-scale of POPs-substitute manufacture, to ensure the adequacy of supplies.

- 2 **Follow-ups:** In preparing the NIP documents, it is necessary to formulate 10-12 technical proposals regarding measures to reduce and eliminating POPs. The proposal would be

discussed by the FMIPA team before they are reviewed by the Technical Committee members. The technical proposals will be divided into 3 aspects, namely

Legislation aspect, including

- (1) Identification of the weakness of the legislation and formulate regulation using economy-base approach
- (2) Determination of quality standards (legislation plus technology)

Technology aspect, including

- (3) Bioremediation of contaminated sites by DDT and PCB (started by inventory and screening of appropriate microbes)
- (4) Expanding cement kiln to be able to incinerate POPs waste properly
- (5) Materials for POPs substitutes
- (6) Mapping of laboratories that are able to analyse POPs, and plan to strengthen them
- (7) Inventory of HCB using audit system
- (8) Inventory of PCB using audit system
- (9) Efforts to reduce UPOPs in metallurgical industries

Awareness aspects, including

- (10) Introduction of POPs teaching material to school and university levels
- (11) Workshops on POPs handling by operators of transformers, incinerators
- (12) Study on POPs impacts on human's health.

Chairman of the Technical Committee for
Preparation of the National Implementation Plan (NIP) on Reduction and Elimination of
Persisten Organic Pollutants (POPs) according to SK MENLH No. 91/2002



(Bambang Purwono)

Annex 2:

RECORDS OF CONSULTATION WITH STAKEHOLDERS AND GENERAL PUBLIC

1 Agreement on Establishment of Working Groups (Jakarta, 17 December 2004)

In this meeting, results of the inventory on PCB, HCB, dioxins/furans, and monitoring on POPs pesticides were presented by the study team. This meeting was also attended by Mr. A Koezegvary from UNIDO Headquarter, Mr. M Matsushita and Mr. N Alie from UNIDO Jakarta Office.

The following agreement was useful for the subsequent step in the completion of the project entitled Enabling Activity on the Implementation of the Stockholm Convention on Persistent Organic Pollutants (POPs) in Indonesia.

No.	Member
POPs Pesticides	
1	Ministry of Environment
2	Ministry of Agriculture
3	Ministry of Health
4	Pesticide Committee
5	Directorate General of Customs
6	World Wild Funds
7	Pesticide Action Network
8	Food and Drug Control (BPOM)
9	Association of Indonesian Farmers (HKTI)
PCB and PCB-Containing Equipment	
1	Ministry of Environment
2	Directorate General Oil and Gas
3	State-Owned Electricity Company
4	State Oil and Gas Company (Pertamina)
5	Indonesian Mining Association
6	Directorate General of Customs
7	Pulp & Paper Association
8	Textile Producers Association
9	Assembaya
10	University of Indonesia
11	Transformer Producers Association
12	Automotive Association
UPOPs	
1	Ministry of Environment
2	Ministry of Industry
3	Ministry of Health
4	Food and Drug Control (BPOM)
5	Steel Manufacturers Association
6	Directorate General of Customs
7	Paint Manufacturers Association
8	Statistics Bureau
9	Assembaya
10	University of Indonesia
11	Regional Government of Jakarta

2 Agreement on Priority Measures for POPs Categories, 22 February 2005

The workshop was attended by members of the Technical Committee and assisted by the Chief Technical Advisor, Mr. Martin Murin.

Category	Priority Measures
POPs Pesticides	1 Improve effectiveness of legislation
	2 Continue inventory activities and monitoring on exposure to human health and the environment
	3 Strengthen resources and capacity building
	4 Develop alternative for pesticides
	5 Remediation of contaminated sites
	6 Inventory on HCB import, stockpile, and use
PCBs and PCB-containing Equipment	1 Establish regulation on PCB-containing equipment
	2 Measure PCB contamination, especially in mining activities, industrial zones and power plant, ships and vessels;
	3 Strengthen capability and capacity of infrastructure as well as the human resource;
	4 Ensure environmentally safe manner in destruction of PCB and the equipment according to the BAT/BEP, and increase the number of destruction facility based on geographical consideration
UPOPs	1 Develop laboratories capable to analyze UPOPs
	2 Monitor UPOPs emission
	3 Apply BAT and BEP
	4 Expedite and improve Blue Sky Program
	5 Improve regulations regarding UPOPs
	6 Public awareness raising

3 Regional Consultation on the Draft BAT/BEP Guidelines, Bangkok, 7-9 March 2005

Objective

- 1 To have constructive consideration regarding best available techniques (BAT) and best environmental practices (BEP) that will be forwarded at the first Conference on Parties (COP1) in Uruguay (will be convened from 2 to 6 May 2005);
- 2 To introduce draft of BAT/BEP guideline for chemicals in Annex C of Stockholm Convention;
- 3 To acquire feedback from participants to improve the draft of BAT/BEP;
- 4 To assist the participant countries in preparing materials to be discussed in COP1 regarding adoption of the guidelines.

Participants: Afghanistan, Bangladesh, Bhutan, Brunei Darussalam, Cambodia, China, Indonesia, Iran, South Korea, Laos, Malaysia, Mongolia, Myanmar, Nepal, Pakistan, Philippines, Sri Lanka, Thailand, Vietnam, Secretariat, Expert Group, UNITAR

No.	Papers presented and discussed
1	Advance Draft: Guidelines on best available techniques and provisional guidance on best environmental practices relevant to Article 5 and Annex C of the Stockholm Convention on Persistent Organic Pollutants
2	Case Study: Waste Management in Bucciniland
3	Reports from the regional EGB experts – BAT/BEP Experiences in Japan
4	Draft BAT/BEP Guidelines: Context and Development
5	Malaysia: Case Study of BAT and BEP Experience. Source category: Hazardous Waste Incinerator
6	Current Status of Dioxins and Furans Handling in Indonesia
7	The Experience of IR Iran in Addressing BAT/BEP in the Development of NIP
8	The Practice on BAT-BEP in China

- 9 Nepalese Context: BAT&BEP for Reduction of Annex C compounds of Stockholm Convention
- 10 Crematoria in Thailand
- 11 Scenario Note for the First Meeting of the Conference of the Parties of the Stockholm Convention
- 12* Case Study on Wood Firing Installations
- 13* Cambodian Presentation on Unintentional Production (POPs) Management
- 14* Case Study on Cement Industry

* Not presented and discussed

Conclusions

- 1 The Consultation is very useful for the country participants that are involved in Stockholm Convention, especially aspects regarding best available techniques and best environment practices to date in reducing and eliminating POPs, particularly the unintentionally produced POPs (dioxin, furan, polychlorinated biphenyls (PCB), and hexachlorobenzene (HCB));
- 2 The Consultation event coincided with the preparation of the NIP by Indonesia. Inputs from this consultation are some action plans that are more realistic to be proposed;
- 3 The Consultation event also coincided with the preparation of CoP1. However, the only 2 months must be used by Indonesia to prepare better NIP;
- 4 The CoP1 must be attended by representatives from Indonesia in order to get better understanding in facing ratification of Stockholm Convention that will be carried out in 2005;
- 5 The CoP1 is also important, even though Indonesia is not a "Party". At least, this meeting can be useful for improving the NIP and, importantly, to understand how to meet the obligations toward Stockholm Convention. When Indonesia has completed the NIP, and the NIP document has been approved by the Steering Committee, and the ratification has been materialized in 2005, then Indonesia can be a Party in 2006;
- 6 Considering that the CoP1 will cover many aspects, Indonesian delegates must consist of members having adequate background in administrative/legal aspects and technical/ programmatic aspects.

4 Training by Mr. Murin regarding NIP Preparation, 25 May 2005

- 1 Although POPs compounds have never been produced, regulations for their prohibition are still necessary to be stipulated to comply with postratification obligations.
- 2 Specific exemption is still open for Indonesia, if not, it must be written statement from the relevant institution that DDT is not to be used anymore. In order to use the facility, the government must show formal data regarding the corresponding POPs. In addition, Indonesia must report to the POPs Secretariat and UNIDO every three years regarding the development of its use.
- 3 Regulations concerning when the regulations to manage PCDDs/Fs are to be effective, in particular for Annex C part 2 (no later than 4 years after the ratification). Before that, laboratories are compulsory; therefore, it is necessary to know the number of industry that is affected and the needed analysis (in conjunction with budgeting). Small or medium size incinerators that cannot fulfil BAT/BEP in due time might be closed down. Solid waste, for example fly ash, must be well defined.
- 4 Subchapter 3.3.8 should mention about legislation and factual condition regarding what actions to be taken, e.g. storage.
- 5 Must be specific on what sector Indonesia will need and invite donor; and the government will be responsible to discuss it with the respective donor. Despite the donor's assistance, Indonesia must perform it.
- 6 MoE as the focal point should have new organization structure with a specific deputy for handling B3 and LB3 issues.
- 7 Community awareness must put high priority on high risk groups.
- 8 Need awareness program for farmers concerning the risk of using DDT, alternative pesticides that can be used, and law enforcement in terms of structure and the institutions.
- 9 The Ministry of Health: has undertaken surveillance on the risk factors of hazardous materials and drugs, but the guidance has not yet finished in the form of ministerial decree, also about health inspector, and law enforcement is to be strengthened.

- 10 Management on all hazardous wastes is an important matter.
- 11 NIP should define when regulations must be in effect, regardless the ministries/sectors. If ministries/sectors do not fulfil the obligations, then the government is considered as not implementing the NIP well. Therefore, collaborations amongst sectors, in this respect; NIP defines what institutions are to be involved and responsible for law enforcement.
- 12 Compensation from the developing countries for the countries in economic transition is in the form of funding, for example, through the GEF. The NIP must be well organized in order to attract funding from the donor and other funding resources.
- 13 All institutions must report accurate data.
- 14 It is not necessary for total phase out of PCBs.
- 15 To minimize smuggling is by strengthening law enforcement.
- 16 Need 3 items for each work element, i.e. legislation projection, analysis of needs, and government approval. After that, projects can be proposed for the funding from the donors. Although laboratories receive large amount of funding for equipment provision, human resource factor and standards in laboratories may result the laboratories cannot perform well. The European Union provides funding for equipment, while the GEF provide funding for analysis for the first 5 years.
- 17 BAT/BEP must be implemented by new installations or do substantial modifications for the existing installations.
- 18 Follow up project to be recommended for Indonesia
 - A Management on PCBs: MSP (medium size project)
 - B Open burning of waste: FSP (full size project)
 - C BAT/BEP for: (FSP)
 - (1) waste incinerating
 - (2) cement kiln that burn hazardous waste
 - (3) pulp and paper production that use elemental chlorine or chemicals that can produce elemental chlorine
 - (4) thermal process in metalurgical industries.

Should in collaboration with UNDP and UNITAR.
- 20 Issues
 - A Pre-requisite of ratification (written commitment) regarding Stockholm Convention.
 - B Projects can be proposed prior to NIP approval.
 - C However, the projects must be in line with the priority in action plans.
 - D It is urgent to prepare work frames for regulations.
 - E Good collaboration is needed amongst all stakeholders
 - F Must be quick (limited GEF source).
 - G Additional funding (co-financing) can be proposed.
 - I GEF can only provide fundig for 4 projects at the most.
- 21 No-combustion technology for PCDDs/Fs is still limited in various countries, therefore, Indonesia must provide its own funding if want to do it.
- 22 Use the remediation terminology, not bioremediation since it can be carried out mechanistically.
- 23 Assciation of merchants is expected to identify importers/companies that used HCB.
- 24 Establish one work unit of POPs under the GR No. 74/2001.
- 25 Should involve the Ministry of Foreign Affairs, Police Department, in the NIP.
- 26 Use the newest NIP guideline.
- 27 Need more inputs from sectors to complete the NIP, for example, from association of pulp and paper industries, association of textile industries (in dyeing processes, suspected to use PCP (pentachlorophenol) and CNP (chloronitrophenene) as the main source of PCDDs/Fs releases). However, PCP has been banned since the 90-s, also the importation.
- 28 The establishment of laboratories must consider two regions of Indonesia, the central and the eastern parts. The laboratories to be established are based on selection and competition amongst proponents. Strengthening the stronger laboratories will minimize funding and more laboratories will be able to be strengthened. Laboratory strengthening is to comply with Stockholm Convention.
- 29 In the regulation of the Ministry of Health, there are 4 components of hospital waste, i.e. medical, citotoxic, general, and radioactive wastes. Separation of these wastes has been practiced and the data is available in the respective hospitals. Medical wastes must be incinerated, either in the facility own by the hospital or elsewhere.

5 Consultation with Stakeholders, 26 May 2005

- 1 Dismissing Draft I of NIP
- 2 Legislation must be specific; therefore, GR 74/2001 must be amended to expedite ratification. Matters to be added: (1) regulatory limits for PCDDs/Fs, (2) regulations on HCB, (3) regulations from sectors (we have prohibitions on DDT, PCDDs/Fs, endrin, etc. except for toxaphene and Mirex), (4) funding sources must be more specific, from APBN, grants, or other funding sources that are available. It is expected that the amendment of GR 74/2001 will be finished in the middle of June 2006.
- 3 For regulations, it is not appropriate to provide them based on chemical groups because it is related to provide new laws, despite the limited time. Therefore, just amend the GR 74/2001, by including all relevant issues with POPs.
- 4 If the regulations regarding PCDDs/Fs (regulatory limits) are stipulated in 2009, it means that the laboratories must be in operation in 2008, and the equipment and human resource strengthening must be provided in 2006. Include in the regulation is regulatory limits in sediments.
- 5 The principle of "polluters pay" has been in effect; this will be implemented in relation to remediation of contaminated sites.
- 6 Laboratories to be established must be accredited for POPs (including methods for sampling and analysis).
- 7 Need an inventory on PCDDs/Fs releases for power plants that are suspected to be the largest source of PCDDs/Fs.

6 Consultation with Stakeholders, 1 June 2005

- 1 Format of NIP must be consistent.
- 2 Chapter II must focus on POPs issues; table must list conventions related to POPs only; in addition to the date, also mention the regulatory background and the relation to POPs. Description in Chapter II should be related to action plans in Chapter III.
- 3 IPM is not a focus, although it is important, it is not a priority in the early activity because in principle chlorinated pesticides have been banned. IPM in plantation has been practiced in 12 provinces for cacao, coffee, pepper, cotton, and tea plantations. The objective is to make farmers aware that pesticides are last alternative. Crop, horticulture, and plantation subsectors have practice IPM; because biological phenomenon in plants and pest organisms are different, crop and horticulture subsectors cannot be deprived from pesticides. The Directorate General of Plantation has a target to train 106.000 farmers, 32000 to go, and this year is the last year of implementation. IPM and IVM are not appropriate alternatives to eliminate DDT. In the NIP, it is suggested to implement IPM to reduce the use of pesticides; this is the best suggestion.
- 4 Forest and land fires in 11 provinces will be related to biomass burning and will cause substantial loss of land functions. Needs data on loss due to forest fires. However, forest fires are not considered as the important PCDDs/Fs source of release, the main source is agricultural land due to the existence of fertilizers and chlorine. Therefore, number of fire incidents is not necessary to be mentioned.
- 5 At this time, ecolabel certification is being developed for manufactured product (voluntary basis). There are 5 categories of products, including transformers containing PCBs.
- 6 There is a suggestion from the central UNIDO office that review on institutions is not focused and the data is incomplete. State some institutional gaps and regulatory gaps, especially those related to POPs.
- 7 Activity 3.3.16: Effectiveness Evaluation. This activity should be conducted by the COP, not by Indonesia. Indonesia needs to report the national report and non-compliance, on regular basis.
- 8 Data on incinerator is impossible to be collected throughout the country, but if it is not available now, it must be planned in the future. Jakarta can be used as representing other big cities in Indonesia.
- 9 In developing laboratories, it is needed to include testing methods for matters in the environment and in living organisms. 10 parameters of organochlorine have been discussed in RSNI. Laboratories must be able to test POPs and check the biomarkers that are able to detect POPs in

human body specimens. For organochlorine, there are data available from water, soil, and sediment samples; now, analysis for POPs in blood is being developed.

10 Amendment on the GR 74/2001 will take a long time, while the follow-up project will be commenced soon. Specific for POPs will be stipulated in the ministerial decree.

11 Use of word/terminologies should be consistent, refer to the text of Stockholm Convention.

7 Consultation with Stakeholders, 8 June 2005

Focused on the topic of chlorinated pesticides

- 1 DDT has long been used for malaria eradication. Reason for no longer use DDT since 1992 is because of resistancy of the malarial vectors. The substitutes are Ikon, Bendiocarp, and Vektron. DDT warehouse are scattered in 17 provinces. Action plan to be proposed is survey to the warehouses in the 17 provinces.
- 2 Amendment of GR 74/2001 should be carried out and must be in line because the legal base for NIP is not yet available. In the existing regulation, POPs is only stated as 'banned'. Amendment for GR 74/2001 has been informed to the concerned Deputy (Mr. Isa) and will be discussed in an internal meeting in the MoE.
- 3 Chapter II contains unrelated matters one to another.
- 4 Objectives and goals of sustainable development are already in the program of MoE.
- 5 The Ministry of Health should complete data on DDT.
- 6 Organochlorine must be clarified because not all chlorinated compounds are organochlorines. Regulations on pesticides can be improved, i.e. with the Ministerial Decree No. 517. This regulation only concerns with administrative sanctions. Punishment regulations are stated in the Act.
- 7 *Perhimpunan Masyarakat Pestisida* informed that (1) all pesticides registered to the Pesticide Committee must comply the FAO, (2) a large amount of illegal pesticides, the products are labelled in Chinese character, (3) the active compound are higher than permitted level in Indonesia, (4) need a "referee" in this issue, and (5) there is an adulteration on pesticides. However, it is realized that entering the the illegal pesticide is difficult to be prevented due to many entry points. It is suggested to make cooperation with China and India regarding prohibition of illegal trading. Action on preventing illegal trading must be incorporated in the NIP. The best action plan for preventing adulteration and illegal trading is by provide information for the farmers.
- 8 Regions of malarial endemic are suspected to be contaminated by DDT.
- 9 Information from the Directorate General of Horticulture: (1) farmers participated in SLPHT are more than 1 million, 90% for rice and approximately 10 % for horticulture, (2) all provinces have implement IPM funded by APBN, (3) IPM is a national policy, (4) of 8 pesticides, dieldrin and chlordane had been registered for termite control. Nevertheless, these two pesticides were used in field for any purposes, (5) DDT was only used for malaria eradication, (6) pesticide illegal trading must be controlled by the central government, provinces, and regency levels, (7) pesticide controller must accommodate multisectors, (8) aspects of IPM: cultivation, human health, environmental, and economy.
- 10 The Ministry of Health informed that IVM (1) targets are regions with high vectors such as malarial endemic sites, (2) malaria eradication is partly funded by donor, which is UNEP, in contrary is dengue, (3) there will be study on the effect of DDT on community health that will in collaboration with various institutions. The amount of funding will be approximately Rp100-150 millions.
- 11 Conclusion: IVM can be one of action plans in the NIP, but budget provided by each ministry is not available yet.
- 12 Condition of remediation must be described, and who will be responsible for it.
- 13 Based on the clear organisation structure within the Ministry of Health, the implementation of IVM can be carried out in regions.
- 14 Mechanism of dissemination and training can be performed through training of the trainers.
- 15 Summary of convention contents must be reviewed.
- 16 Mirex has never been registered, but is detected in the field. This is can be from illegal trading.

8 Consultation with Stakeholders, 9 June 2005

Focused on the topics of PCBs/HCB

- 1 Follow-up for PCBs in transformers and capacitors is not in PLN but also in mining companies that cannot be penetrated by PLN. The government must check establishments in the field of energy outside of PLN. In East Java Province, there is a company collecting PCBs (Lamongan) from used transformers but is not clear how it will be destroyed. Equipment for transformer maintenance is stipulated in the ISO 14001.
- 2 There is a contradictory in the GR 74/2001: PCBs are prohibited but Arochlor can be limitedly used.
- 3 Regulation of Bapedal regarding labeling must be improved by a label mentioning when the equipment will be destroyed, or how long is the life time.
- 4 No importation of PCBs; the MoE will manage the transformers still in use and will provide guidance, for example, what to do if leaking happens. If Stockholm Convention permits the use of PCBs until 2025, the government needs to provide regulations on how to take care of the PCBs. A distinct and clear GR is needed for this matter. Specification on transformer oil must be clear in the importation of transformers, as well as regulation on retrofilling.
- 5 The term of “responsible institution” should be changed to “stakeholder”.
- 6 Propose to establish some noncombustion destruction facilities outside of Java Island so ease the destruction service for remote establishments.
- 7 Stakeholders involved: the Ministry of Energy & Mining, MoE, the Ministry of Pan Power & Transmigration, Pertamina, the Ministry of Trade, Unit of Oil and Gas.

9 Consultation with Stakeholders, 10 June 2005

Focus on laboratory strengthening

Revision on Draft III

- 1 Steps in laboratory strengthening (consists of laboratory inventory, capacity strengthening, SNI development) must be written in the text as an action plan, not just in the appendix.
- 2 Just one laboratory for testing PCDDs/Fs in Indonesia at the beginning. The staff must be trained overseas.
- 3 Pesticide and PCBs laboratories can be selected in the beginning, and should be added in the subsequent years.
- 4 Private laboratories can participate in the inventory but will not be strengthened using APBN.
- 5 Procurement for laboratory equipment should not be from donor source but from APBN dan from bilateral aids.
- 6 Inventory can be initiated in 2006; procurement and strengthening of pesticide laboratories can be realized at the earliest in 2007, depending on the availability of funding.

10 Consultation with Stakeholders, 15 March 2006

Participated by Mr. Martin Murin and Mr. Akos Koezegvary

Agreement:

1. NIP will be legalized in Presidential Decree format
2. Management in the Stockholm Convention implementation will be under Committee of Hazardous and Toxic Materials (within the Ministry of Environment)
3. Stockholm Convention should be ratified in 2006 (assumption: advocating must be made to expedite the ratification)
4. Commencement of the convention should be in 2008
5. Mechanisms and schedule of NIP endorsement

Activity	Month and Date									
	3	4	5	6	7	8	9	10	11	12
1 Appointment of Steering Committee and Technical Committee		√								
2 Inputs on 15 March 2006 workshop		2								
Inputs from <i>stakeholders</i> not attending the workshop		16								
3 Revise draft IV → final draft		23								
4 Review by independent expert			7							
5 Review by KLH			14							
6 Agreement by stakeholders				14						
7 Endorsement by Steering Committee				21						
8 Ratification										√

The Team will send draft IV (in hard copy and compact disk) directly to the high level officials of the concerned stakeholders. Member of the Steering Committee (echelon I) and the Technical Committee will be expanded (especially from institution that has not submitted their nominee).

11 Consultation with Stakeholders, Jakarta: Hotel Park Lane, 11 September 2006

Participants: representative of UNIDO Jakarta (Mr. M. Matsushita, Mr. N. Alie), the MoE, Bogor Agricultural University, the Ministry of Foreign Affairs, the Ministry of Energy and Mining, the Ministry of Health, the Directorate General for Customs.

1. Meeting on 11 September 2006 should be the last meeting in the attempt to complete the final draft of NIP to be the document of NIP. This document of NIP will be used as a reference in the implementation of Stockholm Convention in Indonesia.
2. The final draft of NIP has been approved by the institutions involved in the NIP preparation after accommodating suggestions from the institutions.
3. If necessary, suggestions on the draft of NIP, the MoE still give more time until 25 September 2006. Suggestion can be delivered to Assistant Deputy 4/IV by fax 021 851 4763, or email ilham40@yahoo.com, or ssachmadi@cbn.net.id.
4. For institutions that are invited but do not attend the meeting, the MoE will inform the minutes of the meeting and ask for suggestions in two weeks time (no later than 25 September 2006).

12 Consultation with Stakeholder, Jakarta: Park Lane Hotel, 15-16 November 2007

Attended by UNIDO Jakarta representatives.

The Workshop on Finalization of the National Implementation Plan (NIP) on Elimination and Reduction of Persistent Organic Pollutants (POPs) in Indonesia was decided to be the last consultation with the stakeholders. The agreement is as follows.

Considering:

- 1 Agreement and or written responses on the National Implementation Plan on Elimination and Reduction of Persistent Organic Pollutant in Indonesia from the Ministry of Agriculture, the Ministry of Health, the Ministry of National Education, the Ministry of Defense, the Ministry of Energy and Mineral Resources, the Ministry of Communication and Information, the Agency for Food and Drug Control, the Agency of National Standardization, and the Agency for Research and Technology Application.
- 2 Resume/minutes of the workshop on finalization of the National Implementation Plan (NIP) on Elimination and Reduction of Persistent Organic Pollutant (POPs) in Indonesia on 15-16 November 2007, attended by the Ministry of Industry, the Ministry of Agriculture, the Ministry of Transportation, the Ministry of Health, the Agency for Food and Drug Control, the Ministry of Forestry, the Ministry of Energy and Mineral Resources, the Ministry of Home Affairs, the Ministry of Environment, and the representative of UNIDO Jakarta.

Decided that

All participants agreed on the NIP document that has accommodated all responses and input related to the above points 1 and 2. Therefore, the NIP document is accepted and can be used to proceed toward the ratification of Stockholm Convention.

Jakarta, 16 November 2007

Ketua Tim Teknis

National Implementation Plan (NIP) on Elimination and Reduction of Persistent Organic Pollutants (POPs) in Indonesia

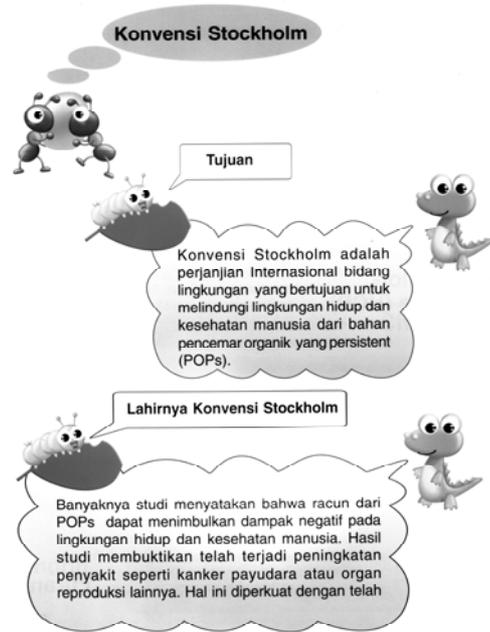


M. Ilham Malik

Annex 3:

SAMPLE OF INFORMATION MATERIAL FOR GENERAL PUBLIC

Publication for General Communities



Upaya Atasi Polusi Dioksin dari Insinerator

HAMPIR seluruh insinerator yang beroperasi di dunia menghasilkan polusi dioksin. Insinerator sampah medis merupakan sumber terbesar polusi dioksin dan logam berat di udara, seperti merkuri dan kadmium. Badan Perlindungan Amerika Serikat (Environmental Protection Agency/EPA) sejak 1989 menyatakan dioksin sebagai karsinogen, yaitu berbagai bahan kimia pemicu kanker.

Dalam seminar teknologi pengolahan limbah di Kementerian Lingkungan Hidup Jakarta, Senin (29/9), Sunardi, dari FMIPA UI, mengatakan, di benzo-para-dioxin yang lebih dikenal dengan dioksin dari berbagai penelitian diketahui menyebabkan gangguan kesehatan pada manusia. Senyawa benzena ini dapat berikatan dengan unsur lain hingga menghasilkan ratusan senyawa baru.

Persenyawaannya dengan unsur klor yang membentuk TCDD (Tetra Chloro Dibenzo para Dioxin) merupakan yang paling beracun dan diketahui secara nyata merupakan faktor pemicu kanker. Dioksin terutama dihasilkan dari reaksi oksidasi atau pembakaran senyawa diklorobenzena yang banyak ditemukan pada pestisida atau herbisida, pemutih kertas, bahan plastik pembungkus makanan, dan alat medis sekali pakai. Dioksin juga terbentuk dari pembakaran bahan organik seperti kayu dan lemak.

Batasan paparan dioksin pada manusia sesuai baku mutu 1406 EPA adalah 1-4 nanogram

per kubik meter asap. Meski demikian, insinerator yang dioperasikan di negara maju termasuk AS pun emisinya jauh lebih tinggi dari baku mutu. Karena itu EPA meminta mengganti insinerator konvensional ini dengan sistem yang ramah lingkungan.

Jepang juga menghadapi masalah polusi dioksin terbesar di dunia karena 70 persen insinerator dunia ada di Jepang. Sebuah insinerator yang terdapat di utara Osaka diidentifikasi sebagai sumber polusi dioksin, 1997. Pada musim semi 1998 ditemukan 8.500 pikogram per gram tanah dekat dengan insinerator tersebut. Pada sirkulasi air untuk pendinginan insinerator ditemukan 53.000 nanogram dioksin. Pada darah pekerja di instalasi itu ditemukan 5.380 pikogram dioksin per gram lemak darahnya. Padahal konsentrasi yang dapat diterima 20-30 pikogram.

Di Desa Hinode dekat Tokyo yang merupakan daerah pembuangan limbah terbesar di Asia memiliki kapasitas pembakaran abu dari insineratornya lebih dari 2,5 juta kubik meter. Di daerah ini ditemukan 18 dari 271 orang meninggal karena kanker dalam waktu kurang dari 10 tahun. Data ini lebih dari empat kali lipat rata-rata kasus nasional Jepang.

Teknologi pengolah limbah

Pembakaran sempurna insinerator pada suhu di atas 800° C, jelas Eka Winatha dari Hepasin Media Pratama, memang dapat mengurangi emisi dioksin

tapi hal itu memunculkan masalah lain, penguapan logam berat seperti merkuri, krom, dan kadmium yang tidak kalah membahayakan lingkungan.

Untuk mengatasi itu, Eka mengembangkan teknologi Desorpsi Suhu Rendah (Low Thermal Desorption) sebagai metode alternatif pengganti insinerator. Teknologi ini diadopsi dari yang pernah dikembangkan di AS, namun kemudian dikembangkan sendiri dengan sistem rotary carbonizer atau prinsip X-Flow. Teknologi temuannya itu kini telah diregistrasi untuk memperoleh paten di Indonesia. Bekerja sama dengan FMIPA UI, ia juga menerapkan sistem menggunakan titanium oksida untuk mereduksi dioksin.

AS menggunakan prinsip siklon dan aliran termal. Teknologi itu telah dicoba di San Francisco pada skala besar untuk mengolah limbah beracun.

Ada beberapa keunggulan teknologi desorpsi suhu rendah ini dibandingkan insinerator yaitu pemanasan tidak langsung dengan termolisis suhu rendah. Dalam hal ini dilakukan proses pengeringan sampai dengan pemanasan suhu rendah yaitu 200-350° C tanpa oksidasi atau pembakaran langsung sehingga meminimalkan pembentukan dioksin.

Konsumsi bahan bakarnya juga efisien, yaitu dengan menerapkan sistem hampa udara pada proses pengeringan menyebabkan penurunan suhu penguapan sehingga proses dekontaminasi dapat terjadi pada suhu rendah. (UN)

Bisnis Indonesia

REFERENSI BISNIS TERPERCAYA

Rabu, 3 Maret 2004

UNIDO percepat Konvensi Stockholm

JAKARTA (Bisnis): United Nations Industrial Development Organization (UNIDO) menggandeng Kementerian Lingkungan Hidup (KLH) untuk mempercepat pelaksanaan Konvensi Stockholm tentang POPs.

Wakil UNIDO untuk Indonesia Masayoshi Matsushita mengatakan POPs (polutan organik menetap) merupakan bahan beracun yang berbahaya bagi kesehatan manusia yang perlu dihapuskan. Kegiatan ini dilakukan untuk meningkatkan pengetahuan dan pe-

mahaman para pembambil keputusan, kalangan industri, dan masyarakat tentang POPs. "Secara keseluruhan kami menyiapkan dana sebesar US\$500.000. Kami berharap Indonesia dapat segera memenuhi semua persyaratan yang diwajibkan konvensi Stockholm dan berupaya menghapus penggunaan POPs," ujarnya di Kantor Persatuan Bangsa-Bangsa, kemarin.

Dia menuturkan kegiatan utama proyek ini antara lain melakukan inventarisasi semua jenis POPs secara nasional serta membuat program penentuannya, menyusun mekanisme pengendalian produksi, pembuangan, dan penggunaan bahan-bahan POPs, dan mengidentifikasi daerah yang kontaminasi.

Anggota Tim Peneliti POPs dari KLH Suminar Setiati Achmadi mengemukakan Indonesia merupakan salah satu dari 150 negara yang menandatangani Konvensi Stockholm pada 23 Mei 2001. Setelah tidak lanjutnya, pemerintah menetapkan kebijakan nasional untuk menghapus penggunaan semua bahan kimia yang beracun, persisten, dan tahap terhadap perubahan lingkungan.

10 Bahan kimia

Pemerintah, lanjut dia, dalam PP Nomor 74/2001 telah melarang penggunaan sepuluh bahan kimia POPs, yaitu aldrin, chlordane, dieldrin, endrin, heptachlor, hexachlorobenzene, mirex, DDT, toxaphene, dan PCB. "Kami dibantu dana oleh *Global Environment Facility* dan

bersama UNIDO, dalam waktu empat bulan ini kami akan menginventarisasi bahan kimia POPs," ujarnya.

Dia mengungkapkan dua tahun lalu KLH telah melakukan penelitian seputar POPs. Salah satu hasilnya emisi dioxin dan furan yang ada di Indonesia pada 2001 diperkirakan mencapai 20.977 gram TEQ atau jauh lebih tinggi dari total jumlah emisi dioxin dan furan dari 17 negara di Eropa.

"Pemerintah perlu memberikan perhatian serius mengingat dioxin dan furan sangat berbahaya bagi kesehatan manusia dan lingkungan hidup," katanya.

Bahan kimia berbahaya POPs, jelas dia, sebenarnya dapat dibandarkan jika pembakarannya dilakukan dengan suhu panas di atas 800

derajat Celsius. Namun persoalannya kebanyakan industri atau pun rumah sakit sebagai pengguna bahan-bahan yang mengandung POPs tidak memperhatikan proses pembuangan dan pembakaran.

"Tingkat panas insinerator di rumah sakit kadang tidak diketahui karena panelnya yang sudah rusak. Akibatnya banyak alat suntik yang masih menyisakan POPs karena pembakaran yang tak sempurna," tuturnya.

Dia menambahkan bersama UNIDO, pihaknya akan melakukan sosialisasi tentang bahaya POPs dan meneliti daerah-daerah yang kemungkinan terkontaminasi. Penelitian ini akan dilakukan dalam waktu empat bulan dan hasilnya akan dipaparkan ke publik pada Juni tahun ini. (01)

UNIDO

ダイオキシン対策を支援

国内企業1000社に質問状送付

発展途上国の工業化への支援活動を行っている国連工業開発機関（UNIDO）ジャカルタ事務所（松下正良代表）は二日、地球環境ファシリテイ（GEF）から五十万ドルを拠出、ダイオキシンなどの残留性有機汚染物質（POPs）対策に当たるインドネシア政府環境省を支援すると発表した。ダイオキシンなど有毒科学物質に対するインドネシア政府の環境対策は、事実上、皆無。UNIDOの支援がどの程度、成果を上げるのか注目される。

松下代表によると、UNIDOは、環境省が編成す

る対策チームと協力し、国内企業約一千社にポリ塩化ビフェニル（PCB）、ダイオキシンなど有毒化学物質の使用量を調査する質問状を送付。

インドネシア国内における有毒化学物質使用の現状を約四カ月かけて把握するとともに、関連省庁に対し、有毒化学物質の製造・使用を禁止する法律の作成を求めていく。

調査結果は、六月下旬に行われるセミナーで発表される予定で、松下代表は「メディアなどを通じて、国民の環境対策に対する関心を高め、有毒化学物質対策

を打ち出していけるようなレベルに持っていきたい」と抱負を語った。

インドネシアは二〇〇一年五月、国際レベルで有毒化学物質の廃絶、削減を行うことを定めた「残留性有機汚染物質に関するストックホルム条約」に署名し、蛍光灯の安定器や家電に使用されるPCB、殺虫剤や農薬に使われるDDTなど、有害化学物質十種類の使用を禁じる政令を発令した。しかし、政府によるデータ収集や情報管理がほとんど行われておらず、有毒物質対策が放置されているのが実状。有害化学物質に対

する国民の関心も低く、集落の軒先で、ビニール袋など有毒物質を発するゴミを焼却することが一般的となっている。

Annex 4:

ADDITIONAL INFORMATION ON CHEMICALS

Perepared by the Ministry of Environment

Identification of POPs Pollution in West Java in 2005 (Identifikasi Pencemaran POPs di Jawa Barat 2005)

Identification of POPs in West Java was carried out in July-October 2005. The locations included 10 districts: Karawang, Subang, Indramayu, Kuningan, Majalengka, Sumedang, Ciamis, Bandung, Cianjur, and Sukabumi. From every district, one or two subdistricts were chosen as samples and from every subdistrict was purposively drawn one to five samples of soil, based on the level of pesticide use. Village from each district was selected based on predominancy of rice and crop commodities that had been categorized as “sentra” of rice and crop production.

Data resulted from this activity was consisted of primary and secondary data. The primary data was collected through direct interview with farmers and relevant officials using predeveloped questionnaires. The secondary data was obtained from *Badan Lingkungan Hidup Propinsi, Kabupaten, Dinas Pertanian Propinsi, Kabupaten/Kota*, and the relevant institutions and some published references relevant to the study. The data from the questionnaires were tabulated and calculated using the following formula:

$$P = \frac{X}{N} \times 100\%$$

where P was the percentage, X was number of respondents giving the same choice, and N was the number of all respondents. Results of the calculation was entered into the standards with some objective criteria, i.e. good (>75%), moderate (56-75%), and poor (<40-50%).

There were 23 types of insecticide active compound that were used by farmers in West Java with 28 trade names and 3 types of active compound property, i.e. contact, gastric, and systemic types. The most dominant active compound was contact type (48.7%), followed by gastric and systemic of 38% and 13.3%, respectively. Active compounds of pesticide: Abamectrin 18.4 g/l, Alfa Sipermetrin 50 g/l, Alfametrin 15/l, Betasiflutrin 25 g/l, Bisultap 400 g/l, Deltametrin 25 g/l, Diafentiuron 500 g/l, Diazinon 600 g/l, Difenokanazol 250%, Dimetoat 396%, Emamektin benzoat 5%, Endosulfan 20%, Fipronil 0,3%, Imidakloprin 25%, Karbofuran 3%, Karbosulfan 50 g/l, Klorfluazuron 50 g/l, Klorpirifos 200 g/l, Lamda Sihalotrin 25 g/l, Metomil 25%, Permetrin 20 g/l, Permetrin 43,5 g/l, Profenofos 500 g/l, Sipermetrin 50 g/l.

Fungicides used by farmers in West Java were 18 types with 17 trade names, consisted of 4 types of mechanisms: systemic, contact, fungistatic, and protective. To that date, the systemic type was dominating to be used for all commodities (rice, crop, and vegetables), reaching 39.9%, followed by the type of contact, protective, and fungistatic, with the amount of 26.8%, 26.8%, and 6.5%, respectively. The fungicides used were: Asibenzolar-S-metil 1% & Mankozeb 48%, Benomil 50%, Difenokanazol 250%, Dimetomorf 50%, Dinikonazol 12,5%, Fenarimol 120 g/l, Heksakanazol 50 g/l, Isoprotilan 400 g/l, Klorotalonil 75%, Maneb 80%, Mankozeb 80%, Mankozeb 83%, Mefenoksan 4% & Mankozeb 64%, Propineb 70%, Simoksaniil 29.0% & Famaksadon 22.5%, Simoksaniil 8.36% & Mankozeb 64.6%, Tebukonazol 25%.

Laboratory test on 40 soil samples showed that in general the concentration of active compounds and the pesticide residues exceeded the regulatory limits that were higher than the maximum of 25% residue. Insecticide residues ranged from 18.6% to 38.2%. Insecticide residues on upland with single-type crop were 22.6-31.2%. On the land cultivated with dry land rice-crop was 18.6-25.2%. For rice field cultivated with rice-crop showed the residue level of 18.6-35.1%. Residue on rice field cultivated mostly with rice all year long was higher, that was 19.7-38.2%. Insecticide residue was the highest in upland area cultivated with rice (monoculture), that was >25%.

Similarly, the level of fungicide residues in wet rice field was affected by type commodity, soil type, cultivation practice, climate, volume of pesticide used, and how the wet soil was tilted. The most dominant fungicide residue in soil originated from the active compound of Mankozeb with its trade name of Dithane M-45 WP and Polarem 80 WP. Farmers were using these in almost all locations. From the

laboratory test, the highest fungicide residue in soil was detected in 4 locations in the District of Indramayu, i.e. 69.8, 65.7, 60.4, and 56.9%; with the maximum limit of the fungicide residue of 50%, and the lowest was in the District of Ciamis, Subdistrict Cijeungjing, i.e. 46.8 and 49.8%, and in Subdistrict Sukadana of 45.8 and 57.3%.

Insecticide residue in soil in almost all locations showed that the levels have exceeded the permitted concentration, with the inhibition value of 25.2-14.4%. It was only at Cimahi area that the level of insecticide residue was lower than the permitted concentration (inhibition value of 17.2-21.3%). Some area with the highest insecticide residue was found in the Subdistrict Losari, in the District Cirebon (inhibition value of 58.2-74.4%), followed by the District of Bandung (inhibition value of 40.0-65.6%).

Annex 5:

DETAIL OF RELEVANT INTERNATIONAL AGREEMENTS

Indonesia has shown its commitment to implement the international agreements regarding environment by ratifying or complying the conventions, in addition to actively participating in negotiations and conferences. In general, there are 5 conventions adopted by Indonesia as the following.

- 7 Agenda 21, blue print of agreement on direction, forms, and pattern of sustainable development that was declared by the Earth Summit in 1992. This is carried out by a preparation of Indonesian Agenda 21 in 1997, followed by an evaluation on the implementation in 2002. In addition, Indonesia stated its commitment to implement Johannesburg Plan of Action, as an output of the World Summit on Sustainable Development, a commemoration of 10th years of Earth Summit. Other follow-up includes policy on Strategic Approach in Chemical Management (SAICM) that had been initiated since 1990s.
- 8 In controlling pollution that affect on the increasing of global temperature, Indonesia has ratified Climate Change Convention and the Kyoto Protocol, Vienna Convention, Montreal Convention and its amendment.
- 9 In August 1994, Indonesia ratified the United Nations Framework Convention on Climate Change (UNFCCC) (Act No. 6/1994). The main goal of this convention is to stabilize the concentrations of carbon dioxide (CO₂) (green house effect), methane (CH₄), nitrite oxide (N₂O), hydrocarbon (HC), perfluorocarbon (PFC), and sulphur hexafluoride (SF₆) in the atmosphere to the level at which the anthropogenic disturbance to the global climate change can be prevented. Indonesia plays an important role in the structure of global geographical climate because it has the second largest tropical rain forest and the widest ocean to absorb the green house gases that affected the global climate.
- 10 Through the Presidential Decree No. 23/1992 and No. 92/1998, Indonesia ratified Montreal Protocol and the amendment, namely, London Amendment and Copenhagen Amendment. The aims were to protect ozone layer, scheduling of gradual elimination and limitation of chemical consumption categorized as ozone depleting substance [ODS, chlorofluorocarbon (CFC), methyl bromide (CH₃Br), carbon tetrachloride (CTC), trichloromethane (TCA), and halon] at national level according to convention at international level. In Indonesia, use of CFC and methyl bromide is considered high. CFC and methyl bromide can be imported until 31 December 2007.
- 11 In the aspect of biodiversity conservation, Indonesia has ratified a convention regarding the biodiversity and the Cartagena Protocol for Biosafety.
- 12 In terms of human health protection and pollution prevention caused by hazardous and toxic materials, Indonesia has ratified Basel and Rotterdam Conventions.

HISTORY OF POPS ISSUE HANDLING IN INDONESIA

1 Outcome from the Trial Air Monitoring of POPs Chemicals in Indonesia (KLH 2005)

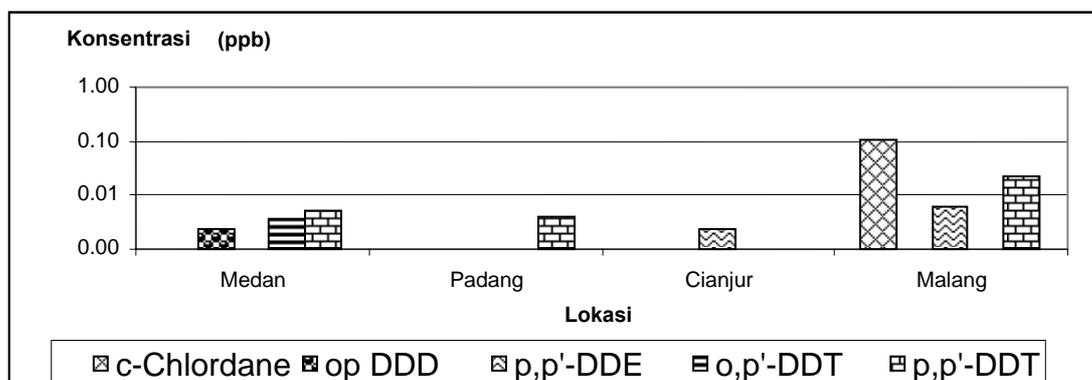
An environmental Monitoring (EMC) station was at suburb area, 25 km south of Greater Jakarta. The samples were taken and sent to Japan for analysis. The results showed the content (in ppm) from 2 samplers were as the following: HCB 100-110, Aldrin 0.99-1.2, Endrin 34-; *p,p*-DDT 12-13, *p,p*-DDE 12-18; *p,p* DDD 9.2-9.3; *trans*-chlordan 18, *cis*-chlordan 11-12; Mirex 0.23-0.33. Dioxins and furans were not reported. Bulk trajectory information showed that below the equatorial line the bulk trajectory of air is almost from Java and Australia; the mixing height is low so there will be no influence from long distance; the trajectory will change the path if the sampling points change to upper equatorial line. Therefore, the city of Medan will be more appropriate for the future target study.

2 POPs monitoring 2005 (by KLH)

Monitoring on environment quality caused by residues of POPs chemicals was conducted in April-October 2005. Samples were taken from several locations surrounding agricultural areas and rivers in the city of Medan, Agam (West Sumatra), Lampung, Cianjur, Brebes, Yogyakarta, and Batu-Malang. The samples were drawn from river waters, river sediments, and agricultural land. POPs chemicals under monitoring were DDT and its derivatives (*o,p*-DDD, *p,p*-DDD, *o,p*-DDE, *p,p*-DDE, *o,p*-DDT, *p,p*-DDT), heptachlor, heptachlor epoxide, aldrin, dieldrin, HCB, Mirex, chordan (*trans*-chlordan and *cis*-chlordan). Objective of the monitoring was to evaluate the existence of some POPs chemicals in the environment.

Results of monitoring showed that several target compounds were detected in water, soil, and sediment samples. The target compounds that were generally detected: DDT and its derivatives. In river waters, *p,p*-DDT and its derivatives were detected in the concentration range of 0.002-0.022 ppb. The highest concentration detected was *p,p*-DDT with the level of 0.022 ppb in an apple orchard in Batu, Malang (Fig. 1).

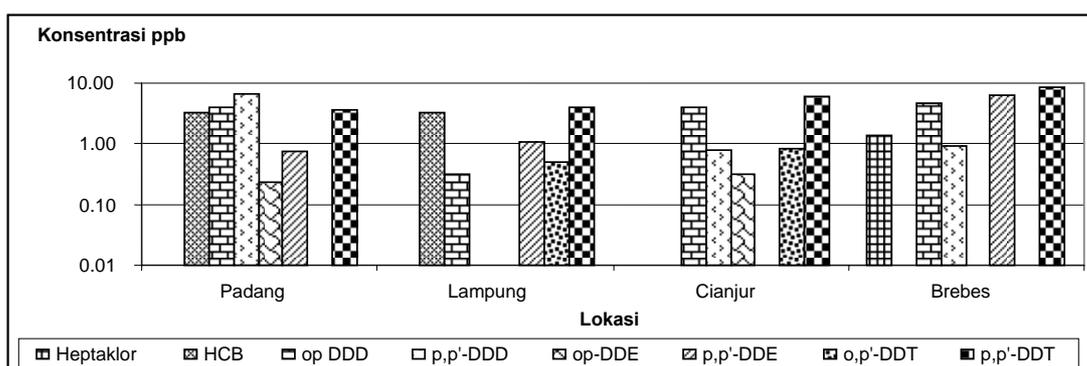
Figure 1. The Highest concentration of POPs detected in water in 2005



Source: KLH 2005

In river sediments, several POPs compounds were detected with the concentration range of 0.230~8.62 ppb. DDT and its derivatives were the major residues detected in the sediments. In the river sediments, HCB and heptachlor were also detected (Fig. 2).

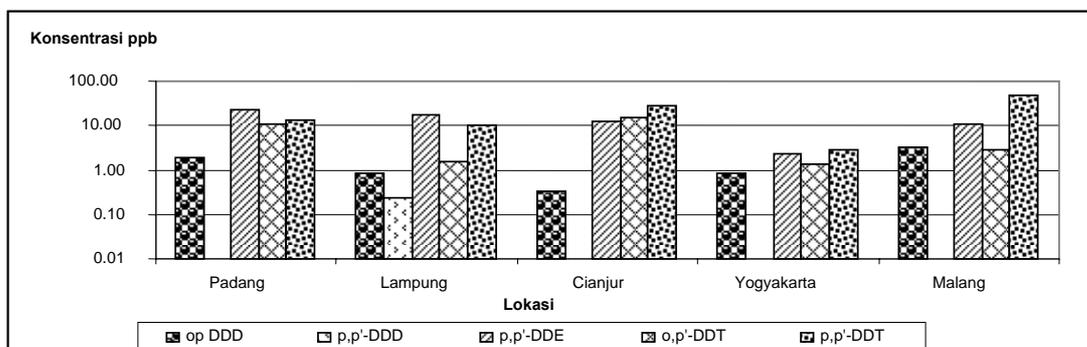
Figure 2. The Highest concentration of POPs detected in sediments in 2005



Source: KLH 2005

The result of monitoring showed that for soil samples there was only DDT and its derivatives detected with the concentration range of 0.24~48.4 ppb. The highest concentration detected was *p,p*-DDT (48.4 ppb) at the agricultural land in Batu, Malang. In agricultural land at Cianjur, *p,p*-DDT was also detected with even higher concentration than its derivatives (Fig. 3).

Figure 3. The Highest concentration of POPs detected in agricultural soil in 2005



Source: KLH 2005

Overall, the results of monitoring on POPs in 2005 showed that POPs that have been banned in Indonesia (GR 74/2001) were still detected in the environment, especially DDT and its derivatives. In general, soil and sediments were the sites for accumulation of POPs as indicated by the higher concentrations as compared to those in the river water.

3 “Community Action Research to Identify the Threat of POPs to Rural Life”, FIELD Indonesia Foundation (Indonesia)

Brebes District is located in northern coast of Java. The district belongs to Central Java Province. The main agricultural product from this district is onion. From total 17 sub-districts in Brebes District, 12 of them plant onion. There are 15-20 villages in each sub-district and in each village there is 3-5 pesticide kiosks. This picture can give us overview how big pesticide use in this district. From the result of survey done by the IPM Farmer Association in 2003, the farmers estimate around ---- ton pesticides used for onion every season. The farmers predicted that some of them are identified as POPs (DDT, Endrin, etc.). Also, the pesticide under I-A (WHO category) and banned pesticide by Ministry of Agriculture is still marketed freely in the agricultural kiosks in the district. Based upon this condition it needs to identify the real status directly by farmer community groups so they will inform to other farmers. This strategy will be expected that will give other farmers true information about the danger of pesticide and expected that they will decide their own plans to deal with this problem. The project will be targeted to achieve several objectives, as follow:

- 1 To increase the awareness of the danger of using pesticides for farmer community.
- 2 To strengthen the organizing of farmer's community through the implementation of action research activities that will be focused in identifying the using of pesticide for farming activities.
- 3 To identify the status of using dangerous pesticides (POPs, banned pesticides, etc.) by the farmers in the communities.
- 4 To develop action plans by farmers that is based on the result of action research activities.

4 “Policy Brief On Zero Waste: A Proposal For Pops-Free Alternative To Managing Municipal Discards In Indonesia, Malaysia And The Philippines” Bali Fokus and Garbage Network (Indonesia), Consumers' Association of Penang (Malaysia), and EcoWaste Coalition (Philippines)

Southeast Asia, particularly in the industrializing countries of Indonesia, Malaysia and the Philippines, faces mounting waste and pollution problems brought about by expanding population, dirty industrial processes, and the globalization of Western consumption patterns marked by throw-away consumer culture. Waste-impacted countries, in their rush to mitigate the effects of wasteful production and consumption, are being lured to build waste burners, regardless of the many studies implicating waste incineration as major source of by-product POPs such as dioxins and furans. Policy makers in Indonesia and Malaysia are mulling over incinerator proposals of various types and sizes. While incinerator pushers in the Philippines are trying to get around the ban as provided for in the Clean Air Act of 1999 and reinforced further in the Ecological Solid Waste Management Act of 2000. The proposed policy brief will show to policy makers in particular and to the citizens in general that a Zero Waste alternative to incineration exists, which, if genuinely implemented, will minimize POPs releases, conserve diminishing resources, generate jobs and stimulate community self-reliance and development.
Indonesia

5 “Monitoring POPs pesticides on Java, Sumatra, and Kalimantan”, Gita Pertiwi (Indonesia)

This project is aimed at detecting circulation of POPs pesticides and other pesticides which are prohibited by the Indonesian government based on the Indonesian Keputusan Menteri Pertanian (Minister of Farming Decree) letter No. 434.1/Kpts/TP.270/7/2001, which prohibits the use of 37 active pesticide ingredients. This monitoring will be deliberately done to detect impacts and compliance as a result of implementing of the above mentioned regulation. The concern is the limited information regarding the ban of these pesticides. Every year a list of prohibited pesticides is drawn up by the pesticide committee. The latest restrictions include a list of 37 active pesticide ingredients, with POPs pesticides among them. However, there is no restriction on importing pesticides in Indonesia. In this project we will do a study document from official documents which are produced by the pesticide committee and farming department, and from field surveys on three islands, Java, Sumatra and Kalimantan. The surveys will

involve field visits, and discussions with farmers as well as interviews with the pesticide committee in the farming department. The written results of the research will become national reports about the current circulation of information regarding the prohibited pesticides and POPs pesticides.

6 Public-Private Partnership

The following is one example of the implementation of public-private partnership, between the government of Indonesia and private sectors. A guideline on co-processing waste materials in cement production was published by Holcim & GTZ (Final Draft, 17 March 2005). The Guidelines include

- result from a public-private partnership between the GTZ GmbH (the German Corporation for International Cooperation) and the cement company Holcim Ltd., to promote the co-processing of waste in cement kilns-that is, the use of wastes along with other materials in kilns to produce cement.
- → improvement of waste management at national and local levels, as well as attempts by the cement industry to reduce environment degradation resulting from cement production. Increasing corporate social responsibility. Achieving the targets set in the Agenda 21 of the “Earth Summit” in Rio de Janeiro (1992), the Johannesburg Declaration on Sustainable Development (2002), and the Millennium Development Goals.
- Taking into consideration all related international conventions such as the Basel and the Stockholm Conventions and the UN Framework Convention on Climatic Change (Kyoto Protocol). → avoid the creation of wastes and reducing their quantities; wherever possible, the concept of cleaner production (CP), recycling and reuse. Co-processing can be classified as a technology for energy and material recovery. → encourage the use of waste as an alternative source for primary energy and virgin raw materials in cement kilns.
- Public-private partnership: innovative techniques and technical know-how are available and will be further developed by the private sector, whereas the public sector should ensure that environment standards are maintained and health and safety regulations are applied and enforcement.
- There is general agreement that co-processing of waste in cement kilns requires:
 - a changes in or adaptations of laws and regulations;
 - b facility personnel and government regulators/inspectors knowledgeable and experienced in waste combustion, including toxic/hazardous waste;
 - c a proper enforcement of the legal framework for all waste management activities, combined with monitoring by the authorities and the strict enforcement of regulations;
 - d the establishment of local emergency preparedness and response programs, in addition to any national programs;
 - e health and safety programs for personnel who may come into contact with toxic or hazardous waste;
 - f a “corporate responsibility” approach on the private and public sectors alike;
 - g transparency in terms of information and communications

Thus ethical conduct, good governance, and social responsibility are prerequisites for successfully implementing the Guidelines.

7 Globally Harmonized System (GHS) of Classification and Labelling of Chemical has been adopted by some national enterprises

8 Registration and Notification for Hazardous and Toxic Materials, has been implemented by KLH.

9 National Chemical Profile has been published by KLH.

10 Facility at port health (Port Health Office) in 45 harbours

11 Public awareness on chemical safety has been carried out through extension workers on safety on using chemicals, from 2002 in all provinces.

12 Program Responsible Care: The Committee was established in 1997 with 72 members.

13 To Be Accomplished:

- 1 Establishment of the National Committee of B3
- 2 Capacity building at the central and regional government and private sectors in the good and appropriate management of B3 and LB3, by trainings in technical and managerial aspects
- 3 Capacity building in the management of LB3 in ASEAN region through optimizing the role of BCRC
- 4 Development of control system on transboundary movement of illegal B3 and LB3 through harbors
- 5 Provide map on potential danger of the existence of B3 and LB3
- 6 Raise awareness of industries, community especially the vulnerable groups: women and children) toward B3 and LB3
- 7 Increase the system on control, management, and use of B3 and LB3
- 8 Develop regulations and policies in the management of B3 and LB3
- 9 Develop the GR 74/2001 regarding the management of B3.

14 http://www.oztoxics.org/ipepweb/projects/project%20index_5_2.html#indonesia

IPEP projects include country situation reports, POPs inventories, sampling of breastmilk and eggs, social and economic impact of POPs pesticides, and participation in the National Implementation Plans, policy briefs and public awareness material.

Annex 7.

**PROCESS OF STAKEHOLDERS INVOLVEMENT AND
FUNDING SOURCE AND BUDGETING IN THE IMPLEMENTATION OF
STOCKHOLM CONVENTION**

Jakarta, 1 November 2006

Agreement:

1. Determination of stakeholders for each action plan.
2. Determination of coordinator of stakeholder for each action plan, written in the first place, provide with job description.
3. Description of monitoring and evaluation activity for each activity. All stakeholders will be involved in the monitoring & evaluation activity.
4. Determination of stakeholders to be funding source for each action plan. Funding source can comprise several sectors in addition to funding from donor and other funding resources.
5. The mechanism for establishment of the Committee of B3 is clearly stated in the GR 71/2001.
6. The approximate amount for funding can be estimated using the funding from UNIDO for PDF A, PDF B, and also ODS program in Indonesia.
7. Details of funding should follow the common practice in the MoE.
8. Reasons for not applying exemption in using DDT must be stated.

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