NEPAL

NATIONAL IMPLEMENTATION PLAN

FOR

THE STOCKHOLM CONVENTION ON PRESISTENT ORGANIC POLLUTANTS (POPs)

Published by:
POPs Enabling Activities Project
Ministry of Environment, Science and Technology
Singh Durbar, Kathmandu, Nepal
April 2007

Government of Nepal

GLOBAL ENVIRONMENT FACILITY

UNIDO

Printed at : Aaryan Offset Press Pvt. Ltd.
Phone : 4238413, 2071844

Gratis copy-This copy is not for sale

Published by:
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(GF/NEP/02/018)
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The National Implementation Plan for the Stockholm Convention was prepared under the UNIDO Contract GF/NEP/02/018 within the framework of the Project entitled "Enabling Activities to facilitate early action on the Implementation of the Stockholm Convention on Persistent Organic Pollutants (POPs)", funded by the Global Environment Facility (GEF).

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Foreword

Nepal is a party to a number of multilateral environmental agreements. The Government of Nepal is fully committed to fulfill the obligations of these agreements. This National Implementation Plan (NIP) is one of our efforts and it is prepared with the support of GEF and UNIDO to meet the obligations set by the Stockholm Convention on Persistent Organic Pollutants (POPs).

The Government of Nepal has recently approved the NIP and is fully committed to carry out activities as per NIP. I understand, the NIP has been prepared after wide consultation with concerned stakeholders, GOs, NGOs, academia and private sectors. Thus, I am assured there will be no problem in its implementation. I am confident also that this Plan will help our government to address the problems of POPs in Nepal. However, we will need some external resources in order to implement the programs under the Plan. Therefore, I would like to request all funding and donor agencies to extend their technical and financial support for the implementation of the NIP.

Finally, I would like to thank GEF and UNIDO for their valuable support in the preparation of this National Implementation Plan

Mahanth Thakur
Minister
Ministry of Environment, Science and Technology

April, 2007

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Foreword

For over the past two decades a series of international treaties have been negotiated to deal with global environmental problems. With the objective of protecting human health and environment from the adverse effects of Persistent Organic Pollutants (POPs) Stockholm Convention on Persistent Organic Pollutants was adopted on 23 May 2001. POPs chemicals include widely used chlorinated organic pesticides, chemicals used by industries, such as polychlorinated biphenyls (PCBs), and also those generated as unintended byproducts of combustion and industrial manufacturing processes (dioxins, furans). Being persistent in nature and global traveler, POPs are not limited to certain political boundaries. People of the developing countries and particularly those living in poor conditions are most vulnerable to POPs chemicals.

Global Environment Facility (GEF) has provided the financial assistance for the project "Enabling Activities to Facilitate Early Action on the Implementation of Stockholm Convention on Persistent Organic Pollutants (POPs)", which is being jointly implemented by the Ministry of Environment, Science and Technology (MOEST) and the United Nations Industrial Development Organization (UNIDO). This project has provided support to prepare an Inventory of POPs in Nepal and to formulate a National Implementation Plan (NIP) for the Stockholm Convention on POPs.

The NIP is a comprehensive, strategic policy document and has been developed after the wide consultation with relevant stakeholders in GOs, NGOs, academia and private sectors, as required by the Stockholm Convention, as well as in compliance with the UNEP/GEF guidelines. The Plan has identified the key problems, issues and priorities with future action plans. I hope this Plan will help Nepal solve the problems faced from the persistent organic pollutants.

I would like to acknowledge all the institutions and individuals actively involved during the preparation of inventory. I wish to specially thank Ministry of Agriculture and Cooperatives, Ministry of Industry Commerce and Supply, Ministry of Health and Population, Nepal Agriculture Research Council, Department of Agriculture, Plant Protection Directorate, Nepal Bureau of Standard and Metrology, Nepal Electricity Authority, Federation of Nepalese Chamber of Commerce and Industry and various NGOs and private organizations for their help and cooperation.

I would also like to extend my thanks to Dr. Bhupendra Devkota, Mr. Dhruba Narayan Manandhar, Dr. Badri B.S. Dangol, Mr. Suman Sharma and Mr. Ram Charitra Sah for their invaluable contributions during the preparation of inventory and NIP. The Ministry would also like to thank Mr. Jay Ram Adhikari, National Project Coordinator of POPs Project and his staff members for bringing this project in this form.

In the end, I would like to express my appreciation to GEF and UNIDO for their financial and technical assistance for the preparation of inventory of POPs in Nepal and the NIP.

April, 2007

Bal Krishna Prasai
Secretary
Ministry of Environment, Science and Technology

List of Acronyms

a.i. : active ingredient
AAS : Atom Absorption Spectrophotometer
ABC : Atmospheric Brown Cloud
AIC : Agricultural Input Company
AICC : Agriculture Information and Communication Centre
APC : Air Pollution Control devices
BAT : Best Available Techniques
BEP : Best Environmental Practices
BHC : Benzene hexachloride
BT : Bacillus thuringiensis
CARE/N Centre for Agricultural Research and Education/Nepal
CBS : Central Bureau of Statistics
CDB : Cotton Development Board
CDC : Central Department of Chemistry
CEAMP Community Environmental Awareness and Management Project
CEPREAD : Centre for Environmental Policy, Research, Extension and Development
CEPHED : Center for Public Health and Environmental Development
CFRL : Central Food Research Laboratory
CITES : Convention on the International Trade in Endangered Species of Wild Fauna and Flora
DADO : District Agriculture Development Office
DANIDA : Danish International Development Agency
DDT : Dichlorodiphenyl Trichloroethane
DEEBS : Department of Environmental Engineering and Biological Sciences
DFTQC : Department of Food Technology and Quality Control
DOA : Department of Agriculture
DOHS : Department of Health Services
DSWC : Department of Soil and Water Conservation
DWIDP : Department of Water Induced Disaster Program
ECCA : Environmental Camps for Conservation Awareness
ECD : Electron Capture Detector
EDCD : Epidemiology and Disease Control Division
EIA : Environmental Impact Assessment
ELAW : Environmental Law Alliance Worldwide
ENPHO : Environmental and Public Health Organization
EPA : Environment Protection Act
EPR : Environment Protection Regulations
FAO : Food and Agriculture Organization
FID : Flame Ionization Detector
FNCCI : Federation of Nepalese Chamber of Commerce and Industries
FO : Furnace oil
FOB : Friends of Bagmati
FOEI : Friends of the Earth-International
GAIA : Global Alliance of Incinerator Alternative
GC : Gas Chromatograph
GEF : Global Environment Facility
gTEQ : Gram Toxic Equivalent with 2,3,7,8 TCDD

HCI : Health Care Institutions
HPLC : High Performance Liquid Chromatography
HPTLC : High Performance Thin Layer Chromatography
IAAS : Institute of Agriculture and Animal Sciences
ICIMOD : International Centre for Integrated Mountain Development
ICT : Information and Communication Technology
IEE : Initial Environmental Examination
IFAD : International Fund for Agricultural Development
IFCS : International Forum for Chemical Safety
ITTA : International Tropical Timber Agreement
IUCN : International Union on Conservation of Nature (World Conservation Union)
JEMC : Janak Education Materials Centre
KMC : Kathmandu Metropolitan City
KU : Kathmandu University
KVA : Kilo Volt Ampere
LCD : Law and Convention Division
MOAC : Ministry of Agriculture and Cooperatives
MOF : Ministry of Finance
MOFSC : Ministry of Forest and Soil Conservation
MOHP : Ministry of Health and Population
MOICS : Ministry of Industry, Commerce and Supplies
MOLD : Ministry of Local Development
MOPE : Ministry of Population and Environment
MOWR : Ministry of Water Resources
MS : Mass Spectroscopy
MW : Megawatt
NARC : Nepal Agricultural Research Council
NAST : Nepal Academy of Science and Technology
NBSM : Nepal Bureau of Standard and Metrology
NEA : Nepal Electricity Authority
NEFEJ : Nepal Forum of Environmental Journalists
NES : National Education System
NESS : Nepal Environmental and Scientific Services
NFL : National Forensic Laboratory
NGOs : Non Governmental Organizations
NIP : National Implementation Plan
NPC : National Planning Commission
NPV : Nuclear Polyhedrosis Virus
NRCT : Nepal River Conservation Trust
NRs : Nepalese Rupees
NSC : National Seed Company
NSDS : National Sustainable Development Strategy
NTV : Nepal Television
OCB : Oil Circuit Breakers
ODS : Ozone Depleting Substances
PCBs : Polychnorinated Biphenyls
PCDD/F : Polychlorinated dibenzo-p-dioxins and dibenzofurans
PIC : Prior Inform Consent
PMTC : POPs Management Technical Committee
POPs : Persistent Organic Pollutants
PPD : Plant Protection Directorate

PRTR : Pollutant Release and Transfer Register
SAARC : South Asia Association for Regional Cooperation
SCISC : Steering Committee on the Implementation of Stockholm Convention
SEF : Save the Environment Foundation
SEJ : Society of Environmental Journalists
SHELGA : Society for Human right, Environment. Law and Governance Activities
SIIR : Shri Ram Institute for Industrial Research, New Delhi (India)
SOE : State of the Environment
SWC : Social Welfare Council
SWMRMC : Solid Waste Management and Resource Mobilization Centre
SWOT : Strengths, Weaknesses, Opportunities and Threats
TCD : Thermal Conductivity Detector
TCDD : Tetrachloro dibenzo-p-dioxin
TCDF : Tetrachloro dibenzo-p-furan
TLC : Thin Layer Chromatography
TU : Tribhuvan University
UNCCD : United Nations Convention to Combat Desertification
UNDP : United Nations Development Program
UNEP : United Nations Environment Program
UNFCCC : United Nations Framework Convention on Climate Change
UNIDO : United Nations Industrial Development Organization
UNITAR : United Nations Institute for Training and research
USD : US Dollars
UV-Vis : Ultra Violet and Visual Spectroscopy
VDCs : Village Development Committees
WEPCO : Women Environment Prevention Committee
WHO : World Health Organization
WP : Wettable Powder
WTO : World Trade Organization
WWF : World Wildlife Fund
µg/l : Microgram per liter

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National Implementation Plan on POPs

EXECUTIVE SUMMARY

The Stockholm Convention on Persistent Organic Pollutants (POPs) is an international treaty aimed at protecting human health and the environment from POPs chemicals. This Convention entered into force on 17 May 2004 and it ensures the environmentally sound management and the disposal of POPs wastes from the world. At present 12 chemicals including eight organochlorine pesticides (Aldrin, Chlordane, DDT, Dieldrin, Endrin, Heptachlor, Mirex and Toxaphene), two industrial chemicals (PCBs and Hexachlorobenzene) and two unintentionally produced chemicals (Dioxin and Furans) are listed as POPs chemicals, which due to their toxicity, persistence, tendencies of bioaccumulation and biomagnification and long distance transfer are posing serious threats to human health and environment.

Under the financial assistance of Global Environment Facility (GEF), an agreement was signed between the Government of Nepal, represented by the Convention Focal Point the then Ministry of Population and Environment (MOPE) (now Ministry of Environment, Science and Technology, MOEST) and United Nations Industrial Development Organization (UNIDO) on March 11, 2003 to undertake a project entitled "Enabling Activities to Facilitate Early Action on the Implementation of the Stockholm Convention on POPs in Nepal". The objective of this project is to assist the Government of Nepal to meet the Convention obligations and formulate and endorse its National Implementation Plan (NIP) on POPs. It also aims to strengthen national capacity and enhance knowledge and understanding amongst decision makers, managers, industry, NGOs and public at large on POPs.

The land-locked Nepal lies in South Asia between India and China with a population of 23.2 million (CBS 2001) and an average density of 157 persons/ km^2 (985.3 persons/km^2 in urban areas). The population growth rate was estimated at 2.24 per cent per annum between 1991 and 2001. This Himalayan country is divided into three broad ecological regions mountains (35%), hills (42%) and Terai lowland (23%). Nepal, based on the major river systems, is also divisible into three regions, viz, Koshi river system in the east, Gandaki River system in the middle and Karnali River system in the west.

About 20.2% of the total land is cultivated land, which supports more than half of the country's population. Terai (17% of the total land) in the south is the fertile land where 60% of the total grain is produced. Due to its varied topography Nepal has a wide variety of climates ranging from sub-tropical in the south to alpine in the northern mountains. The main rainfall is due to summer Monsoon, whereas winter is dry.

Nepal has a multiparty democracy. The country is divided into 75 districts grouped into 14 zones and five developmental zones. There are 3,912 Village Development Committees (VDCs) and 58 municipalities, including one metropolitan and three sub-metropolitan cities in the country.

Geographic challenges of the country have amplified economic challenges. About 81 per cent of the total population depends upon agriculture and use of agrochemicals (fertilizers and pesticides) is increasing to support the growing population. The Human Development Report 2005 (UNDP 2005) ranked Nepal 136 out of 177 countries in human development. Nepal Living Standard Survey 2003/04 showed that 32% of the population is living below the official poverty line.

Broadly, Nepal's environmental issues can be categorized into three levels: forest depletion, land degradation, solid waste management, water, and air pollution as the most significant issues requiring immediate attention; dwindling biodiversity, haphazard urbanization, forest fire, groundwater depletion, glacial lake outburst flood event, food security, and alternative energy can be classified as moderately urgent; and waning fisheries, decreasing biomass energy, transboundary movements of wastes, and noise pollution as the third level issues.

Soil pollution occurs due to the use of chemical fertilizers and pesticides as well as due to the use of effluent mixed waste water for irrigation. Water is getting increasingly polluted due to the industrial effluents, hazardous wastes dumped along the river banks, fertilizers and pesticides from the agricultural areas of the watershed.

Legal provisions on environmental management are very new in Nepal. Setting up of environmental standards and extended rules and regulations for enforcement and necessary institutional setting are gradually progressing.

Nepal is party of seventeen international conventions and signatory of five conventions. Basel convention on control of transboundary movement of hazardous wastes was already ratified by Nepal that came into force since 13th January 1997. The Nepalese Parliament ratified the Stockholm Convention on POPs on October 13, 2006. This National Implementation Plan (NIP) prepared by the MOEST is in line with the Stockholm Convention. Nepal has not yet singed the Rotterdam Convention on the Prior Informed Consent (PIC) Procedure and International Forum on Chemical Safety (IFCS).

Nepal has prepared a baseline inventory of POPs during 2004-2005. The first part of the National Implementation Plan (NIP) describes Nepal’s current situation regarding POPs. The second part contains the details of the actions which need to be carried out to meet all the obligations of the Stockholm Convention.

The annual import of pesticides during 2002 was almost 117591.10 kgs of active ingredients (a.i) and 176372.81 kg a.i. in 2003 with a value of NRs 183.535 million and 123.158 million respectively. Fortunately all were non-POPs pesticides only. However, the balance sheet and trend of import and use of pesticides in recent years indicate a sign of further accumulation of not used pesticides, which ultimately may become obsolete.

There are 74.5151 Metric tons of old stock of pesticides in Nepal, out of which about 10.058 m. tons were identified as POPs pesticides, whereas 23.610 M tons were found in mixed form, which after laboratory analysis were also confirmed to belong to POPs pesticides. The total amount of POPs pesticides thus increased to 33.668 M tons. This is 45 per cent of the total obsolete stocks of pesticides.

Nepal does not produce PCBs and dielectric fluids. The possible entry of PCBs in the country may be due to the grant assistance by the donor countries which have assisted Nepal in developing and installing Hydropower stations, transmission and distributin lines.

At present Nepal Electricity Authority and transformer manufacturing private companies in Nepal import/use PCBs free dielectric fluids, but the dielectric fluid and equipment contaminated and cross contaminated with PCBs are also present in significant quantity. About 106185.3 litres of PCBs contaminated transformer oil was found during the preliminary inventory.

PCBs seem to be a potential danger in terms of occupational health. Increased precautionary gears and awareness programs would improve the workers' health.

DDT is no more in use in Nepal and its import, distribution, sale and use has been prohibited since 2001. There is no possibility of its import and use legally, but because of the porous boarder with India, where DDT is still being produced and used, DDT may enter Nepal illegally. Since 1995 use of DDT in the health sector has been replaced with other non POPs pesticides, mainly synthetic pyrethroids. Thus, there is no need to file any exemption for import and use of DDT.

The preliminary inventory on Dioxins and Furans emissions (335.972 gTEQ) was made according to the methods recommended in the UNEP Standardized Toolkit for Identification and Quantification of Dioxin and Furan Releases. The major source of PCDDs and PCDFs releases is uncontrolled combustion. There is no specific legislation in place for controlling the releases of PCDD/F from commercial as well as non commercial sectors.

There are some regulatory frameworks for the management of pesticides and solid wastes, but none of the legislation sets levels for contamination for POPs chemicals in waste or products. Obsolete pesticides harbouring warehouses and their immediate vicinities can be taken as pesticides contaminated sites, but exact locations of pesticides burials in the past could not be identified. Temporary landfill sites and transformer workshops are also among the sites which may be contaminated by PCDD/F and PCBs. There is as such no remediation measure adopted for the POPs contamination sites in Nepal.

There is no intentional production and import of POPs chemicals currently either in industries, power distribution, in agriculture or public health in the country. There is no plan of using them in the future either. The generation of unintended PCDD/F from different sources is planned to be reduced through the implementation of this action plan.

Regular and systematic monitoring of POPs, except pesticide monitoring in food items, is lacking, but the findings of some studies give clear indication of the presence of POPs in the Nepalese environment quite above the recommended and permitted levels.

Nepal does not have any comprehensive public information policy and practices directly related to POPs issues. General public and even the authorities of stakeholder organizations were found to be quite unaware of the adverse effects of PCBs and PCDD/F.

About one fourth of all NGOs registered in Nepal have at least Environment Conservation as one of their main objectives. Very few of such organizations are undertaking research or awareness programs on POPs chemicals.

The analytical laboratories in the country have little experience in analyzing organo-chlorine residues in water, soil, sediment and vegetable samples both in private and public laboratories. However, no laboratory is equipped to analyze PCDD/F samples in the country.

Nepal has no declaration and reporting systems of the release of POPs. The POPs inventory gives preliminary information on the potential sources of POP chemicals, their amount of stockpiles and release into the environment, as well as the rough estimation of impacted populations and contaminated areas in Nepal.

The existing acts and regulations are not enough to address overall chemicals being imported and used in the country except for some chemicals specified in the laws, e.g. Pesticide Act 1991,

Pesticides Regulations 1994 have several provisions of registering, licensing and monitoring of pesticides and EPA 1997 and EPR 1997 have several provisions in giving clearance through IEE and EIA prior to importing and producing of any new chemicals.

Legal and institutional systems to regulate the import, production and use of hazardous and toxic chemicals are not effective as desired. EPA 97 and EPR 97 have made strong provisions for hazardous substance management demanding a full scale environmental assessment for the recycling and recovering waste containing hazardous substances and for projects dealing with production, import, sale of pesticides. Regarding POPs management there is no specific regulation in Nepal.

A SWOT analysis showed that Nepal has good professional and organization basis to fulfill the Convention obligations, but the laboratory (technical) basis is not adequate.

Barriers at policy and institutional levels as well as cutural and financial barriers can hinder the effective implementation of the NIP.

After assessing the inventory data and information, and discussion during priority validation workshops and endorsed by the Steering Committee Meeting, the following ten priority areas are identified for Nepal for safer and proper management of POPs:

Priorities for the management of Persistent Organic Pollutants (POPs) in Nepal

Activities	Final Priority
Pesticides • Safe packaging , safe storage, and disposal of obsolete pesticide • Remediation and site stabilization	1
PCBs • Manage stockpiles of PCBs and appropriate measures for handling and disposal of articles in use • Identification of Stockpiles of PCB contaminated article in use and waste • Ban on sell of PCB contaminated transformer oil	2
POPs • Public awareness raising, information and education	2
PCDD/F • Complete ban on elemental chlorine bleach to start with pulp industries • Integrated waste management policy, legislation with special reference to reduce, reuse, and recycle of wastes • Complete ban on open burning of kitchen and garden waste in municipality area aimed to put complete ban on open burning throughout the country	3
Legislative framework/ Capacity building • Institutional strengthening, legislation/policy formulation on POPs • Harmonization of sector legislation • Human resource development, research and development	4
Environmental monitoring (pre and post disposal)	5
BAT/BEP • Alternative energy program for household energy need	6
Promotion of intermediate technological solution on hazardous waste disposal	7
Release reduction from industrial process/establishment with the utilization of **CP/EE/EM technology**	8
Establishment of **electrical crematoria**	9

The MOEST, as the Focal Point to the Stockholm Convention, will implement the NIP supported by a POPs Officer, who will look after the POPs Unit established under the Law and Convention Division within the Ministry. Steering Committee on Implementation of Stockholm Convention (SCISC) will coordinate the implementation of the Action Plans, whereas POPs Management Technical Committee (PMTC), formed under the SCISC, will execute different action plans by employing Project Managers for different action plans. The service of the experts can also be taken as required.

The following table gives a summary of the major activities under the given actions to be undertaken for the disposal or reduction of emission or reduction in use of the POPs chemicals in Nepal.

Action Plans	Objectives	Activities
Institutional and regulatory strengthening measures	• Strengthened national institutions with interagency coordination • Strengthened and updated or amended regulations in line with Stockholm Convention • Open burning system and use of POPs generating chemicals banned • Expanded scope of alternate energy programs	• Establishment of the Enforcement Agency for Environmental Requirements • Establishment of Interagency Coordination Mechanism • Implementation of Action Plan on Stockholm Convention • Coordination and Cooperation between Basel, Rotterdam, Stockholm Conventions in Nepal • Cooperation and Coordination of Activities Concerning Promotion of BAT and BEP • Ban on the use of POPs containing materials • Ban on the use of chemicals potential for generating POPs • Ban on open burning of kitchen and garden waste in urban areas • Formulation/Amendment of Integrated Waste Management Policy and Amendment of SWMRM Act • Formulation of Hazardous Chemicals Management Rules • Harmonization of sector legislation • Establishing Information Education and Communication (IEC) System • Further strengthening and expanding the scope of alternate energy program for household & industrial use
Measures to reduce or eliminate releases from intentional production and use	• Harmonizing and amendment of relevant laws • Establishing and strengthening of relevant institution (MOEST and MOAC)	• Harmonizing of sectoral laws and amendment with respect to time requirement and in line with POPs convention Article 3 (point 3 & 4) and Annex D • Establishing and strengthening institutional aspect of both line ministries (MOAC and MOEST) for permanent set up of monitoring mechanism.
Production, import and export, use, stockpiles and wastes of Annex A POPs pesticides (Annex A, part I chemicals)	• Complete inventory of POPs pesticides prepared • Obsolete pesticides safely packaged, stored, and disposed and contaminated sites remediated and stabilized • Further accumulation of pesticides prevented	• Preparation and adoption of a strategy for complete inventory and collection of obsolete pesticides • Preparation and establishment of control mechanisms and cooperation of inspection bodies to oversee POPs wastes • Safe packaging and labelling and safe interim storage of obsolete pesticides until final disposal • Transport of obsolete pesticides and contaminated soil and containers to disposal site for disposal in line with Basel and Stockholm Conventions • Site stabilization and remediation • Establishment of a system for control of illegal import, application and balance between import and demand of pesticides
Production, import and export, use, identification, labelling, removal, storage and disposal of PCBs and equipment containing PCBs (Annex A, part II chemicals)	• Stockpiles of PCBs & PCBs contaminated articles in use and waste identified • Stockpiles of PCBs and PCBs contaminated articles managed and appropriate measures taken for their handling and disposal	• Updating of transformer database along with labeling and tagging of decommissioned and in use transformers • Collection of information on retrofilling • Construction of warehouses to store PCB wastes (articles and oil) • Replacement of PCBs contaminated oil and articles

	• Developed system for monitoring of contaminated areas and point sources	• Formulation of Guidelines for collection, storage, further use and transportation • Disposal of PCB wastes • Ask welding workshops to stop using old oil and to return • On-site testing by portable Test-kit • Control of illegal import and use of PCBs contaminated oil
Production, import and export, use, stockpiles and wastes of DDT (Annex B chemicals) if used in the country	***Nepal has already banned DDT***	
Register for specific exemptions and the continuing need for exemptions (article 4)	***Nepal has lodged no registration for any sort of exemption at presrnt***	
Measures to reduce releases from unintentional production (article 5)	• Complete and updated inventory of all Annex C POPs; • Increased awareness and skills among concerned people; • Established system / infrastructure for control of releases from unintentional production; • Established system for long-term permanent monitoring and reporting on the releases from unintentional production.	• Updating/revising inventory of Annex C POPs in Nepal • Household energy switch for controlling emission of PCDD/Fs • Capacity building activities • Controlling open burning of agriculture residues and forest fires • Establishment of Electrical Crematoria • Establishment of hazardous waste management facility • Establishing system for long-term permanent monitoring and reporting on Annex C POPs • Regulatory framework for release limit values • Economic instruments for release reduction
Measures to reduce releases from stockpiles and wastes (article 6)	• Prepared assessment of current situation with releases form stockpiles and wastes; • Established procedures for elimination of releases from stockpiles and wastes	• Identify and Mapping of Stockpiles, Products, and articles consisting of or containing chemicals listed either in Annex A, B and C. • Preparation of an Inventory of Sewage Treatment Plants Number of sewage treatment plants that are in the inventory • Determination of the extent of the contaminated areas and determination of the level of contamination • Establishment of procedures for elimination of releases from stockpiles and wastes • Preparation of economical analyses for the sustainability of the process of recycling-burning dumping technology
Identification of stockpiles, articles in use and wastes	• Prepared inventories of stockpiles, articles in use and wastes	• Preparation and adoption of a strategy for inventory completion • Preparation and establishment of control mechanisms and cooperation of inspection bodies to oversee stockpiles, articles in use and wastes • Development of schemes for positive influence in the business sector, having active roles and responsibilities in this area
Manage stockpiles and appropriate measures for handling and disposal of articles in use	• Prepared technical standards for handling and disposal of articles in use; • Developed a system for monitoring of handling and disposal of articles in use	• Preparation and adoption of a strategy for handling and disposal of articles in use • Development of schemes for positive influence in the business sector, having active roles and responsibilities in this area • Preparation and establishment of control mechanisms and cooperation of inspection bodies concerning handling and disposal of articles in use
Identification of contaminated sites (Annex A, B and C Chemicals) and remediation in an environmentally sound manner	• Prepared environmental assessment of contaminated areas; • Prepared strategy for contaminated areas recovery; • Realized decontamination activities	• Preparation of an implementation strategy for these activities • Preparation of a methodology of the assessment • Prioritization of contaminated areas for their recovery, taking into account mainly the impact of contamination on human health or its environmental risk

		• Preparation of technological and technical work procedures • Carrying out the decontamination activities
Facilitating or undertaking information exchange and stakeholder involvement	• Established National Focal and list of stakeholders prepared • Established system of information exchange between responsible the National Focal Point and the responsible	• Preparation of institutional and technical set up to establish National Focal Point • Preparation of stakeholders list • Development of a system for collection and exchange of information • Definition of formats for information exchange on POPs
Public awareness, information and education (article 10)	• Educated and trained government officials for implementation of the Convention • Educated and trained business sector representatives for implementation of the Convention • National education system incorporated POPs information and disseminated through education (curricula) • Educated general public for principles and objectives of Stockholm Convention	• Preparation and realization of training for government officials of different levels for implementation of the Stockholm Convention • Preparation and realization of training for business sector representatives • Educational activities focusing on POPs , their sources, applications, uses and hazards and management of POPs wastes • Preparation and implementation of countrywide information and educational campaign concerning hazards of POPs
Effectiveness evaluation (article 16)	Not applicable at present	
Reporting	• Information on POPs emission and release levels and on the progress in the implementation reported to the Convention to meet its obligations	• Preparation of national reports for the Conference of the Parties to the Convention; • Inventory reports on POPs emission and release • Preparation of reports on progress in the elimination of PCBs; • Development of data collection system concerning different activities and POPs emissions from different sources
Research, development and monitoring (article 11)	• Established network for cooperation, data and information exchange of scientific institutions involved in POPs research activities in home or in the region; • Established and adopted an internationally accepted system of standardization of methods for residue analysis in abiotic and biotic matrices; • Developed system of quality assurance and quality control in Nepalese laboratories	• Preparation of an inventory of institutions involved in POPs research activities • Establishment of new and strengthening of existing labs at national level • Establishment of a network for cooperation, data and information exchange among these institutions • Establishment of internationally accepted system • Development of scheme for adoption of the system by research/ scientific institutions • Development of standards for quality assurance and control • Development of scheme for adoption of the standards by scientific institutions
Technical and financial assistance (articles 12 and 13)	Plan will be developed later	

One of the main obstacles in immediate disposal or reduction in release/emission of POPs in Nepal is the inadequate infrastructure and capacity presently available in the country.

For the regular updating of the inventory of POPs-containing articles or POPs-contaminated wastes or POPs emitting sources substantial technical and financial support will be required. Nepal can manage this part of the task with the available professionals, but the financial resources are still inadequate.

Countrywide and massive awareness raising campaign in different forms and through different fronts is an urgent task demanding additional professional support and financial resources.

Issue specific action plans with priority activities are developed to indicate the areas where key investments are required. Further areas in which support from donors or from bilateral cooperation will be required will be included in the updated versions of the NIP.

A timetable to carryout different action plans of the NIP is prepared considering the present facilities and future developments of the required infrastructures and capacities.

A total of USD 41,856,260 is estimated to be required for a period 2007 to 2028 to carry out different activities while implementing the NIP. Contributions from state budget, bilateral or multilateral supports and donor assistance and also from industry sectors will be used to meet these huge expenses. About USD 2,738,260 proposed for coordination activities during the implementation of NIP is also included in this total amount.

1. Introduction

Under the financial assistance of Global Environment Facility (GEF) an agreement was signed between the Ministry of Population and Environment (MOPE) and United Nations Industrial Development Organization (UNIDO) on March 11, 2003 to undertake a project entitled "Enabling Activities to Facilitate Early Action on the Implementation of the Stockholm Convention on Persistent Organic Pollutants (POPs) in Nepal". The Nepalese Parliament has recently ratified the Stockholm Convention on POPs, which was signed on 5 April 2002. The objective of this project is to assist the Government of Nepal to meet its obligation under article 7 of the Stockholm Convention to prepare and endorse its National Implementation Plan (NIP) on Persistent Organic Pollutants (POPs). It also aims to strengthen national capacity and enhance knowledge and understanding amongst decision makers, managers, the industry, NGOs and public at large on POPs and formulate a National Implementation Plan.

1.1 Stockholm Convention, its aims and its obligations

The Stockholm convention on POPs is an international treaty among countries aimed at protecting human health and the environment from POPs. The Convention is the outcome of the commitment of the international community to protect human health and the environment from POPs. Once in force it sets a goal of ending the release and use of 12 most dangerous POPs, namely eight organochlorine pesticides (Aldrin, Chlordane, DDT, Dieldrin, Endrin, Heptachlor, Mirex and Toxaphene), two industrial chemicals (PCBs and Hexachlorobenzene) and two unintentionally produced chemicals (Dioxin and Furans). The Convention was adopted on May 23, 2001 by 92 States and European Community in Stockholm, Sweden. The said convention is designed to commit governments to proceed towards control and bans on the production, generation and use of a pernicious group of pesticides and industrial chemicals and emissions of unintended by-products and promotes and requires appropriate substitution with cleaner products, materials, processes, and practices. It will likewise ensure the environmentally sound management and disposal of POPs waste. The convention entered into force on May 17, 2004.

1.2 The key objectives of the Convention

- Eliminate the production and use of specific POPs: aldrin, chlordane, dieldrin, endrin, heptachlor, hexachlorobenzene, mirex, and toxaphene. There are exceptions for PCBs in use, and certain other limited exemptions.
- Restrict the production and use of DDT, which is to be used only for disease vector control in accordance with WHO guidelines.
- Restrict exports of POPs.
- Develop strategies for identifying stockpiles of POPs and products containing POPs.
- Take measures to ensure that POPs wastes are managed and disposed off in an environmentally sound manner according to international standards and guidelines (e.g., the Basel convention on the control of trans-boundary movement of hazardous wastes and their disposal).
- Endeavour to identify POPs-contaminated sites for possible remediation.
- Ensure that PCBs are managed in an environmentally sound manner and, by 2025, take action to remove from use PCBs found above certain thresholds.

- Develop and implement an action plan to identify the sources and reduce releases of POPs by-products. Promote the use of best available techniques (BAT) and best environmental practices (BEP).

The Stockholm Convention has five essential aims:

i. Eliminate dangerous POPs, starting with the 12 worsts
ii. Support the transition to safer alternatives
iii. Target additional POPs for action
iv. Clean-up old stockpiles and equipment containing POPs
v. Work together for a POPs – free future

1.3 Provisions of the Stockholm Convention

The Article 3 of the convention requires to follow appropriate measures to reduce or eliminate releases from intentional production. Each party shall prohibit and/or take the legal and administrative measures necessary to eliminate production and use of the chemicals listed in Annex A. Similarly, the import and export of the chemicals listed in Annex A should be prohibited in accordance with the provision of Paragraph 2 and also restrict the production and use of chemicals listed in Annex B in accordance with the provision of that Annex. A country should review the current list of registered chemicals and phase out use and or production of materials, which exhibit properties of POPs as described in Annex D and any exemptions granted should minimize or eliminate any potential exposure to humans and the environment.

The convention gives governments until 2025 to phase out "in–place equipment" such as electrical transformers and capacitors containing polychlorinated biphenysls (PCBs), as long as the equipment is maintained in a way that prevents leaks. It grants them another three years to destroy the recovered PCBs. The recovered PCBs must be treated and eliminated by 2028. PCBs can eventually be eliminated, but this will require additional money and know-how. Equipment containing PCBs is dispersed widely across the countryside, notably along electric power-line grids. Safe destruction or containment of PCBs requires special measures and high-tech equipment. With current technologies and facilities, only limited amounts can be dealt with at a time.

Article 4 of the convention has provision for register of specific exemptions listed in Annex A or Annex B. Any party by means of a notification in writing to the Secretariat, register for one or more types of specific exemption listed in Annex A or B. It limits the production and use of DDT for controlling mosquitoes and other disease vectors in accordance with WHO recommendations and guidelines and only when locally safe, effective and affordable alternatives are not available. Use of DDT will be carefully regulated and monitored and must be publicly registered.

According to the article 5 of the convention each party should take measures to reduce or eliminate releases from unintentional production i.e. release derived from anthropogenic sources of each chemical listed in Annex C with the goal of continuing minimization and, where feasible, ultimate elimination. There is also need of developing an action plan within two years of the date of entry into force of convention and evaluate the current and projected releases taking into consideration the source categories identified in Annex C.

It will require governments to take steps to reduce the release of dioxins, furans, hexachlorobenzene and PCBs as by-products of combustion or industrial production, with the goal of their continuing

minimization and where feasible, ultimate elimination. Governments are to develop action plans within two years of the convention's entry into force and promote the use of best available techniques and best environmental practices. By signalling governments and industry that certain chemicals have no future and at the same time respecting their legitimate short-term concerns, the convention will stimulate the discovery of new, cheap and effective alternatives to the world's most dangerous POPs

Article 6 of the convention requires taking the appropriate measures to reduce or eliminate releases from stockpiles and wastes containing chemicals listed either in Annex A or Annex B or annex C. These chemicals should be handled, collected, transported and stored in an environmentally sound manner and dispose in such a way that the POP content is destroyed and identify the sites contaminated by chemicals listed in Annex A or Annex B or Annex C. The convention will not allow recovery, recycling, reclamation, direct reuse or alternative uses of POPs and it will prohibit their improper transport across international boundaries.

It will immediately ban all production and use of the pesticides endrin and toxaphene in countries that have ratified the convention. Those who are parties to the Convention should stop producing the pesticides aldrin, dieldrin, and heptachlor and those wishing to use remaining supplies require registering publicly for exemption. Countries with exemptions will have to restrict their use of these chemicals to narrowly allowed purposes for limited time periods. The need for exemption is to be periodically reviewed. It will limit the production and use of chlordane, hexachlorobenzene and mirex to narrowly prescribed purposes and to countries that have registered for exemptions and exemptions expire after five years. It will restrict imports and exports of the 10 intentionally produced POPs, permitting them to be transported only for environmentally sound disposal or for a permitted use for which the importing country has obtained an exemption.

According to the article 7 each Party shall develop and endeavour to implement a National Implementation Plan (NIP) for the implementation of its obligation under this convention, within two years of the date on which this Convention enters into force, and integrate NIP into national plan and national sustainable development strategies.

Each party may submit a proposal for listing a chemical in Annexes A, B and /or C as per Article 8. As per Article 9 and 10, each party shall facilitate or undertake and promote the exchange of information, through national action plans, amongst national focal points. It seeks to increase public awareness of the dangers of POPs, provide up-to-date information on these pollutants, launch educational programs, train specialists and develop and disseminate alternative chemicals and solutions.

Article 11, calls on governments to encourage and to undertake further research on POPs, to monitor the health effects of the 12 chemicals and to exchange information, which will be useful for countries with limited medical and environmental-protection resources. The convention will also arrange for developed countries to provide technical and financial help to poorer nations in these fields. It will set up a worldwide mechanism for monitoring data on POPs

1.4 National Implementation Plan (NIP)

Article 7 of the Convention explicitly mentioned that every party should develop and implement National implementation Plan (NIP) as an obligation of the Convention. The NIP and specific action plans are based on the findings of the assessment and inventory reports. The basic goal of the NIP is to:

- Develop national system for the environmentally sound management of chemicals, including legislation and provision for implementation and enforcement.
- Develop the database of the POPs chemicals in Nepal regarding export, import, production, use and stockpiles.
- Assess the mechanism for eliminating the production and accidental release of POPs to the environment.
- Identify provision of a control system on the import of POPs chemicals and improvement of the knowledge and capability of human resources,
- And also develop proposal for adoption of alternative technologies and disposal plan.
- The action plan, which will be prepared under NIP, will identify the urgent and high priority issues, cost and benefit options and strategy for information exchange and education strategy.

2. Country baseline

2.1 Country Profile

2.1.1 Geography and population

Nepal, a Himalayan country which extends from east to west, lies in South Asia between India and China (Figure 2.1) with a population of 23.2 million (CBS, 2001). The country has a length of 885 km from east to west and an average width of 193 km from north to south. The nearest point in Nepal from the sea is about 960 km away. Nepal is among the 27 least developed countries and 15 land-locked countries of the world. The country is divided into three broad ecological regions (1) Mountains (2) Hills and (3) Terai lowland, covering 35 percent, 42 percent and 23 percent respectively of the country's total area (CBS 1999). On the basis of major rivers and their tributaries, Nepal can be divided into three regions, namely Koshi river system in the east, Gandaki River system in the middle and Karnali River system in the west.

Figure 2.1: Location of Nepal in Asia region

Table 2.1: Areas and Population by Physiographic Region

Physiographic region	Area		Number of districts	Population Census, 2001 (in million)		Population Density (Persons/ Km^2)
	Km^2	%		No.	%	
Mountains	51,817	35.2	16	1.688	7.29	33
Hills	61,345	41.7	39	10.251	44.28	167
Terai	34,019	23.1	20	11.212	48.43	330
Total	147,181	100	75	23.151	100.00	157

Source: MOPE, 2001; Population Census Report, 2001

Nepal is predominantly rural since approximately about 85 per cent of the population of 23.151 million lives in the rural areas. The population growth rate is estimated at 2.24 per cent per annum between 1991 and 2001 with about 7.29, 44.28 and 48.43 per cent of the population living in the Mountains, the Hills and the Terai, respectively (Table 2.1). Based on the population of 2001, a total of 4.2 million households having an average household's size of 5.44 were recorded. The population

density is about 330 persons/km^2 in the Terai, 167 persons/km^2 in the Hills and only about 33 persons/km^2 in the Mountains. However the population density has reached to 985.3 persons/km^2 in the year 2001 in the urban areas. For 2001, the crude birth and death rates are estimated at 33.06 and 9.62 per thousand populations respectively, with the total fertility rate of 4.2. The infant mortality rate has declined from 97.5 in 1991 to 61.5 in 2001 and life expectancy rate has increased from 54 to 59.7 years during the same period (CBS, 2001).

Land

About 97 per cent of the total area is covered by land. Although the mountain region covers over one third of the total area (Table 2.2), land suitable for cultivation is only 2 per cent. Out of the total hill area, about one-tenth is considered suitable for cultivation while the Terai area is fertile and is a food production centre of the country. It indicates that about 23 per cent of the total area support for nearly half of the total population. The percentages of cultivated land, forests (including shrub land) and miscellaneous type of land (mountains, rivers and urban areas) account for 20, 39 and 41 per cent, respectively of the total land area.

Table 2.2: Land Use Patten

Land Use Type	Area (*1000 ha)	Percentage
Cultivated land	2,969	20.2
Non-cultivated land	987	6.7
Forests	4,269	29.0
Shrub land/degraded forests	1,559	10.6
Grassland	1,757	12.0
Others	3,167	21.5
Total	14,718	100.0

Source: MOPE, 2001; MOFSC, 1999; and MOAC, 2001.

The altitude varies from 60m in the south to 8848 m high Mt. Everest in the north. Nepal has flat land in the south, hills and valleys in the middle and lofty Himalayas in the north.

The Southern part (low land) occupies about 17% of the total land area. It is fertile with alluvial soil and produces about 60% of the total grain production of the country. The central part of the country has moderate size mountains ranging from 1000 to 3000m having warm to cold temperature climate. The hill slopes are terraced for cultivation and forests cover the remaining land. Most of the rivers are located in this zone. About 52% of the total population of the country live in this zone. Kathmandu valley is a flat-bottomed valley and covers an area of about 351 sq. km. Kathmandu is the capital of the country with an average altitude of 1330 m.

The northern part of the country has high mountains. About 4% of the country is covered with snow. Most of the land is not suitable for agriculture and vegetation is confined up to an altitude of 5500m.

Climate

Nepal has a wide variety of climate ranging from sub-tropical in the south to alpine in the northern mountains due to its varied topography. The variation of topography is responsible for a wide range of climatic conditions of Nepal. It varies from the freezing cold to the sweltering heat. The average annual rainfall in Nepal is about 1600 mm but the actual amount differs in different climatic zones. The country records a range of 44.1º C to –17.9º C temperature.

The first season is hot and monsoon prevails from June to September, during which average maximum precipitation of 1530 mm occurs. This season ascends for about 80 percent of the total annual precipitation in Nepal. The second season is the post- monsoon season lasting roughly through the month of October. This season is characterized by warm weather. The third is the pre- monsoon season, extending roughly from the month of March to May. These months are hot and dry. About 15 percent of the total precipitation falls in pre and post monsoon season, and the remaining 5 percent during the winter months (December – February). There is a significant variation in precipitation distribution and it ranges from less than 200 mm to 5,200mm. The distribution of rainfall over the country is spatially varied due to topographical orientation and vertical extension, and generally decreases from east to west with a few exceptional cases in the west. The land towards the south of the high Himalayas gets most of the rain whereas its northern part gets very little or no rain while its Northern part receives very little or no rain and exhibits the rain shadow effect. The temperature in Nepal generally decreases from the south to the north with some exceptions in the valleys and tars (upland plains) of the hills. On an average, the mean temperature is less than 3ºC in the mountains, and exceeds 30ºC in July while the mean temperature is below 18 degree Celsius in January even in the lowland plains.

Political and economic profile

Nepal is a land-locked country with multiparty democracy and bordering India to the East, West and South and China to the North and has a total land area of 147,181 km^2 ranging in altitude from less than 100 meters in the South to 8,848 meters to the North. The country is divided into 75 districts grouped into five developmental zones with 16 districts Mountain Region, 39 districts in the middle (hills) and 20 districts in the southern plains. Administratively, the districts are divided into 3,912 Village Development Committees (VDCs) and 58 municipalities, including one metropolitan and three sub-metropolitan cities.

Figure 2.2: Political Map of Nepal

In addition to geographic challenges, Nepal also must contend with extensive poverty. The Human Development Report 2005 (UNDP 2005) ranked Nepal 136 out of 177 countries in human development, and indicated that 32% of the population is living below the official poverty line.

Agriculture is the mainstay of economic activity in Nepal. About 81 per cent of the total population depends upon agriculture for subsistence living. Agricultural land is also affected by the uneven use of agro-chemicals such as chemical fertilisers and pesticides. The consumption of chemical fertiliser increased from 2,069 tons in 1965/66 to 185,797 tonnes in 1994/95. Although the maximum national average consumption of chemical fertilizer is low, its inappropriate use has increased soil acidity in a number of places, particularly due to high doses of acidic fertilisers. There are cases of contamination of pesticides such as DDT in food items.

A household survey by the World Bank estimated that the poverty line is about NRs. 4000 (USD 77) per capita per annum. This covers a basic calorie intake, housing and various non-food items. The incidence of poverty varies substantially, reflecting the wide variation in living costs. In the lowlands and hills around 42% of the population live below the poverty line, but the proportion is much higher in the western zone than in the eastern. In the mountains, 57% of the population live below the poverty line. Landless marginal and small farmers comprise the 89-96 percent of those living below the poverty line in rural areas

Annual per capita GDP and GNP for the fiscal year 1999/2000 are estimated at NRs. 16,681 and NRs. 17,284 respectively (MOAC 2000). Some indicators portraying the low level of social development are:

- A life expectancy of 54 years;
- An infant mortality rate of 98 per thousand;
- An adult literacy rate of 31 percent with female literacy rate of 13 percent and
- A daily calorie intake of 1,957 cal per capita (IFAD, 1998).

Profiles of economic sectors

Over the past three decades, Nepal's economy has been growing at an average pace of about 4 per cent, which only marginally exceeds the rate of population growth of 2.37%. The growth rate in the agricultural sector over the same period is even smaller, less than 2.5%, which has shown inconsistent behavior over the years, probably reflecting overwhelming dependence on the monsoon. The slower rate of agricultural growth is largely responsible for the existing higher poverty incidence and severity of it in the rural areas.

Environmental overview

Nepal is endowed with rich natural and cultural diversity. It extends from the flat plains of the Terai to the lofty peaks of the world’s tallest mountains. This varied geographic setting brings both complexity and opportunity for environmental management and sustainable development.

Mountain populations, much more than lowland population, have evolved economically, socially and biologically sustainable degree of equilibrium or balance in close relationship with their physical environment, which is now threatened.

Nepal is facing two broad categories of environmental problems. The rural areas face the problems of soil erosion, landslide, flood, scarcity and unsafe drinking water, and low calorie intake, which are

broadly associated with forest depletion watershed degradation and decline in agricultural production. The urban areas experience environmental pollution of varying magnitudes. In a broader perspective, Nepal's environmental issues can be divided into three caegories based on their urgency. Among the first level (most urgent) issues are: forest depletion, land degradation, solid waste management, water, and air pollution can be considered most significant issues requiring immediate attention. Among these issues, the first two issues reflect the rural problems, while the later three are more concerned with the urban environment. Similarly, in the second level are an additional eight issues (dwindling biodiversity, land degradation, haphazard urbanization, forest fire, groundwater depletion, glacial lake outburst flood event, food security, and alternative energy), which can be classified as moderately urgent from view of management. In the third level are issues such as waning fisheries, decreasing biomass energy, transboundary movements of wastes, and noise pollution (Table 2.3).

Table 2.3: Prioritization of Significant Environmental Issues

Most Urgent (5 issues)	**Moderately Urgent (8 issues)**	**Less Significant but still Significant (4 issues)**
• Forest depletion • Land degradation • Solid waste management • Water management • Air pollution	• Dwindling biodiversity • Desertification • Haphazard urbanization • Forest fire • Groundwater depletion • Glacial lake outburst flood events • Food security • Alternative energy	• Waning fisheries • Decreasing biomass energy • Transboundary movement of wastes • Noise pollution

(UNEP, 2001)

Soil pollution due to use of chemical fertilizer and pesticides is now getting serious concern in intensively cultivated agricultural land near to the market and road network mainly around the major highways. However, due to irrigation of chemically polluted water from industries soil pollution is observed in the pocket areas.

Water is increasingly getting polluted due to the disposal of industrial effluent, hazardous wastes in the river systems, mixing of fertilizers and insecticides and pesticides from the agricultural area of the watershed through the process of soil erosion.

Sporadic studies on water quality indicate degradation in the quality of river and drinking water. There is biological contamination in drinking water. The Bagmati River, which drains the Kathmandu valley, is among highly polluted at different stretches due to discharge and /or disposal of organic and inorganic wastes. The water is unfit for human consumption as well as for aquatic life. The holy river Bagmati is biologically dead due to discharge of such domestic and industrial wastewater in the stretch flowing through urban areas.

As per report, industrial wastewater is directly discharged into the terrestrial and aquatic systems without any treatment. This contains high load of oxygen demanding waste, disease causing agents, synthetic organic compounds, plant nutrients, inorganic chemicals and minerals and sediments.

2.2 Institutional, policy and regulatory framework

2.2.1 Environmental policy, sustainable development policy and general legislative framework

Government of Nepal is taking steps towards sustainable development with policies in place regarding environmental management. Most of the legal provisions on environmental management

are very new. Some require setting up of environmental standards and others require extended rules and regulations for enforcement and necessary institutional setting. Nepal has ratified the "Basel Convention on transboundary movement of hazardous wastes", which came into force since January 13, 1997. On October 13, 2006, the Nepalese Parliament ratified the Stockholm Convention on POPs, which was signed on April 5, 2002.

The Tenth Plan (2002-07), also known as Poverty Reduction Strategy Paper (PRSP), has identified that poverty has continued to be the biggest challenge for the development of the country. In order to reduce poverty, focus has been given to agriculture development, private sector involved in development through the adoption of open and market based economic policy and promotion of social inclusion in every sector of development. The government agencies have been envisaged to be the facilitators and regulators than the agent of development themselves. The objectives of Tenth Plan for environment protection admits that the sustainable development is possible only when environmental aspects are given due consideration in economic development process. Another objective is to promote wider public participation in the urban environmental pollution control activities as well as in keeping rural areas clean, green and beautiful.

The Sustainable Development Agenda for Nepal, 2003 not only sets goals of national development for next 15 years based on the trend of recent past, but also describes the pathways to achieving the goals, detailed objectives, followed by necessary government policies. Due to cross cutting linkages, the discussion is grouped into broad topic themes which are income, health, education, institutions and infrastructure, forest ecosystems and biodiversity and security. Many of these objectives are to be fulfilled through policies in multiple sectors, while policies in individual sectors will contribute to achieving multiple objectives.

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) and controlling institutions

Different stakeholder ministries and organizations have shared responsibility of the management of chemicals including POPs during different stages.

Table 2.4: Inter-Ministerial responsibilities on POPs

Stages / Ministries	Trade	Production	Use	Transport	Unintentional production	Waste import / Export	Waste Disposal	Policies
Environment, Science & Technology	x	x	x	x	x	x	x	x
Agriculture and Cooperatives	x	x	x				x	x
Industry, Commerce & Supplies	x	x	x		x		x	x
Health and Population	x		x				x	x
Water Resources – NEA	x	x	x	x		x	x	x
Labor, Transport & Commerce		x	x	x	x		x	
Local Development (Municipalities & SWMRMC)		x	x		x		x	x
Physical Planning & Works		x			x			
Finance-Custom Office	x					x		
National Organizations								
National Planning Commission								x
Environment Protection Council								x

Table 2.5: Responsibilities of different Divisions/Sections of the Ministry of Environment, Science & Technology and their contributions to the Implementation of the Stockholm Convention

Divisions & Sections	Roles – Main responsibilities	Foreseen contribution to POPs Management
Environment Division		
EIA Section	• Formulate plans, policies, strategies, guidelines and programs to manage/conserve natural resources • Implementation of EIA	• Control over POPs releasing activities (restricting implementation) • Monitoring of industries
Environmental Standards & Monitoring Section	• Decide Environmental quality standards • Compliance evaluation and monitoring of standards • Form short term and long term programs on pollution control • Advise on implementation of international conventions and agreements elated to pollution control • Act as Focal Point for ministry on policy, legal and technical aspects of pollution control and mitigation	• Statistical data on POPs • Enforcement of legislation on POPs (including bans, restriction of production and use of POPs and emission limits from unintentional sources) • Waste disposal • Import, Export, transport of waste POPs
Environment Promotion & Extension Section	• Act as Secretariat of Environment Protection Fund (EPF) • Develop EPF with support of the government, national and international organization for environmental protection • Capacity building • Raise public awareness on environmental issues • Initiate public participation on environmental conservation and promote green consumerism	• Contribution in providing fund for implementation of the Convention • Awareness, education and public information on POPs • Human resources development for POPs implementation
Planning Evaluation & Administration Division		
Policy Formation & Coordination Section	• Policy formation • Monitoring and evaluation • Coordination within the ministry • Promote contact, maintain relationship and coordination with international organizations	
Law and Convention Division		
Law Section	• Prepare drafts of new regulations • Provide legal advice on conventions, bilateral programs, and international commitments • Initiate the process to become party to international conventions related to environment	• Focal point for Stockholm Convention • Seek fund from international organizations for POPs disposal • Formulate new rules and regulation on hazardous wastes and POPs chemicals
Science & Technology Promotion Division		
Research and Development Section	• Identify new technology suitable for the country • Support research institutions/ organizations	• Human resource development
Technology Transfer Section	• Form policy on technology transfer • Coordinate with foreign institutions and implement the program on technology transfer	• BAT and BEP technology

Budget of the Ministry of Environment, Science and Technology (for fiscal year 2006-07)

The total budget allocated to this ministry is NRs. 53.436 million (USD 722 108), which constitutes only 0.037 % of the national budget (NRs. 143912.3 million) in the fiscal year 2006-07.

Table 2.6: Budget allocation (in NRs. thousand) of the MOEST for Fiscal Year 2006-07

Source of Funding	Administration	Environment Div.	Science & Technology	* Figures in brackets indicate the percent allocation of the budget within the ministry
Government of Nepal	11486	20050	21650	
Donations/Aids	--	250	--	
Total	11486 (21.5%)*	20300 (38.0%)*	21650 (40.5%)*	

This budget allocation shows that the environment, science and technology are not a national priority at present, but it is expected that this will change in the future.

2.2.3 Relevant international commitments and obligations

The Basel convention on the control of transboundary movements of hazardous wastes and their disposal was adopted in 1989 in response to concerns about toxic wastes from industrialized countries being dumped in developing countries. It came into force in 1992. Convention's principal focus was the elaboration of control on the "transboundary" movement of hazardous wastes, and the development of criteria for environmentally sound management of the wastes. Nepal has ratified the convention on August 15, 1996 and the provisions of the convention are fully effective in Nepal since January 13, 1997.

The Basel convention calls for international cooperation between parties in the environmentally sound management of hazardous wastes and the improvement of national capabilities to manage hazardous waste in an environmentally sound manner as well as for the development of technical and legal infrastructure including needed legislation and regulations. Training, education and public awareness are considered to be important elements in the development of the countries' capability. Where a lack of resources is observed, technical assistance should be provided through the sub-regional and regional centres as well as the Secretariat of the Basel Convention. Nepal has signed the Stockholm Convention on POPs on April 5, 2002 and developed the National Implementation Plan (NIP) under Stockholm Convention. The Nepalese Parliament recently ratified the Stockholm Convention on POPs on October 13, 2006 and Nepal is now in the process of becoming its Party. Nepal has not yet signed the Rotterdam Convention on Prior Informed Consent (PIC) Procedures and International Forum of Chemical Safety (IFCS).

Table 2.7: List of International Conventions ratified or initiated for ratification by Nepal

S. No.	Title of the International Conventions	Ratification/ Signing Date
Conventions to which Nepal is a Party		
1.	Convention on High Seas	December 28, 1962
2.	Treaty Banning Nuclear Weapon Test in the Atmosphere, in Outer Space and Under Water	October 7, 1964
3.	Plant Protection Agreement for the South East Asia and Pacific Region, 1956	August 12, 1965
4.	Treaty on Principals Governing the Activities of States in the Exploration and Use of Outer Space including the Moon and Other Celestial Bodies	October 10, 1967
5.	Treaty on the Prohibition of the Emplacement of Nuclear Weapons and other Weapons of Mass Destruction on the Seabed and the Ocean floor and in the Subsoil thereof	July 6, 1971
6.	Convention on the Prevention of Marine Pollution by Dumping of Waste and Other Matter	January 1, 1973
7.	Convention on the International Trade in Endangered Species of Wild Fauna and Flora (CITES)	June 18, 1975
8.	Convention for the Protection of the World Cultural and Natural Heritage	June 28, 1978
9.	Convention on Wetlands of International Importance especially as Water Fowl Habitat (Ramsar Convention)	December 17, 1987
10.	Agreement on the Network of Aquaculture Centres in Asia and Pacific	January 4, 1990
11.	International Tropical Timber Agreement (ITTA)	July 3, 1990
12.	Convention on Biological Diversity (CBD)	November 23, 1993
13	United Nations Framework Convention on Climate Change (UNFCCC)	May 2, 1994
14.	a. Vienna Convention for the Protection of the Ozone Layer	April 6, 1994
	b. Montreal Protocol on the Substance that Deplete the Ozone Layer	July 6, 1994
	c. London Amendment to the Montreal Protocol on Substance that Deplete Ozone Layer	July 6, 1994
15.	Basel Convention on Control of Trans-boundary Movement of Hazardous Waste and their Disposal	August 1996
16.	United Nations Convention to Combat Desertification in those Counties Experiencing Serious Drought and/or Desertification, Particularly in Africa (UNCCD)	September 10, 1996
17.	Kyoto Protocol	April 19, 2005
Conventions to which Nepal is a Signatory		
1.	Convention of Fishing and Conservation of the living Resources of the High Seas	April 29, 1958
2.	Convention on Continental Shelf	April 29, 1958
3.	Convention of the Prohibition of the Development, Production and Stockpiling of Bacteriological (biological) and Toxic Weapons and on their Destruction	October 10, 1972
4.	United Nations Convention on Law of Seas	December 10, 1982

5.	**Stockholm Convention on Persistent Organic Popputants (POPs)#**	October 13, 2006
MOU signed between the MOEST (previously MOPE) and International Organizations		
1.	MOU regarding the Implementation of Project Atmospheric Brown Cloud (ABC) in Nepal between MOPE, Regeants of University of California, Scripps Institute of Oceanography University of California, UNEP-RRCAP and ICIMOD	August 31, 2004
2.	MOU between UNEP and MOPE regarding Preparation of National Sustainable Development Strategy (NSDS) and Establishment of Multi-Stakeholders Mechanism for NSDS	June 24, 2004
3.	MOU between MOPE, ICIMOD and UNEP for Preparation of Kathmandu Valley City IEA/SOE Report	September 2004

#The Nepalese Parliament has recently ratified this Convention and further steps in becoming a Party is in process.

Nepal, as member of the SAARC countries, is working under Male Declaration on Transboundary Movement of Air Pollution.

2.2.4 Description of existing legislation and regulations addressing POPs (manufactured chemicals and unintentionally produced POPs)

The Solid waste (Management & Resource Mobilization) Act, 1987 was formulated for the management of solid waste, including the categorization and management of hazardous waste, in the Kathmandu Valley. Although this first attempt to regulate waste management was very good, due to absence of specific provision for the management of the hazardous waste it will not be sufficient to address the provision of the Basel Convention, Stockholm Convention and other convention related to management of chemicals in an environmentally sound manner.

Environmental Protection Act (1997) and Environmental Protection Rules (1997) were formulated to reduce adverse impacts on the environment and ensure the proper use of natural resources for environmental conservation. The Act is the first attempt by the government to deal specifically with environmental issues. The Act and Rules empower the authorities to control the management of the waste in very broad terms and lack of itemized provisions for the wastes related to Basel Convention. Specific standards, authorization for management and handling and requirements of environmentally sound management of hazardous wastes are not put in place.

The existing legislations have defined waste in very broad terms. Nepal has no comprehensive National Policy and strategy for waste management nor does it have a National waste act and rules to cover the hazardous waste definition and management including transboundary movement (Adhikari and Pokhrel, 2004). As a consequence pursuant to paragraph 1 of Article 3, Nepal is yet to inform the Secretariat of the convention of the waste, other than those listed in Annex I and II and any requirements concerning transboundary movement procedure applicable to such wastes (Adhikari and Pokhrel, 2004). Government has powers to regulate the waste and waste management but in the absence of itemized details of the provisions in rules and backup guidelines, the Environmental Protection Act and Environmental Protection Rules are as good as non-existent. So far Nepal does not have any policies or regulations specifically dealing with hazardous waste. Some ad hoc policies, for example, the Cabinet decision to ban production of plastic bags thinner than 20 μm, addresses only the waste management part of plastic bags. It probably was not considered that upon burning the thicker bags, more dioxins would be released.

Although the Environmental Protection Act and Regulations have been in effect, they have not been effectively implemented because MOPE has not yet issued sufficient environment standards and it does not have the manpower to implement the Regulations. Furthermore, the government has yet to develop more specific regulations for water quality, solid waste management and hazardous waste management.

Industrial Enterprises Act, 1991 was promulgated, to promote and regulate industrial development in Nepal and has listed some industries as "industries affecting safety, public health and environment" and made special provisions for their establishment. The Act, however, does not address the issue of industrial pollution. No references have been made to compliance of environmental standards by industries or monitoring of environmental impacts.

Labor Act, 1991 administrated by the Ministry of Labour, is the main regulation regulating the working environment, which deals with occupational health and safety. It has provisions for the management to make certain arrangements such as the removal of waste accumulated during production process and prevention of accumulation of dust, fume, vapour, and other impure materials, which would adversely affect health of workers, and to provide clothing and devices to workers handling chemical substances and other hazardous and explosive substances.

Pesticides Act, 1991 and Pesticides Regulations, 1994 was gazetted by the then His Majesty's Government of Nepal to regulate the pesticide use within the country. All pesticides are registered and regulated under the Pesticides Act and the Pesticides Rules. The Act regulates the import, manufacture, sale transport, distribution, production, marketing and use of pesticides in Nepal with a view to prevent risk to human health and the environment. The Act calls for the formulation of a Pesticides Committee, under the Chairmanship of Secretary to the Ministry of Agriculture, to formulate and implement national policy for pesticides.

According to the Act, a Pesticide Regulation Agency will be established to register appropriate pesticides, issue certificates and develop guidelines for their proper use. There will be restriction on the import, export, production, marketing and use of unlisted pesticides and a license will be required for the formulation, marketing and professional use of listed pesticides. Section 13 of the Act allows HMG to appoint Pesticide Inspectors. According to Section 18 of the Regulations, the Inspectors have the authority to enter any house, vehicle or factory premises and seize any imported pesticides or those being sold contrary to the provision of the Act and Regulations.

Local Self-Governance Act, 1999 is responsible for managing domestic solid waste. Municipalities are also supposed to preserve water bodies such as lakes and rivers and assist in controlling water, air and noise pollution. The Act does not require the local govt. to manage hazardous waste, but empowers them to fine anyone upto Rs.15, 000 for haphazard dumping of solid waste.

Related Institutions in the control of hazardous wastes

At present the national and other related institutions involved in governmental control on hazardous chemicals are;

Government Sector

- Ministry of Environment, Science and Technology.
- Ministry of Agriculture and Cooperatives
- Sectoral Ministries and Departments.
- National Committee on Man and Biosphere, 1974.
- National Resources Conservation Commission 1980s.
- Environment & Resource Conservation Division in the National Planning Commission, 1987.
- Council for Conservation of Natural and Cultural Resources, 1990.
- Environment Protection Council, 1992 chaired by Rt. Hon. the Prime Minister.

- Municipalities.
- Nepal Electricity Authority

Private sector

Federation of Nepal Chamber of Commerce and Industries (FNCCI) is the apex body representing the private sector of the business and entrepreneurs in Nepal. It is a well organized and strong force lobbying on behalf of industrialists. FNCCI has an Environmental Division to look into environmental issues. There are very few companies providing environmental services and have shortage of professionals experienced in the field of waste management.

Pesticide dealers have formed a Pesticides Association of Nepal, which can be mobilized to provide training on the proper use of pesticides.

NGOs

Some NGOs like Nepal Forum of Environmental Journalists (NEFEJ), Environment and Public Health Organization (ENPHO), Save the Environment Foundation (SEF) and other NGOs are involved in disseminating and raising awareness about the hazardous chemicals for the general public.

2.2.5 Key approaches and procedures for POPs chemicals and pesticides management including enforcement and monitoring requirements

The Ministry of Environment, Science and Technology (MOEST), the Ministry of Agriculture and Cooperatives (MOAC), the Ministry of Industry, Commerce and Supplies MOICS), the Ministry of Water Resources (MOWR), the Ministry of Health and Population (MOHP), the Ministry of Local development (MOLD) and the Ministry of Finance (MOF) are mainly responsible for the protection of environment and health with respect to POPs chemicals. The management of toxic chemicals, such as plant protection chemicals and their residues, dielectric insulating fluids, formulation of rules and regulations on these issues and their implementation and monitoring, as well as promotion of international cooperation are among the tasks of these (relevant) ministries.

The MOEST formulates and enforces the rules and regulations on environmental issues, especially for the protection of the environment through control and compliance monitoring. The MOEST needs more environmental officers to effectively implement its plans and programs on environmental monitoring, environmental assessment, pollution control and compliance monitoring as well as on environmental promotion and extension. As specified in the EPA 97 and EPR 97, the regular monitoring of the environmental conditions is the responsibility of the MOEST with the support of Environmental Inspectors.

The Department of Custom under the MOF is in charge of control and enforcement of the regulation related to trade, export and import of goods including chemicals. The Quarantine Officers under the MOAC are posted at border points for the control of food, pesticides and plant material import and export. The MOAC forms policy and legislation regarding the pesticides and is also the owner of obsolete pesticides stored in different warehouses. The Plant Protection Directorate under this ministry is responsible for controlling plant protection materials. District Agriculture Development Offices in the country recommend and monitor the use of agrochemicals including the pesticides.

The MOICS is responsible for the industrial activities and through regulations and standards promotes the cleaner production.

Nepal Electricity Authority (NEA) under the MOWR decides the quantity of the dielectric fluid to be purchased through tender notices and sets the standard of the transformer oil it purchases directly or through private sector suppliers.

The MOHP regulates the import and use of pesticides in vector control and formulates regulations and guidelines for the control of hazardous wastes through the Health Care Waste Management.

The MOLD is the line ministry for the solid waste management through Solid Waste Management and Resource Mobilization Centre.

Some other governmental and non-governmental as well as private organizations also monitor the environmental samples related to environment and public health, such as,
DFTQC – food samples
PPD – pesticide samples
Entomology Division – pesticide samples
NBSM – monitors the accredited laboratories, which undertake the environmental monitoring

2.3 Assessment of the POPs issue in the country

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

Summary
According to the latest data from Pesticide Registration and Management Division under Plant Protection Directorate (PPD) of the Ministry of Agriculture and Cooperative (MOAC)/Government of Nepal, the annual import of pesticides during 2002 was almost 117591.10 kgs of active ingredients (a.i) and 176372.81 kg a.i. in 2003 with a value of NRs 183.535 million and 123.158 million respectively. Fortunately all were non-POPs pesticides only. However, the balance sheet and trend of import and use of pesticides in recent years indicated a sign of further accumulation of not used pesticides, which ultimately may become obsolete.

There are 74.5151 metric tons of old stock of pesticides in Nepal, out of which about 10.058 M Tons were identified as POPs Pesticides, whereas 23.610 M tons were found in the mixed form, which after laboratory analysis were confirmed to belong to POPs pesticides. Thus, the total amount of POPs pesticides increased to 33.668 M tons. This is about 45 % of the total obsolete stocks of Pesticides.

2.3.1.1 Historical, current, and projected future production, use and import and export

Chemical pesticides for the first time were introduced in Nepal in 1950 when DDT and pyrethrum were imported from USA, exclusively for "Malaria Control of the Gandak Hydropower Project" (Rana 2001). In 1952, Paris green, gammexane and nicotine sulphate were imported again from USA for malaria control program of the government (WWF, 1995). In the following years (in 1956) DDT

was used to combat malarial mosquitoes. The remarkable success of DDT in the control of vector of malaria encouraged its use as pesticides in agricultural sector, too. This led to a rapid increase in the import of chlorinated hydrocarbons (now organochlorines) in Nepal followed by other groups of pesticides for use in agricultural sector. The chronological order of different groups of pesticides introduced in Nepal is: 1950s- organochlorines; 1960s - organophosphates; 1970s - carbamates; 1980s - synthetic pyrethroids.

Regarding the nature of organochlorine pesticides and impact on the environment and public health, the then His Majesty's Government of Nepal (now Government of Nepal, GON) has banned 12 pesticides such as DDT, BHC, aldrin, dieldrin, endrin, chlordane, lindane, heptachlor, toxaphene, mirex, phosphamidon and organomercury compounds effective from April 9, 2001. Thus, all eight persistent organic pollutant (POP) pesticides (DDT, aldrin, dieldrin, endrin, chlordane, haptachlor, toxaphene and mirex) are among those banned in Nepal since 2001. Government of Nepal proactively also banned other pesticides, which have similar characteristics of POPs such as BHC, Linden, Phosphidamine, and Organomercury fungicides. Here it is noteworthy that some of these are proposed to be included under POPs.

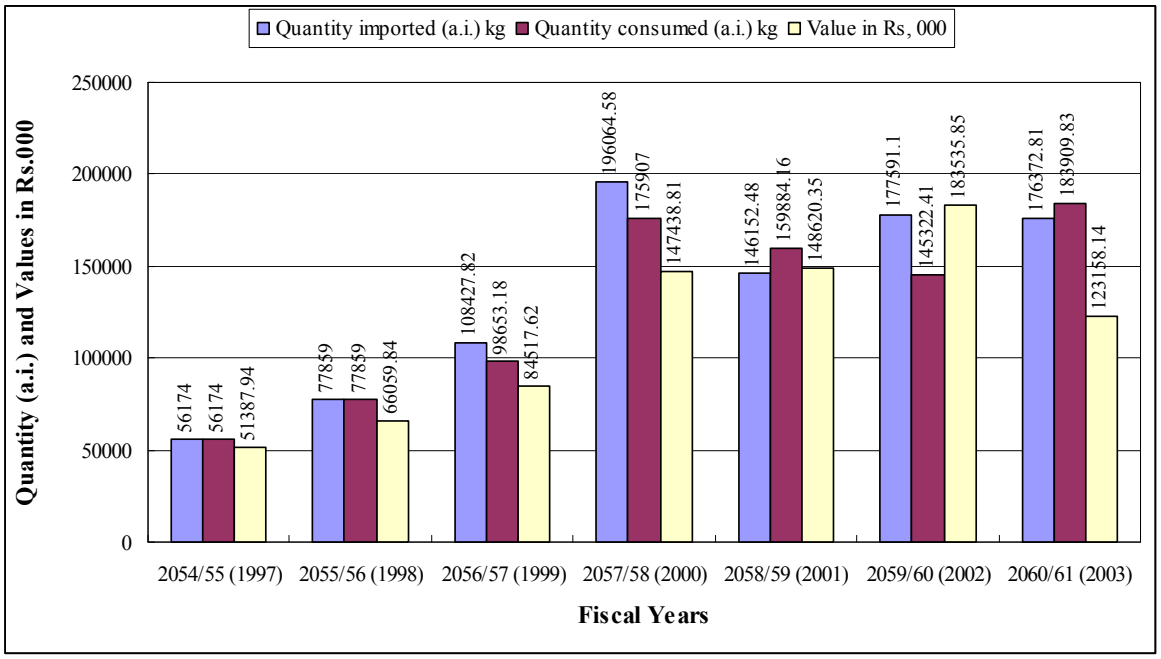
At present, the most common pesticides used in agricultural and public health sectors in Nepal are organophosphates and synthetic pyrethriods. Of the organochlorines, endosulfan (thiodan) is the only insecticide that is still being used.

As all of the pesticides listed under Annex A, part 1 of the Stockholm Convention on Persistent Organic Pollutants (POPs) have already been banned, there are no possibilities of further import, export, production and use in Nepal. The trend of import, consumption and expenditure in terms of their values is shown in Table 2.8 and Figure 2.3 below.

Table 2.8: Trend of Pesticide Import, Consumption and their value

Fiscal years	Quantity imported (a.i.) kg	Quantity Consumed (a.i.) kg	Value in Rs, 000
2054/55 (1997)	56174	56174	51387.94
2055/56 (1998)	77859	77859	66059.84
2056/57 (1999)	108427.82	98653.18	84517.62
2057/58 (2000)	196064.58	175907	147438.81
2058/59 (2001)	146152.48	159884.16	148620.35
2059/60 (2002)	177591.1	145322.41	183535.85
2060/61 (2003)	176372.81	183909.83	123158.14

Figure 2.3: Pesticides import, consumption and their values



At present there are four industries namely Kisan Agrochemicals, Nepal Krishi Rasayan Products, Pashupati Agro Chem. and Nepal Pesticides and Chemicals that are registered to produce/formulate pesticides. It was learnt that these industries mainly repackage some of the pesticides in small containers as per consumers need/demand before sending them to the market.

Table 2.9: Import of major Pesticide groups in litres and kg based on a.i.

Major Group of Pesticide Import other than POPs :a.i. (kg)	Quantity imported in different years						
	1997	1998	1999	2000	2001	2002	2003
Insecticides	31818.39	28728.42	47153.33	74920.6	63151.14	78936.78	95536.9
Fungicides, Bactericides, Acaricides and Seed Treatment	17438.18	37679.3	54530.66	102772.98	75444.88	90570.36	55590.8
Herbicides	6122.95	9566.49	2678.8	14943.4	3258.84	6843.9	11239
Rodenticides	400	786.77	4064.4	3420	4297.6	1240	7868
Total Pesticide import	55779.52	76760.98	108427.2	196056.98	146152.46	177591.04	170234.7

Table 2.10: Value of pesticides imported in Nepal (in million NRs)

S.N.	Year	Value (in million NRs.)	S.N.	Year	Value (in million NRs.)
1	1983	10.598	8	1997	51.388
2	1984	33.287	9	1998	66.060
3	1985	21.188	10	1999	84.518
4	1986	4.066	11	2000	147.439
5	1987	22.815	12	2001	148.621
6	1988	42.314	13	2002	183.536
7	1989	42.394	14	2003	123.158

Source: Dept. of Customs and PPD, 2004

Nepal shares 1200 km. long open and porous border with India on the east, west and south and a mountainous border with China. There is possibility of transboundary movement of some of the pesticides such as DDT and BHC from India through open border. However, it was quite difficult to record the quantity of such illegal trading. In 2004 District Agriculture Development Office, Makwanpur seized almost 1650 kg of BHC from one of the Agro-Trading Depot in Hetauda. This

was identified during the pesticide inventory work under POPs Enabling Activities Project of the MOEST.

There is the possibility of increasing use of pesticides, which neither fall under POPs nor are banned by the Nepalese government. Since there is no balance between the quantity of imported pesticides and the quantity required for application in agricultural as well as in the public health sector, there are chances that the unused stocks get and obsolete. So it is necessary to take strong regulatory and monitoring measures to prevent further accumulation, by introducing a license system for the import of prescribed pesticides.

At present, pesticides are purchased not only by the concerned government agencies. Private dealers are also involved in import, formulation, sale and distribution. As per the Pesticide Regulation 1994 the importer must report on the type and quantity of the pesticides imported during the given fiscal year within the first three months of the following fiscal year. But due to the lack of effective implementation, exact quantification of the imported pesticides, imported but unused as well as that stock, which could be on the verge of date expiration, cannot be done.

According to the latest inventory, there is a stock of 74.5151 metric tons of date expired pesticides (Table 2.11 and 2.12) in Nepal. These stocks are stored in warehouses/stores located at 25 different locations in the country. Efforts are now underway to collect smaller stocks to one centre in a region, thus concentrating them to major sites with the hope that future actions regarding packaging, transportation, monitoring and disposal will be less painstaking. However, all 25 sites, where the obsolete stocks are stored, should be regarded as contaminated sites that require decontamination.

Table 2.11: Amount of date expired pesticides including POPs pesticides stored at different warehouses

SN	Location	Amount in m. tons	Remarks / Storage condition
1	AIC Amlekhganj	50.900	Packed in 200 litres steel drums and 60 litres HDPC
2	NSC, Nepalganj	6.735	Some packed in 60 litres HDPC; some in bad condition
3	NARC, Khumaltar	4.761	Packed in 200 litres HDPC
4	AIC Biratnagar	1.660	Stored in thatched house in the worst condition
5	SSD, Hetauda	1.650	Stored in rented room
6	RARS, Lumle	1.635	Dust spread over, bad condition
7	CDB, Khajura	1.485	Liquid spilled over, worst condition
8	AIC, Pokhara	1.285	Bags broken, but storage condition acceptable
9	AIC, Birgunj	0.850	Stored in small room
10	NSC, Janakpurdham	0.813	Dust spread over, bad condition
11	AIC, Surkhet	0.202	Deposited to NSC, Nepalganj
12	RARS, Khajura	0.387	Storage condition acceptable
13	DADO, Banke	0.370	Stored in open garage, worst condition
14	AIC, Kuleswor	0.214	Storage condition acceptable
15	AIC, Bharatpur	0.18	Storage condition acceptable
16	NSC, Hetauda	0.149	Storage condition acceptable
17	ARS, Pakhribas	0.137	Storage condition acceptable
18	AIC, Ghorahi	0.137	
19	AIC, Sindhuli	0.130	
20	AIC, Gaighat	0.109	
21	AIC, Illam	0.082	
22	AIC, Guleria	0.051	Deposited to NSC, Nepalganj
23	AIC, Lamahi	0.502	
24	AIC, Rajapur	0.054	
25	DADO, Mustang	0.0371	
	NARC, Khumaltar	22 cylinders	Methyl bromide
	CHC, Kirtipur	21 cylinders	Methyl bromide
	GRAND TOTAL	74.5151 m. tons + 43 cylinders of methyl bromide (each cylinder contains about 50 kg methyl bromide)	

Source: POPs Enabling Activities Project, MOEST

Table 2.12: Quantity of different groups of date expired pesticides in different locations (in m. tons)

SN	Office /Location	Amount	POP pesticides	ORMERCURY	ORCHLORINE	ORGANOPHOSPHATES	CARBAMATES	SYNTHETIC PYRETHROIDS	MIXED	FUNGICIDES	RODENTICIDES	FUMIGANTS	HERBICIDES
1.	AIC, Amlekhganj	50.90	28.10	7.400	7.300	1.200	-	-	-	2.500	1.000	2.000	1.40
2.	NSC, Nepalganj	6.735	3.258	0.301	0.335	0.044	0.035	1.500	0.430	0.151	0.596	-	0.085
3	NARC, Khumaltar	4.761	0.300	0.542	-	3.594	0.050	0.050	-	0.050	0.050	0.100	0.025
4.	AIC, Biratnagar	1.660	-	0.130	0.045	0.112	0.085	-	-	0.780	0.100	0.128	0.28
5.	SSD Hetauda	1.650	-	-	1.650	-	-	-	-	-	-	-	-
6.	RARS Lumle	1.635	-	-	0.305	0.478	0.205	0.001	0.050	0.542	-	-	0.054
7.	CDB, Khajura	1.485	-	-	0.431	0.798	-	0.231	0.025	-	-	-	-
8.	AIC, Pokhara	1.285	0.800	-	-	0.379	-	-	-	0.084	0.02	0.002	-
9.	AIC, Birganj	0.850	-	0.010	-	0.026	-	0.005	-	0.006	0.802	0.001	-
10.	AIC, Janakpurdha	0.813	-	-	0.001	0.029	0.003	-	0.600	-	0.022	0.158	-
11.	AIC, Surkhet	0.202	-	-	-	0.202	-	-	-	-	-	-	-
12.	RARS, Khajura	0.387	-	-	-	0.300	-	-	0.005	0.082	-	-	-
13.	DADO, Banke	0.370	-	-	-	0.362	-	-	-	0.008	-	-	-
14.	AIC, Kuleswor	0.214	-	-	-	0.120	-	0.031	-	0.002	0.001	0.060	-
15.	AIC, Bharapur	0.181	-	-	0.005	0.104	0.025	-	-	0.012	0.007	0.027	-
16.	NSC, Hetauda	0.149	-	-	-	0.009	0.120	0.013	-	-	-	0.007	-
17.	ARS, Pakhribas	0.137	-	-	-	0.008	-	-	-	0.087	0.001	0.041	-
18	AIC, Ghorahi	0.137	-	-	0.003	0.062	0.001	0.013	-	0.058	-	-	-
19.	AIC, Sindhuli	0.130	0.100	-	-	0.011	-	-	-	0.018	0.001	-	-
20.	AIC, Gaighat	0.109	-	-	0.050	0.027	0.019	0.007	-	0.001	0.005	-	-
21.	AIC, Illam	0.082	-	-	0.001	0.015	-	0.001	-	0.061	-	0.004	-
22.	AIC, Guleria	0.051	-	-	-	0.035	-	0.016	-	-	-	-	-
23.	AIC, Lamahi	0.502	-	-	-	0.464	-	-	-	-	0.006	0.002	0.030
24.	AIC, Rajapur	0.054			0.037	0.003	-	-	-	0.014	-	-	-
25.	DADO, Mustang	0.037	-	-	-	0.025	-	-	-	0.0121	-	-	-
Grand Total		74.5151	32.558	8.383	10.163	8.40	0.543	1.868	1.11	4.468	2.612	2.53	1.874

Table 2.12 depicts a total of 32.558 m. tons of pesticides already identified as POPs pesticides and 1.11 m. tons of mixed pesticides, which needs further identification. Thus at present the total stock of obsolete POPs pesticides comes to be 33.668 Metric tons, which makes 45.34% of the total obsolete pesticides stocks in Nepal.

In addition to the above obsolete pesticides, there are 43 cylinders of methyl bromide, each cylinder containing about 50 kg of methyl bromide (Table 2.11).

Nepal has already become a Member of World Trade Organization (WTO) in 2004. Therefore, to comply with the provisions as well as commitments towards WTO, Nepal has to de-register some of the currently used pesticides. As per the commitments, it has been decided that four pesticides, Monocroptophus, Quinalfus, Forate, and Ethion are to be banned from being used in the tea plantations. This was proposed by the Pesticides Technical Sub-committee in October 5, 2004 and decision to ban on October 12, 2004 by the Pesticide Committee.

2.3.1.2 Institutional and regulatory Framework:

This is dealt in subsection 2.2.4, however, the ministries and different legal provisions that fall under different ministries are as follows (Table 2.13):

Table 2.13: Institutions and different legal provisions related to POPs

Institutions	Legal Provisions
MOEST	Environment Protection Act 1997 (Article No. 3, 4, 7, 8, 11, 12, and 18) Environment Protection Regulation 1997 (Rule. 3, 15, 16, 18, 20, 45, IEE: Schedule 1(B)(a) 3,15,16,19, 21, 23, Schedule 1(B)(b) (1),2, Schedule 1(H) 1, 2 (a,b,c, d, e) Schedule 1(I) 3 (a,b,c) EIA Schedule 2(B) 3,5,15,16,17, 18 Schedule 2(H) 1, 2 (a,b,c,d,e), 3 (a,b,c,d,e), 4(a,b,c,d) Schedule 2(I) 3 (a,b,c,d) Schedule 2(J) 1 Schedule 7 (pertaining to Sub-Rule (1) of Rule 16 Industries Requiring Certificates of Pollution Control (8, 10, 12, 15, 19, 20, 21, 23, 25, 26, 46, 48, 52, 53, 55 etc)
MOAC	Pesticide Act 1991 (Articles. 3, 7, 8, 9, 10, 11, 12, 13, 15 and 17) Pesticide Regulation 1994 (Articles 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16 and 20). Food Act, Pesticide Residue Standard for Legume, Pulses, and Mineral Water
MOICS	Industrial Enterprises Act (Provision related with permission for establishing Pesticides, fertilizers, Pharmaceutical Industries, Pulp and paper industries,).
MOHP	Health Care Waste Management Guideline (NHRC, KMC, MOHP) etc. Environmental Health Impact Assessment Guidelines
MOLD (SWMRMC)	Solid Waste Management and Resource Mobilization Act (provision reputed with land filling, waste management, waste waster treatment facilities establishment etc)
MOWR (NEA)	Import related provisions in relation to PCBs in NEA.

2.3.1.3 Summary of available monitoring data and health impacts

Detailed description is given in subsection 2.3.7

2.3.1.4 Present management (option, use, stockpiles and waste)

Nepal has prepared the Inventory of POPs chemicals to fulfil the obligation of Stockholm Convention as a first step towards the development of this NIP. The obsolete pesticides, which were not stored safely, are being packaged in an environmentally safe manner.

There are two options for managing existing POPs Pesticides:

- Local safe disposal of less toxic and non-persistent pesticides, and
- Disposal of POPs in other countries having disposal facilities.

Stockpiles are stored in various warehouses (Tables 2.11 & 2.12) and packaging of about 56 m. tons of them (50.9 m tons in Amlekhgunj and 4.76 m. tons in Khumaltar) is in good condition, though the storehouse at Amlekhgunj is adjacent to a School. Those stockpiles stored very badly in other warehouses are being packaged in safe containers and efforts are underway to concentrate them in few safer warehouses.

With reference to waste management, there is no sanitary landfill site at the moment in full operation. Most of the municipalities dumped their wastes either along the banks of rivers or in isolated open/public places. Hazardous wastes produced in the hospitals are mostly burnt open and the so-called incinerators, which are in use in some of the hospitals are of low quality and do not meet the standard and efficiency of recommended incinerators.

2.3.1.5 Current capacity and experience in the field of POPs pesticides

The import, distribution, sale and use of pesticides related activities is governed / administered by the Pesticide Registration and Management Division, under the Ministry of Agriculture and Cooperatives (MOAC). This organization has very good network and infrastructures in terms of Pesticide Inspectors, Laboratories, Quarantine, etc. However, effective monitoring and supervision of pesticide related activities are weak due to time constraints of the pesticide inspectors and lack of enough budgets for extensive health and socio-economic impact studies.

As Focal Point to the Stockholm Convention for the management of POPs chemicals, the MOEST through POPs Enabling Activities Project has recently completed the inventory of POP chemicals and has developed the NIP. There is an urgent need to develop the infrastructure and to establish a networking with required number of qualified expertise by involving relevant government and other organizations to address POPs issues nation wide.

2.3.1.6. The list of stakeholders involved in the POPs pesticide inventory

The POPs pesticides inventory was prepared by a national consultant hired by MOEST/POPs Enabling Activities Project in coordination with concerned governmental agencies mainly with the Department of Agriculture, District Agriculture Development Offices, Agricultural Input Company (AIC), Nepal Agriculture Research Council (NARC), Cotton Development Board (CDB), National Seed Company (NSC)), Municipalities, Local NGOs, farmers, Agrovet, etc.

The participants, who represented different stakeholder organizations, of four workshops (Inception workshop, Inventory training workshop, Prioritization workshop and Validation workshop) also contributed during the POPs pesticides inventory either directly or indirectly from their corresponding positions.

2.3.2 Assessment with respect to Annex A, part II chemicals (PCBs)

Summary
Nepal does not produce PCBs and dielectric fluids. The possible entry of PCBs in the country may be due to the grant assistance by the donor countries which have assisted Nepal in developing and installing Hydropower (HP) stations and also due to the oil purchased by the NEA.
The inventory was focused mainly on electrical transformers and dielectric fluids under the ownership of NEA.
NEA and transformer manufacturing private company in Nepal import/use PCBs free dielectric fluids since 1990, but the dielectric fluid and equipment contaminated and cross contaminated with PCBs already present are also present in significant quantity. Their quantities should be determined during the implementation of the NIP.

PCBs seem to be a potential danger in terms of occupational health. Increased precautionary gears and awareness programs would improve the workers health and safety.
Further actions require identification, detailed analysis and inventory of the transformers and quantities of liquid dielectric.

2.3.2.1 Introduction

The Polychlorinated biphenyls (PCBs) are mixtures of synthetic organic chemicals with the same basic chemical structure and similar physical properties ranging from oily liquids to waxy solids. The chemical formula for PCBs is $C_{12}H_{(10-n)}Cl_n$, where n is a number of chlorine atoms within the range of 1-10. PCBs, already synthesized in 1866 for the first time, were produced commercially since 1929, and since then have been widely used in industrial products. The industrial countries have been the main manufacturers of PCBs.

There are no known natural sources of PCBs. Total cumulative world production of PCBs is estimated at 1,200,000 tons, 370,000 tons of which is supposed to be present in the global environment (Brunstrom 1991). PCBs are synthetic organic chemicals comprising 209 individual chlorinated biphenyl compounds (known as congeners), but only approximately 50 of these compounds have been found in commercial mixtures. Exposure to each of these compounds is associated with different levels of risk for harmful effects.

Though the production and sale of PCBs is prohibited in the international market, it is still in use in electrical equipment, namely transformers, capacitors, oil circuit breakers, welding machines, etc. and in products with a long technical lifetime, such as building materials and paints. Thus the total load to the environment is still to increase in the future and exposure to these compounds is associated with different levels of risks.

2.3.2.2 Health effects of PCBs:

PCBs that have already leaked out into the environment have spread to every corner of the earth and accumulated in the food web. PCBs in aquatic environments adhere to small particles which are readily absorbed by plankton and filtering-feeding or mud-dwelling organisms. Complex marine food chains allow the chemical to concentrate in dangerous amounts in the higher trophic levels (biomagnification). This is due to PCBs being readily soluble in hydrophobic media, such as oily or fatty substances, which means they can be easily incorporated in any lipid deposits in any organism and hardly destroyed or excreted. PCBs are only very slightly volatile and the greatest danger is ingestion of contaminated food and absorption of these substances through the body surface, for example, due to splashes while working with PCB containing equipment. In addition, PCBs adsorb into dust particles and thus can enter the respiratory organs.

PCBs are dangerous to both humans and the fauna. Some PCBs have dioxin-like toxicity and can be fatal for the child in the womb even in very low concentrations. PCBs have been demonstrated to cause a variety of adverse health effects, viz. cancer in animals and effects on the thyroid and immune system, reproductive system, nervous system, endocrine system, etc. Due to resistance to degradation, PCBs persist in the environment for decades. The “half-life” of the chemical in sediments and soil is expected to be tens, maybe hundreds of years. PCBs thus belong to the group of POPs (Persistent Organic Pollutants)

Due to their non-flammability, chemical stability, high boiling point and electrical insulating properties, PCBs were used in hundreds of industrial and commercial applications including electrical, heat transfer, and hydraulic equipment; as plasticizers in paints, plastics and rubber products; in pigments, dyes and carbonless copy paper and many other applications.

2.3.2.3 PCBs usage in Nepal

The entry of transformer oil to Nepal dates back to 1910, when the first hydropower station started its generation and various electrical equipment filled with dielectric fluids were imported. Especially those which were imported after 1929 may contain PCBs. The use of PCBs in Nepalese industries seems to be negligible, compared with industrialized countries. Industries using heat transfer fluids and hydraulic fluids are also negligible in Nepal. Thus the possibility of PCBs use is more in closed than in partially closed systems. But with increased use of lubricants, breaker oil, cutting oil and paints, the possibility of PCB contamination in open applications may be high.

Closed and semi-closed applications of PCBs:
Closed and semi-closed applications include electrical transformers, capacitors, Oil Circuit Breakers (OCBs), Metering units, voltage stabilizes, etc., which in Nepal are under the ownership of Nepal Electricity Authority (NEA).

The summary table shows the total number of transformers and the total amount of dielectric fluid in both power transformers and distribution transformers in generating stations, grid substations, distribution centres and branches of NEA.

Table 2.14: Power and distribution transformers by number and oil content

S.N.	Particulars	Number of Transformers		Transformer oil (Kg)
		Power	Distribution	
1	Generating stations	69	16	380007.4
2	Small Hydropower stations	--	76	30909.76
3	Grid Substations	154	38	884295.42
4	Distribution Centres	10	4975	933168.3
5	NEA Branches	23	2983	470124.9
6	Workshops/Repairing centres	--	124	66139.32
	Total	256	8468	2,764,645.1

Source: PCBs Inventory, MOEST/POPs, 2006.

Capacitors are devices that can accumulate and hold an electrical charge. Department of Custom registers only 24 capacitors imported during the fiscal year 2002/2003, but only 17 were found under NEA Grid Operation Department with 31534 litres (27119.24 kg) of oil.

The number of Oil Circuit Breakers (OCBs) showed that 96 such equipment are in use under NEA Grid Division, but those in powerhouses are replaced or changed by new types of Circuit breakers, such as Gas Circuit breakers (SF-6) and Vacuum Circuit Breakers. These OCBs contain only 20465 litres (17600 kg) of oil. Newer generating stations and grid substations were found to use newer alternatives rather than oil filled circuit breakers.

About 2000 pieces of Metering units were under use throughout the country in the past. Each unit contains 150 litres of dielectric fluid. Such oil filled units are now replaced by gas filled ones and about 200 oil filled units are still in use in the country.

During the field visit, one very old voltage stabilizer (20KVA, with 50 litres oil) decommissioned since 1973 was found in "Gorkhapatra Corporation", the printing house of government owned national daily. There are larger voltage regulators at Tribhuvan Airport, Royal palace, Electro-mechanical Department of Royal Nepal Army and Birendra International Conference Centre. Due to security reasons, detailed information on such equipments could not be received.

There are about 10000-12000 welding workshops, scattered throughout the country, and each workshop on an average possesses two welding machines, in partially closed or open conditions. Each machine is filled with 40 litres (average) of dielectric fluid. These industries buy the used transformer oil (very possibly PCBs contaminated) at cheaper rate to fill in their machines. Considering the above number of workshops and each workshop using 80 litres (40 litres * 2 machines), about 800 000 – 960 000 litres (500000 – 600000 kg) of transformer oil is filled in such machines. Reuse of old oil in welding machines is quite alarming. Among the three samples analysed, 2 showed PCBs at >50 ppm level. Since quite a high number of labourers are constantly exposed to such oil, a close collaboration with the NEA and its staff and extensive awareness program for NEA staff and welding machine operators would be helpful in solving this problem.

Open applications of PCBs:
There is no documentation on possible use of PCBs in open applications (lubricants, carbonless copy paper, plastic industries, PVC industries, enamel paints, etc.) in Nepal. The hydraulic fluid and lubricating oils used in larger construction equipment are from Duckhams, Caltex or Shell companies and this indicates that this fluid is most likely PCBs free.

PCB-containing wastes:
Only the old transformers piled at Transformer Repairing Workshops of NEA could be regarded as PCB containing wastes. About 50 old and decommissioned distribution transformers are found in Lainchaur Workshop (NEA Transformer Division). The usable parts from these pieces, as NEA sources quote, were used while repairing other transformers. A surface area of about 80 m^2 is covered by these stockpiled transformers, and thus contaminated by oil.
Similarly, 20 m^2 area of Everest Transformer Workshop in Pokhara was found contaminated by oil and only 8 decommissioned transformers were stockpiled there.
Three pieces of old and decommissioned transformers (two decommissioned 20 years back and now lying in Printing Department, Ministry of Communication and Information) and (one decommissioned 30 years ago and lying in Gorkhapatra Corporation) could be located. As stated by the respective authorities, these transformers still contain original oil. These three transformers together may contain about 200 litres of dielectric oil (This estimate is based on the size of the transformers, which are covered by other stockpiled equipment and were not possible to take out during the site visit).
As stated above, it has at present become difficult to isolate the PCB containing wastes. However, a closer collaboration with the NEA and better understanding between the Ministry of Environment and Science-Technology (MOEST) and NEA would help settle this problem. This needs to be worked out in detail while implementing the NIP.

Scrap oil (old transformer oil)
As given in the following Table 2.15, there is considerable amount of scrap oil stockpiled at different locations. Considering the rate of transformer maintenance (10-12% of the distribution transformers) and retrofilling till date, this amount should have been quite high. During the survey, it was found that the old oil from power transformers after treatment, if usable, is refilled in distribution transformers belonging to NEA. The used transformer oil or scrap oil is bought by Grill Industries to use in their welding machines.

Table 2.15: Amount of Old oil stockpiled (not in use at present) at different locations

Locations	Old oil (L)
Marsyangdi HP Station	22890
Siuchatar Grid SS + Patan Grid SS	27500
Ammunition Department, RNA	600#
Transformer Division Lainchaur	11000
Transformer Division, Lainchaur	4000
Everest Transformer, Pokhara	400
Government Printing Houses	200
JEMC Sanothimi, Bhaktapur	500
JEMC Sanothimi, Bhaktapur	800
Devighat Hydropower, Nuwakot	5000
Biratnagar Rani D.Substation	12296

Source: PCBs Inverntory, MOEST/POPs, 2006

Earlier reports mentioned a stock of 2000 litres (NBSM), but at present there is only 600 litres found stored in three drums.

Table 2.15 depicts the amount of old transformer oil found during the inventory work. Most part of the old stockpiled oil was found PCB contaminated (Table 2.16).

2.3.2.4 Samples of transformer oil collected and analyzed

About 64 samples from different parts of the country representing powerhouses, grid stations, divisions and branches under NEA (oil samples from transformers in use and from stockpiled oil), were analysed for PCBs presence/absence using DEXSIL tool kit. A total of 106185.3 litres of transformer oil was found PCBs contaminated during qualitative analysis, and on quantitative analysis carried out in Shriram Institute for Industrial Research (SIIR), New Delhi (India), most of the samples showed PCBs concentration above 50 ppm (Table 2.16). Most of the contaminated oil is found as stock piled at different locations; mainly in Syuchatar, Patan, Lainchaur and Biratnagar.

Table 2.16: PCBs contaminated dielectric fluids (transformer oil) from different parts of country

	Sample Source	Location	Quantity of oil	PCB concentration (mg/kg)#
1	Stock of old oil evacuated from repaired transformers	Lainchaur NEA Transformer Division	11 000 litres	821
2	Old oil from 1967 APK 100 KVA transformer	Kathmandu	44.5 gallons (202.3 litres)	
3	Traufo Union 500 KVA transformer	RNA, Sundarijal	400 litres	
4	Transformer oil stored in drums	Ammunition Department, RNA, Swayambhu	600 litres	736
6	Stockpiled oil stored in drums (*5 samples analysed*)	From Patan and Syuchatar stations	27500 litres	959, 614, 16, 33, 3
7	Hydraulic oil from Balaju Yantrashala	Balaju Yantrashala, BID, Kathmandu	200 litres	
8	Hydraulic oil Sanothimi, Bhaktapur	JEMC, Sanothimi, Bhaktapur	500 litres	
9	Transformer oil, Sanothimi, Bhaktapur	JEMC, Sanothimi, Bhaktapur	800 litres	
10	Oil from 20 yrs old Welding machine	Maharajgunj, Kathmandu	50 litres	
11	Oil from 4 year old Welding machine	Baluwatar, Kathmandu	2*40 litres (80 litres)	
12	Old oil for reuse after filtering	Everest Transformer Pvt.Ltd., Pokhara	200 litres	
13	Oil from old transformers during repairing	HEETS, Pokhara	400 litres	
14	New Oil (Nepvolt)	HEETS, Pokhara	800 litres (4 drums)	

15	Oil from 7.5 MVA power transformer	Kundhar Grid Station, Pokhara	9600 kg (11136 litres)	145
16	Oil filtered for reuse in Butwal Grid station	Butwal Grid Station, Rupandehi	2400 litres (12 drums)	
17	25 drums of old oil collected since 2000	Devighat HP, Nuwakot	5000 litres	2
18	Oil from decommissioned 6.3 MVA NGEF transformer	Devighat HP, Nuwakot	2000 litres	3
19	Old Turbine oil	Trishuli Powerhouse	2 drums = 400 litres	
20	Old transformer oil from 1962 Scheron Transformer (3.75MVA) Geneve	Trishuli Powerhouse,	2035 kg (2360 litres)	10
21	Oil from 3 MVA power transformer in use	Gaddachauki (Mahendranagar)	3000 litres	
22	Oil form power transformer at Banbari/Duhabi	Multifuel Power Plant, Duhabi, near Biratnagar	6300 kg (7308 litres)	1214
23	Transformer oil	Biratnagar Rani Disribution Substation	10600 kg (12296 litres)	1206
24	Oil from old transformer	Duhabi Grid station, Sunsari	14832 kg (17205 litres)	1095
25	Eastern Electricals, Biratnagar (Pvt. Repairing centre)		300 kg (348 litres)	368
		Total	106185.3 litres	
90623 litres (>50 ppm PCBs) & 15562.3 litres (at marginal level or <50 ppm PCBs)				

For detail see Annex III Table 9
Source: Inventory of PCBs, 2006

2.3.2.5 Available monitoring and health impact data

Since there is no monitoring of PCBs in the environment and also the systemic investigations on effects of PCBs on human and environment are lacking. The inventory work indicates that most of the stakeholders, and general public in particular, were not aware of the adverse effects of PCBs on humans and environment. The practice of using old transformer oil as massage oil in muscular and joint pains and the belief that this oil inhibits further infection, helps in healing of wounds and stopping of bleeding, and hence very much asked by the ordinary public, is very alarming. A survey among the workers involved in repairing and maintenance of transformers showed that:

- 10.8% of the NEA workshop employees and only 4% of the private workshops employees (7.7% of the total informants) were aware of health effects of PCBs
- 27% of NEA employees and 7% of private workshops employees (18.5% of the total) had health problems
- 59% of NEA employees and 14.3% of private workshops (40% of the total) were aware of impacts of PCBs on the environment.

2.3.2.6 Present regulations pertaining to PCBs (optional)

No regulation pertaining only to PCBs exists in Nepal. However, NEA in its tender notice clearly mentioned that the dielectric fluid to be supplied to the NEA must be PCBs free and the suppliers must submit written document verifying this. Efforts are now underway at government level to bring this under some regulations.

2.3.2.7 Production/import/export of PCBs and electrical equipment

Nepal is not a PCBs producing country, hence there is no export of it. Being a developing country, there are no large industries here and PCBs using industries are also negligible. The possible import of PCBs mixed dielectric fluid (in closed applications) in the past in Nepal may be due to electrical transformers installed by the donors in the form of grant aid for hydroelectric power stations. With the ban on the production of the PCB oils and additives in the early 80s, the import of PCBs also to Nepal may have stopped.

According to the Department of Custom Nepal, a total of 288157 Kg of transformer oil was imported to Nepal during the fiscal year 2002/2003. The Procurement Division of NEA, the only organization that owns all the transformers, purchased a total of 30,000 litres of transformer oil (Transol, manufactured by Savita Chemicals, Mumbai, India) during the fiscal year 2003/2004. The Grid Transmission Division of NEA also purchases 20 000 litres of dielectric oil annually to fill/retrofill in the power transformers at grid stations. The inventory shows a total of 2764645.1 kg of transformer oil currently in use in electrical transformers.

NEEK, the largest manufacturer of transformers in Nepal, has imported 1,160,439 litres of Hyrax brand oil to fill in its 7,053 transformers (83% of total transformers in the country), currently in use in Nepal. Among other smaller and newer manufacturers Everest Transformer Pokhara was found using Transol and HEETS Pokhara is filling Hyrax and Nepvolt oil in its new transformers.

Department of Custom, Government of Nepal, registers 2345 welding machines imported to Nepal during the fiscal year 2002/2003.

The initial inventory of transformers and transformer oil draws the following conclusions:

- No electrical equipment clearly indicated the PCBs content in its dielectric fluid.
- Transformers imported after 1990 do not contain PCB-contaminated oil, but older transformers still contain PCB-contaminated oil.
- Circuit Breakers and Metering units in use under NEA now use gas instead of oil.
- The alarming situation is due to the welding machines, filled with the PCB-contaminated old transformer oil, scattered though out the country.
- Decommissioned transformers and sites where they are stockpiled including floor of the transformer repairing workshops can be considered as the PCBs containing wastes and /or PCB contaminated sites.
- No presence of PCBs has been found in the open applications such as lubricants, hydraulic fluids, enamel paints, plastic industries.
- The great danger of PCB-contamination lies in the sector of environmental and occupational health.
- There are no installations for PCB-containing wastes treatment and decontamination of previously PCB-containing equipment is also not practiced in Nepal.

2.3.3 Assessment with respect to Annex B chemicals (DDT)

Summary

DDT is no more in use and since 2001 its import, distribution, sale and use has been prohibited by the decision of the government. So there is no possibility of its import and use legally, except through porous boarder with India, where DDT is still being produced and used. Thus, there is no need to file any exemption for this. Even in the health sector, use of DDT has been replaced with other non POPs pesticides, mainly synthetic pyrethroides, since 1995.

2.3.3.1 Introduction

In the public health sector DDT was used for the first time in 1956 in Nepal for the control of vector of malaria. The import and use of DDT increased by several orders of magnitude after 1956 and was found used till 1994. The highest amount (965 metric tons) of DDT was used in the year 1978. DDT

was replaced by newer organophosphates such as ficon and actellic, and synthetic pyrethroids such as icon and α - cypermethrin.

National Malaria Control Program (NMCP) abandoned the use of DDT since early nineties; however, it was used for Kala-azar control in 1994. After the controversy in 1995, Ministry of Health and Population (MOHP) has stopped the import and use of DDT for Vector Diseases Control in public health sector since. Moreover, some of the vectors are resistant to DDT and public acceptance is very poor. If WHO recommends its use for Kala-azar elimination form the South Asia Region (Bangladesh, India, Nepal), then it has to produce evidence of efficacy, cost presently occurred, environment friendliness and acceptance of the community, then it will be put before the technical committee in Pesticide Board and Malaria expert group. MOHP sees very bare minimum chandces of DDT use in public health in near future. However there is some obsolete DDT lying in various warehouses. As per the latest inventory data the total DDT available in the country is 3.305 tons (Table 2.17).

Table 2.17: Date expired DDT storage in various locations

S.No.	Location	Amount(tons)
1	Amlekhgunj	3.2
2	Nepalgunj	0.105
3	Khumaltar	NA
Total		3.305
Source: MOEST/POPs Enabling Activities Project The Pesticide Inventory report , May 2005		

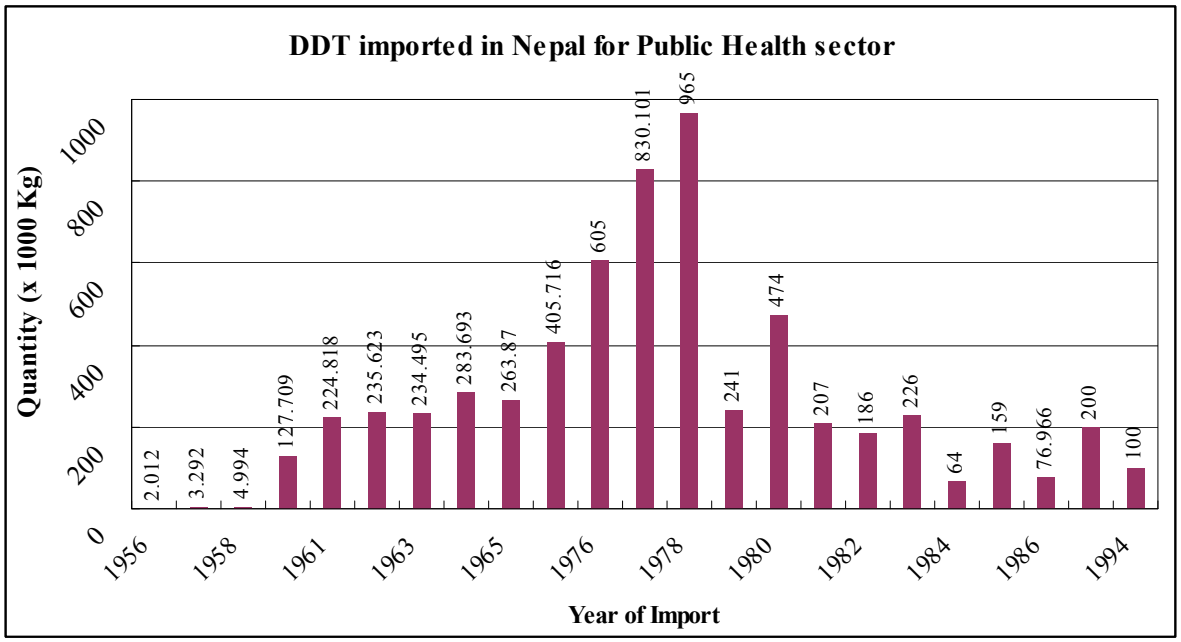
The history of DDT and other similar chemicals imported for use in the public health sector is shown in the table (Table 2.18) given below.

Table 2.18: Import of DDT and other insecticides in public health sector

S.N.	Year	DDT in kg	BHC in kg	Malathion in kg	Ficon in kg	Actellic in liter	Icon in kg	α Cypermethrin in kg
1.	1956	2012						
2.	1957	3292						
3.	1958	4994						
4.	1959	NA						
5.	1960	127709						
6.	1961	224818						
7.	1962	235623						
8.	1963	234495						
9.	1964	283693						
10.	1965	263870						
11.	1966	NA						
12.	1967	NA						
13.	1968	NA						
14.	1969	NA						
15.	1970	NA						
16.	1971	NA						
17.	1972	NA						
18.	1973	NA						
19.	1974	405716	33375					
20.	1975	NA						
21.	1976	605000						
22.	1977	830101						
23.	1978	965000						
24.	1979	241000						
25.	1980	474000						
26.	1981	207000						
27.	1982	186000						
28.	1983	226000		159100				

29.	1984	64000		484000				
30.	1985	159000		490000	18000			
31.	1986	76966		233626	18663			
32.	1987	NA		NA	NA			
33.	1988	NA		NA	NA			
34.	1989	NA		31337	5325	55540	383	
35.	1990	NA		6765	29907	56542		
36.	1991	NA		19145	2797	12445	2419	
37.	1992	NA		NA	NA	NA		
38.	1993	200000		350000				
39.	1994	100000		270000				
40.	1995							NA
41.	1996							NA
42.	1997							NA
43.	1998							NA
44.	1999							NA
45.	2000							NA
46.	2001							NA
47.	2002							75000
48.	2003							70000
49.	2004							55000
Final Pesticide Inventory, table no.12 based on EDCD, DOHS, 2004 Note: DDT - 75 % WP; Malathion -50 % WP ; α Cypermethrin - 5 %								

Figure 2.4: DDT Import in Nepal for public health purpose



Malaria Eradication Program was started in 1966 (Figure 2.4) using DDT, which could control the malaria to the greater extent by controlling the vector population. On knowing the environmental and health problems of DDT and also attracted by the international practices, the Ministry of Health and Population has shifted the use of DDT to the Cypermethrin to control Malaria.

The present management of DDT and their empty containers, current capacity and experience in the field of DDT, and the stakeholders are mentioned above in the sections (2.3.1.4 to 2.3.1.6)

2.3.4 Assessment of releases from unintentional production of annex C chemicals (PCDD/PCDF, HCB and PCBS)

Summary

The preliminary inventory on Dioxins and Furans emissions was made according to the methods recommended in the UNEP Standardized Toolkit for Identification and Quantification of Dioxin and Furan Releases. According to the results of this inventory, the major source of PCDDs and PCDFs releases is uncontrolled combustion. Owing to the lack of factors and methodology, the emissions estimate of PCBs and HCB were not included in the inventory. There is no specific legislation in place for controlling the releases of PCDD/F from commercial as well as non-commercial sectors.

2.3.4.1 Emission sources in Nepal

During the inventory exercise, the UNEP Standardized Toolkit for Identification and Quantification of Dioxin and Furan Releases, 2005 was used to calculate the annual dioxin and furan releases. The Toolkit addresses direct releases and transfers of PCDD/PCDF in the following five compartments and/or media.

i. Air
ii. Water (fresh water sources and then subsequently into sediments)
iii. Land (soil)
iv. Wastes (including liquid, sludge, and solid residues, which are handled and disposed of as waste or mainly recycled)
v. Products (such as chemical formulations or consumer goods such as paper, textiles, etc.)

Owing to the lack of factors for estimation of PCBs and HCB release, lack of fund and limited time allocated for this task during the inventory process, only the inventory of dioxins and furans release was prepared.

2.3.4.2 Summary of PCDD/F release inventory in Nepal

The preliminary inventory on Dioxins and Furans emissions was prepared according to the recommended UNEP Standardized Toolkit for Identification and Quantification of Dioxin and Furan Releases. Experts involved in making inventory collected secondary data on waste generation, production capacity of the industries assessed, current practices of waste management, etc. in each sector and where possible field survey was carried out to estimate and validate the secondary information. Besides, expert opinions were also sought during this process. According to the results of this inventory, the major source of PCDDs and PCDFs releases is found to be the uncontrolled combustion of agricultural and other wastes.

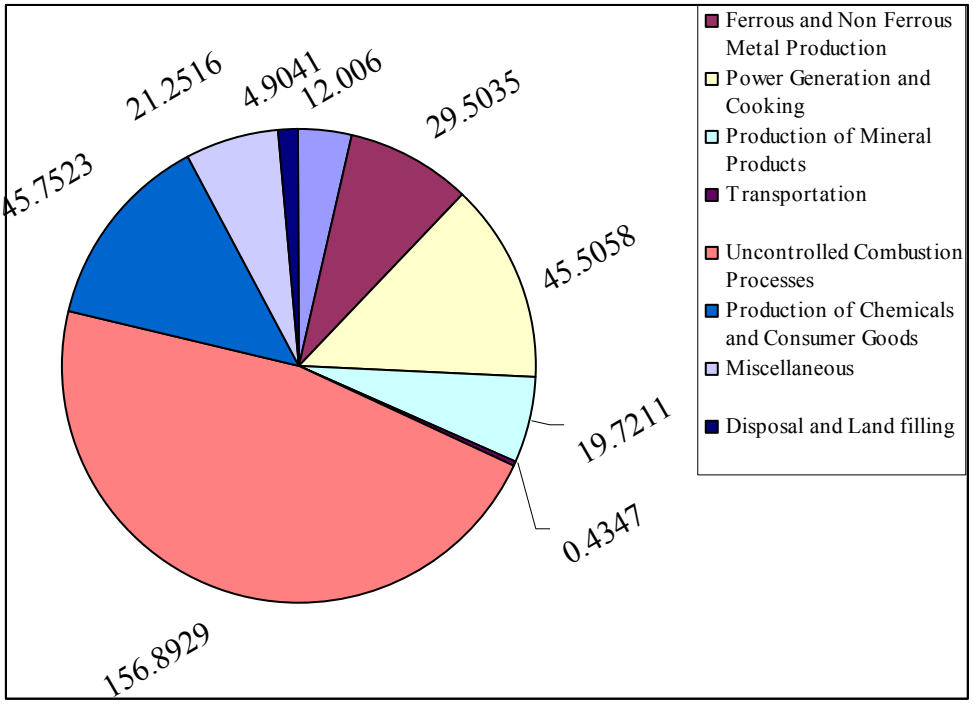
A short summary of the PCDD/Fs inventory is presented in this report. Following summary table describes the summary of the dioxin and furan releases from each category to all media.

Table 2.19: Nepal National PCDD/PCDF Inventories 2003

No.	Source category	Annual release g TEQ/y)					Total/Sector (g TEQ/y)
		Air	Water	Land	Product	Residue	
1	Waste Incineration	12.00[1]	0.0000	0.0000	0.0000	0.0060	12.006
2	Ferrous and Non Ferrous Metal Production	5.8200	0.0000	0.0004	0.0000	23.6831	29.5035
3	Power Generation and Cooking	38.0075	0.0000	7.4983	0.0000	0.0000	45.5058
4	Production of Mineral Products	19.7135[2]	0.0000	0.0076	0.0000	0.0000	19.7211
5	Transportation	0.4347	0.0000	0.0000	0.0000	0.0000	0.4347
6	Uncontrolled Combustion Processes	108.6762	0.0000	35.2321	0.0000	12.9846	156.8929
7	Production of Chemicals and Consumer Goods	0.1720	0.0000	0.0000	2.5713	43.0090	45.7523
8	Miscellaneous	20.6918	0.0000	0.1864	0.0000	0.3734	21.2516
9	Disposal and Land filling	0.0323	0.0505[3]	0.4939	4.3274	0.0000	4.9041
10	Potential Hot- Spots	-	-	-	-	-	-
Total		182.1690	0.0143	43.4187	6.8987	80.0561	335.972[4]

Source: PCDD/F Inventory, MOEST/POPs, 2006.

Figure 2.5: Annual PCDD/F release estimate for the year 2003



[1] Original estimate by Mr. Pokhrel was 0.9000 g TEQ/Y
[2] Original estimate by Mr. Pokhrel was 7.4345 g TEQ/Y
[3] Original estimate by Mr. Pokhrel was 0.0143 g TEQ/Y
[4] Original total estimate by Mr. Pokhrel was 312.5568 g TEQ/Y

2.3.4.3 Identification of major sectors leading to PCDD/F release

The following major sectors were assessed for the release of PCDD/F as per the methodologies recommended by UNEP Standardized Toolkit for Identification and Quantification of Dioxin and Furan Releases, 2005

- Waste management
- Industrial process of certain types of industries, such as pulp and mineral industries.
- Power Generation and Cooking
- Transportation
- Agricultural waste burning and forest fires

2.3.4.4 Identification of data gaps

Misclassification of the health care waste incineration facilities leading to underestimation of the release
Current inventory has not accounted the amount of PCDD/F releases due to direct discharge of industrial wastewater and municipal sewage into inland water surface and wetlands.
Data used for the release assessment from secondary metal production and thermal wire reclamation is limited. The data used for calculation from iron and steel production sector is incomplete.

2.3.4.5 Full country inventory

The inventories of PCDD/F release from each sector are briefly described here. For further information, please refer to the Inventory of Dioxins and Furans for Nepal, 2004.

Main source category 1: Waste incineration

Currently there are no municipal waste incinerators in the country, therefore municipal waste is transported to landfill sites and are even burnt in some cases in an uncontrolled manner. However the health care wastes are primarily burnt and also are mixed with municipal waste for land disposal.

Health care waste incineration

Few major hospitals have the facility to incinerate the medical wastes in their compound but the incinerators do not incorporate Air Pollution Control Device. Majority of the medical wastes are burnt in the hospital compound. So, out of 500 tons of medical wastes generated per year, about 300 tons is estimated to be burnt in the hospital compound. The total dioxin release estimated for all environmental media is 12.0060 gTEQ per year. The break down for each environmental compartment is given in the following table.

Sub category	Annual release gTEQ/y					Total/Sector (gTEQ/y)
Health care waste incineration (Uncontrolled batched no APC)	Air	Water	Land	Product	Residue	
	12.000	0.0000	0.0000	0.0000	0.0060	12.0060

Main source category 2: Ferrous and non ferrous metal production

Iron ore sintering, coke production and other primary metal production do not exist in Nepal. Only Iron and Steel Production, foundries and thermal wire reclamation exist in Nepal. This sector is estimated to release 29.5035 g TEQ of dioxin every year.

Sub category	Annual release g TEQ/y					Total/Sector (g TEQ/y)
Ferrous and Non Ferrous Metal Production	Air	Water	Land	Product	Residue	
	5.8200	0.0000	0.0004	0.0000	23.6831	29.5035

Main source category 3: Power generation and heating

Commercial energy mainly constitutes electricity, fossil fuel and biomass while the domestic energy largely comes from biomass. Most of the electricity generated in the country comes from hydropower while only 43.79 MW capacity diesel/FO generators located at three different places generate electricity during the peak demand. There are 111,395 biogas plants operating in the country for household cooking and 11314811 tons of wood is used for domestic cooking. Besides 6094 tons of coal and 18787 tons of kerosene is being burnt for energy generation for domestic use. The total of 45.5058 g TEQ of PCDD/F release is estimated from this sector.

Sub category	Annual release g TEQ/y					Total/Sector (g TEQ/y)
Power Generation and Cooking	Air	Water	Land	Product	Residue	
	38.0075	0.0000	7.4983	0.0000	0.0000	45.5058

Main source category 4: Production of mineral products

There are 24 cement plants in the country for cement manufacturing producing above 25 million metric tons. There are many micro-scale lime industries scattered throughout the country. But, the exact lime production in the country is not known. The Government owned lime industries, i.e. Jogimara Lime Industry and Agriculture Lime Industry, produce 6,000 metric tons of lime every year. Brick kilns in Kathmandu Valley as well as in all the urban areas in the country are important sources of building materials. The population of urban area is growing at an alarming rate and the number of houses that are built has grown. With the increase in population, the number of brick industries catering to the demand of bricks in the valley has grown. Currently 9972264136 pieces of bricks are produced annually. 201218 tons of asphalt is made in the country for black topping of the roads. The total PCDD/F release from this sector (cement, lime, brick, asphalt mixing) has been calculated to be 19.7211 g TEQ per year. This is summarized in following table,

Sub category	Annual release g TEQ/y					Total/Sector (g TEQ/y)
Production of mineral products	Air	Water	Land	Product	Residue	
	19.7135	0.0000	0.0076	0.0000	0.0000	19.7211

Main source category 5: Transport

Until 2000, the Department of Roads had constructed 15,308 km of roads of which 46.6 percent of roads are fair weather, 23.8 percent are gravelled and 29.5 percent are black-topped. The total length of black-topped road until this time is 4522 km. Number of vehicles registered in Nepal until 2003/04 includes 12587 buses, 3971 minibuses, 26067 trucks, 82864 light vehicles and 270949 motorcycles. There is no information on whether all of these are in operation or what numbers have already scrapped out. Besides there are two diesel train engines plying on 51 km railway line. Total PCDD/F release from this sector is estimated to be 0.4347 g TEQ every year.

Sub category Transport	Annual release g TEQ/y					Total/Sector (g TEQ/y)
	Air	Water	Land	Product	Residue	
	0.4347	0.0000	0.0000	0.0000	0.0000	0.4347

Main source category 6: Uncontrolled combustion process

Uncontrolled combustion of biomass includes waste burning, agricultural residue burning, accidental fire in houses and forest fire. Agricultural residue burning is the most used method of disposal of wastes by farmers traditionally. Forest fires are quite common in Nepal mainly due to absence of scientific management of forest resources. Forest fires occur during the dry season starting from the beginning of March and ending before the onset of monsoon in the latter half of June. The total PCDD/F release from this category is the largest release sources in Nepal and has been estimated to be 156.8929 g TEQ per year.

Sub category Uncontrolled combustion process	Annual release g TEQ/y					Total/Sector (g TEQ/y)
	Air	Water	Land	Product	Residue	
	108.6762	0.0000	35.2321	0.0000	12.9846	156.8929

Main source category 7: Production of chemicals and consumer goods

Major categories of the industries identified for the estimation of PCDD/F in this sector are 5 pulp and paper industries, 169 textile industries, 108 wool dying and carpet industries and 15 leather and tanning industries in Nepal. The total PCDD/F release from this industry is estimated to be 45.7523 g TEQ per year. The break down of release to different media is given in the following table.

Sub category Production of chemical and consumer goods	Annual release g TEQ/y					Total/Sector (g TEQ/y)
	Air	Water	Land	Product	Residue	
	0.1720	0.0000	0.0000	2.5713	43.0090	45.7523

Main source category 8: Miscellaneous

Regarding the drying of biomass activities in Nepal, the commercial production of tea and cardamom involves drying activities using wood and other biomass. The production of tea in the year 2003 was 11,651 tons and the firewood estimated to dry this quantity of tea is 46,605 tons. Similarly estimated wood and other materials burnt for cremation of dead bodies is 88,849 tons. Likewise tobacco smoke from 51,600 cigars and 7,659,920,000 cigarettes, by number, too is contributing to PDCC/F release. The total quantity of PCDD/F release is estimated to be 21.2516 g TEQ per year from this category.

Sub category Miscellaneous	Annual release g TEQ/y					Total/Sector (g TEQ/y)
	Air	Water	Land	Product	Residue	
	20.6918	0.0000	0.1864	0.0000	0.3734	21.2516

Main source category 9: Disposal and land filling

There are two public wastewater treatment plants, namely Bagmati Area Sewerage Project in Kathmandu and WWTP in Hetauda Industrial Estate, operating for municipal waste water and industrial wastewater treatment, respectively. In addition to these there are some individual waste water treatment plants commissioned by Gorkha Brewery, Shree distillery, Chaudhary Udhyog Gaun,

etc. However, the current calculation of PCDD/F release from this sector includes Bagmati and Hetauda WWTP only. Total PCDD/F release from both wastewater and sludge is calculated to be 0.5082 g TEQ per year.

The popular mode of waste disposal in Nepal is composting. This is practiced in all rural areas for resource recovery as the agricultural manure, whereas in urban areas such wastes are dumped (and land filled). About 10% of such wastes are expected to be composted, hence releasing 4.3274 g TEQ per year. Moreover, this waste is either land filled or dumped in designated areas thus the organic fraction of this waste (65.5%) is decomposed, ultimately leading to PCDD/F release. When such composting is accounted, the PCDD/F release would be increased to 28.3442 g TEQ per year.

Most of the municipal and industrial wastewater is dumped /drained in rivers and lakes in Nepal. The amount of PCDD/F generation has not been calculated.

The waste oil from motor workshop discharge has been estimated to release 0.032385 g TEQ per year.

Sub category	Annual release g TEQ/y					Total/Sector (g TEQ/y)
Disposal and land filling	Air	Water	Land	Product	Residue	
	0.0323	0.0505	0.4939	4.3274	0.0000	4.9041

Main source category 10: Potential hotspots
There is no estimate made in this category.

2.3.5 Information on the state of knowledge on stockpiles, contaminated sites/areas and residue/wastes, identification, likely numbers, relevant regulations, guidance, remediation measures and data on releases from sites

Summary
There are some regulatory frameworks for the management of pesticides and solid wastes, but none of the legislation sets levels for contamination for POPs chemicals in waste or products. Obsolete pesticides harbouring warehouses and their immediate vicinities can be taken as pesticides contaminated sites, but exact locations where pesticides were buried in the past could not be identified. Temporary landfill sites and transformer workshops are among sites which may be contaminated by PCDD/F and PCBs. There is as such no remediation measure adopted for the POPs contamination sites in Nepal.

2.3.5.1 Introduction

The serious environmental and human health threats due to POPs in Nepal are due to:
Import of pesticides in quantities beyond the amount required, thus unused and date expired stock is the major source of contamination in places where they are stored. PCBs mixed dielectric/insulating oil, filled in electrical equipment, when evacuated from transformers during repairing/maintenance works leaks into the environment thus contaminating the environment and posing serious threats to human health and environment (refer subsection 2.3.2: PCBs containing wastes).

Major stocks of such pesticides are collected, packed and stored in some government warehouses, yet there is a good stock still in dispersed conditions and thus contaminating the soil, water and air. The inventory of pesticides has identified about 75 m tons of such obsolete stocks, which need immediate

action (i.e. disposal), so that the environment in the immediate vicinity will not be further contaminated.

Over 106185 litres of PCBs contaminated transformer oil are located in different parts of the country (Table 2.15 and Table 2.16). Some PCB containing oils are still in use in power transformers located in generating stations and grid-stations of NEA.

Currently in Nepal, none of the legislation sets levels for contamination for POPs chemicals in waste or products. In order to build inventory on contaminated sites, it was aimed to identify at least those locations, where POPs contamination could be suspected. Temporary landfills hence could be selected as one of the contaminated sites. UNEP in 2001 estimated that about 83 percent of all recorded waste generation in Nepal is municipal wastes, while about 11 percent is agricultural waste and 6 percent is industrial waste. The total municipal waste generation in Nepal in 2003 with an urban population of 3,487,000 was calculated to be 1,369 tons per day or approximately 500,000 tons per year (SWMRMC, 2004).

2.3.5.2 Information on POPs stockpiles

During the inventory exercise one of the major tasks was to assess the stockpiles of Annex A part I and part II POPs, which are discussed in subsections 2.3.1 and 2.3.2.

2.3.5.3 Institutional and Regulatory Framework

Plant Protection Directorate under MOAC as institution and Pesticide Act 1991 and Pesticide Regulation 1994 as regulatory frameworks are effective in the area of pesticide management.

In case of PCBs there is no specific national institution and regulatory measures that exist till date.

Solid Waste Management and Resources Mobilization Act 1986 and subsequent Rule 1987 are in place and these legal provisions are further complemented by the Environment Protection Act 1997 and subsequent Rules 1997, and Industrial Enterprise Act, 1992. However the proper definitions, guidelines and requirements for hazardous waste management are not incorporated in any of these Regulations. This is dealt in detail in subsections 2.2.4, 2.2.5 and 2.3.1.2.

2.3.5.4 Sites contaminated with POPs

A contaminated site may be defined as a site at which substances are found at the concentrations higher than background levels and pose or are likely to pose an immediate or long-term hazard to human health or the environment and exceed their levels specified in law.

Obsolete pesticides storage sites particularly at AIC (Biratnagar), RARS (Lumle), DADO (Banke) and NSC (Nepalgunj and Janakpurdham) have been found heavily contaminated. The storage situation is worst at AIC (Biratnagar), DADO (Banke) and ADB (Khajura), whereas it is bad in NSC (Nepalgunj), RARS (Lumle) and NSC (Janakpurdham). In addition to these 24 contaminated sites, where pesticides have been stored since long time, there are some contaminated sites where pesticides had been buried in the past to dispose the obsolete stocks. Exact location (latitude and longitude) of the burial sites are not known, the tentative locations are as follows:

- About 53 tons of obsolete pesticides were buried and sprayed in near by forests in Amlekhganj, Nepalganj, Biratnagar, Saljhandi-Rupandehi, Janakpur, and Bhairahawa (Source: Politics in Poison , 2003, NEFEJ, pages 5-6).

- Likewise 64 tons of obsolete pesticides has been mixed with lime and buried. Exact location is unidentified.
- Adhabar and Majona forests, on the east of Amlekhganj in the year 1985, where buried pesticides were again retrieved after one year due to public protest. This stock is now stored in the warehouse at Amlekhgunj (SB Ghimire quoted in Politics in Poison, 2003, NEFEJ).

The main sites contaminated with the PCBs are transformer-repairing workshops, both under the NEA and private ownerships (please refer 2.3.2 PCBs contaminated Wastes). The floor of the workshop and the ground where old transformers are stockpiled are contaminated with the old oil leaked during repairing and retrofilling activities. The larger yet unnoticed contamination is due to welding workshops scattered throughout the country, mainly in urban and semi-urban areas. Manifold impacts of such contaminations could be due to the use of old transformer oil in such welding workshops. Moreover, the illusion that "transformer oil can be a remedy to cure certain ailments" is very alarming, since this will have direct health impacts also in the future.

The Gokarna land fill site which is closed now was in operation from 1986 till 2000 and has the deposit of all municipal wastes. As the waste segregation was not practiced prior to dumping, it may hence contain all conceivable POPs that might have been used during mid eighties and nineties. Municipal solid wastes that were and even now are disposed off in the municipal waste disposal sites in the country are generated from the following sources:

- household wastes;
- commercial wastes (slaughtering house, green groceries, auto workshops, discarded paints, papers, cardboards, textiles, plastics, glass, wood, etc.)
- industrial wastes (cardboard, papers, plastics, oil & grease, sludge, spent solvents etc);
- health care waste (body parts, needles, plastic tubes, contaminated swabs, cotton, plasters, bottles, empty reagent containers etc)

This landfill however has not been assessed for any contamination of PCBs, POPs pesticide residues and PCDD/F. This could therefore be one of the contaminated sites. However, a recent grab sample of the leachate from Gokarna landfill site (a closed landfill now) did not show any presence of PCDD at µg/l level (GC-MS analysis). Besides this, all other urban landfill/dumping sites are thus to be included as the contaminated site which includes all the Bagmati, Bishnumati, Dhobikhola corridors which were land filled by solid waste generated in Kathmandu. Moreover, all other urban areas too have their dumping sites (not land fills) at the vicinity of the settlements mostly along the river banks or open areas and lowlands (to reclaim the land for building houses) having more or less similar types of wastes.

In addition, some bigger industries like those located away from city core areas didn't have access to municipal waste disposal sites. This is also because the land fills were intended to take care of the municipal solid waste only. Therefore, these industrial wastes are mostly dumped near their places of origin/generation. Some of the industrial wastes are selected and re-used, yet, most of them end up at landfills in the backyards of industrial facilities.

Health care wastes from the very beginning continue to be treated as municipal solid wastes and are disposed of at municipal landfills/dumpsites. Despite the publication of Guidelines for the Management of Health Care Waste by National Health Research Council in cooperation with WHO, the health care waste disposal practice however has not been significantly changed. There are 26 hospitals that have incinerating facilities mostly (20 out of 26) with class I incinerators as defined by UNEP's Dioxin Tool Kit, and only 6 hospitals have class II incinerators.

Negative impacts of these practices may be noticed, for instance, on ground waters, surface waters and the soil in urban and industrial parts of the country. The Municipalities and Solid Waste Management and Resource Mobilization Center, which are responsible for waste collection and management and building infrastructure for waste management respectively have been facing severe financial difficulties. Industrial waste management issue has not been able to draw significant attention of the general people as well as government agencies as of now. So far very little attention is paid to the re-use of the wastes generated at the industrial sector. If they were re-used, obvious financial results would be achieved and environmental pressures would be decreased.

2.3.5.5 Preliminary identification of priority sites

On the basis of the inventory data, following sites (Table 2.20) need higher priority while developing any management options with regards to pesticides.

Table 2.20: Priority contaminated sites

Contaminated Site	Factor for giving high priorities	Priority
Amlekhgunj ware house	• Proximity to School and residential area • Very old building and large storage • Large stock of POPs pesticides stored • Next to the highway and river; danger of flood	1
Biratnagar warehouse	• Old bamboo-mud hut with broken wall and leaking roof • Enough dampness of wall and floor • Next to the office and market	2
Nepalganj warehouse	• Stored in a garage with an iron-grill open door • Located adjacent to offices and residential buildings • Strong smell during summer season	3
Hetauda	• Storage in the rented room	4
Lumle	• Dust spread over and bad condition	5
Khajura	• Liquid spilled over, worst condition	6
Janapurdham	• Dust spread over and bad condition	7
Pokhara	• Bags broken	8
Birganj	• Stored in small room	9

The transformer workshops, both under NEA and Private ones, and welding workshops are the priority sites contaminated with PCBs. These sites should be considered for remediation and the action plan should include this.

2.3.5.6 Current capacity and experiences

There are number of governmental and non governmental organizations having capacity and experiences in the assessment of contaminated sites. In the government sector, NARC, NAST, Forensic Lab, Department of Food Quality and Control, Central Laboratory of Chemistry, though not in desired extent, have been doing such assessments and monitoring of pesticides residues test in food items, and some environmental samples. At the private level NESS, Soil test laboratory, and Kathmandu University have the assessment capacity. Some of the NGOs, e.g. ENPHO have the capacity and equipment for POPs analysis, other than PCDD/F. The details of the institutional and infrastructure survey owned by several government, private and non-governmental organizations is discussed in the subsection 2.3.10.

2.3.5.7 Overview of international experiences and practice

There is as such no remediation measure adopted for the POPs contamination sites in Nepal. However, there is a potential to adopt Phytoremediation to treat POPs as practiced in Canada, (Okonee), USA (University of Oklahoma, University of Iowa, University of Missouri, University of Maryland, Louisiana State University), Switzerland (Swiss Fedral Institute of Technology), etc.

Conclusion

In order to assess the importance of waste management in the context of the POPs issue, the following activities should be carried out:

- Current legislation has to be amended in order to include hazardous waste management such as setting standards for POPs contamination, including liability issues related to the contamination and clean-up procedures.
- Guidelines should be developed for identification and assessment of POPs contaminated sites
- All the contaminated sites are to be identified and should be incorporated in the cadastre map including prioritization of the sites for clean up.
- POPs contamination should be analytically confirmed for all the identified locations.
- Setting up of a laboratory or upgrading of existing ones, which have the capacity to analyze all sorts of POPs.
- A new policy has to be introduced in waste management sector.

2.3.6 Summary of future production, use and releases of POPs – requirements for exemptions

Summary
There is no intentional production and use or import of POPs chemicals in industries, in power generation/distribution, in agriculture or in public health in the country at present. There is no plan of using them in the future either. The baseline unintended generation of PCDD/F from estimated sector is planned to be reduced through the implementation of this action plan.

2.3.6.1 Introduction

Nepal has never produced POP- chemicals, belonging to Annex A & B. Moreover, the present legal regulations also prohibit the import and use of such chemicals.

Detailed Forecast of Production, Use of Annex A and B POPs, and Releases of Annex C POPs:

There is no data of different POPs pesticides used by names and quantities. It is hence assumed that the organochlorine group includes all POPs pesticides in this case. Organochlorines with active ingredient of 3560 kg, 3503 kg, 9270 kg, 8854 kg and 9752 kg were used in consecutive years from 1997 to 2001 before they were banned for import, sale and use (Source: Pesticide Inventory, 2005).

There are still some very old transformers, though very few, in use with PCB contaminated oil in them. The potential hazard of PCBs to the environment and human health lies in the fact that old and PCBs contaminated stock of transformer oil stockpiled in NEA and private transformer workshops is sold in cheaper price to welding workshops or even to the general public, who are misguided to use such oil for therapeutic purposes.

Table 2.21: Production and use of POPs Pesticides and PCBs

	Year	2004/05 (Baseline Inventory)	2010	2015	2025
POPs chemicals		(Tons)	(Tons)	(Tons)	(Tons)
Aldrin	Production	Nil	Nil	Nil	Nil
	Use	*	Nil	Nil	Nil
Chlordane	Production	Nil	Nil	Nil	Nil
	Use	*	Nil	Nil	Nil
Dieldrin	Production	Nil	Nil	Nil	Nil
	Use	*	Nil	Nil	Nil
Endrin	Production	Nil	Nil	Nil	Nil
	Use	*	Nil	Nil	Nil
Heptachlor	Production	Nil	Nil	Nil	Nil
	Use	*	Nil	Nil	Nil
Mirex	Production	Nil	Nil	Nil	Nil
	Use	*	Nil	Nil	Nil
Toxaphene	Production	Nil	Nil	Nil	Nil
	Use	*	Nil	Nil	Nil
Hexachloro-benzene	Production	Nil	Nil	Nil	Nil
	Use	*	Nil	Nil	Nil
PCBs	Production	Nil	Nil	Nil	Nil
	Use	About 106185.3 litres of PCBs contaminated oil	Very little	Nil	Nil
	* In Nepal, import, sale and use of POPs pesticides are banned since 2001.				

The baseline values for PCDD/F presented in Table 2.22 below are the result of the preliminary inventory and will be refined during the detailed inventory development and will be re estimated.

Table 2.22: Release from unintentional production

Source category	Baseline value 2003	Estimated for 2010	Estimated for 2015	Estimated for 2025
Waste Incineration	12.0060	To be estimated	To be estimated	To be estimated
Ferrous and Non Ferrous Metal Production	29.5035	To be estimated	To be estimated	To be estimated
Power Generation and Cooking	45.5058	To be estimated	To be estimated	To be estimated
Production of Mineral Products	19.7211	To be estimated	To be estimated	To be estimated
Transportation	0.4347	To be estimated	To be estimated	To be estimated
Uncontrolled Combustion Processes	156.8929	To be estimated	To be estimated	To be estimated
Production of Chemicals and Consumer Goods	45.7523	To be estimated	To be estimated	To be estimated
Miscellaneous	21.2516	To be estimated	To be estimated	To be estimated
Disposal and Land filling	4.9041	To be estimated	To be estimated	To be estimated
Potential Hot- Spots	-	To be estimated	To be estimated	To be estimated
HCB	-	To be estimated	To be estimated	To be estimated
PCBs	-	To be estimated	To be estimated	To be estimated

The PCDD/F release given above is the baseline release estimated for the base year 2003 for all environmental media. Some data might need revision as indicated in some cells. As per the requirement of the Convention (article 5) the inventory has been targeted for every 5 years for first two inventories.

2.3.6.2 Detailed information on export of Annex A and B chemicals

Not applicable in Nepalese conditions, since this country neither manufactured these pesticides and industrial chemicals in the past, nor will produce them in the future, thus there have been no exports in the past nor will there be in the future.

2.3.6.3 Detailed information on import and use of Annex B chemicals

Use of DDT had been replaced by other non-POPs pesticides, mainly synthetic pyrethroides since 1995 in health sector. Table 2.23 shows the quantity imported and used before it was banned in 2001. The obsolete amount of identified DDT is about 3.305 tons now located in two warehouses Amlekhgunj and Nepalgunj.

Table 2.23: Import and use of DDT in public health sector

S.N.	Year	DDT Produced	DDT imported and used a.i. in kg
1.	1956	0	2012
2.	1957	0	3292
3.	1958	0	4994
4.	1960	0	127709
5	1961	0	224818
6.	1962	0	235623
7.	1963	0	234495
8.	1964	0	283693
9.	1965	0	263870
10.	1974	0	405716
11	1976	0	605000

12	1977	0	830101
13	1978	0	965000
14	1979	0	241000
15	1980	0	474000
16	1981	0	207000
17	1982	0	186000
18	1983	0	226000
19	1984	0	64000
20	1985	0	159000
21	1986	0	76966
22	1993	0	200000
23	1994	0	100000
24	1995	0.	0
		Total	6120289

2.3.6.4 Requirements for exemptions

Nepal has never produced POPs pesticides and has fortunately banned the import of such chemicals. PCBs have never been produced in Nepal and there is no production projected in the future. Nepal has not filed any exemptions at the Stockholm Convention either.

2.3.7 Existing programs for monitoring releases and environmental and human health impacts/hazards, including findings

Summary

Regular and systematic monitoring of POPs, except pesticide monitoring in food items, is lacking, but the findings of some studies give clear indication of the presence of POPs in the Nepalese environment quite above the recommended and allowed levels. The impact of POPs chemicals on the human population and environment is high in the vicinity, where these chemicals are either stored or wastes generated and/or dumped.

2.3.7.1 Introduction

Except Department of Food Technology and Quality Control, which monitors the pesticides residues in food items only, there is no program/system of regular monitoring of POPs releases into the environment in Nepal. This may primarily be due to the lack of required facilities in terms of human resources and laboratory support. But it is necessary to establish a monitoring system for the measurement, research, control and assessment of releases of all POPs to meet the provisions of Stockholm Convention as well as of EPA 97. This would require:

- Monitoring of POPs levels in the industrial and municipal landfills, in surface waters and in soil and in organisms
- Measurements of the emissions of Dioxin/Furan from thermal emission sources, chlorine bleaching processes and monitoring of Dioxin/Furan in air of large municipal-industrial complexes.

As found during the preliminary inventory of POPs chemicals, the impact of POPs chemicals on the human population and environment will be the highest in the vicinity of larger facilities, where

- Obsolete POPs pesticides are stored
- PCB contamination is suspected, e.g. transformer repairing workshops and welding workshops
- Uncontrolled burning is taking place and large amounts of solid wastes are dumped.

2.3.7.2 Current monitoring standards and capacity for monitoring of POPs presence in the environment

Due to the lack of systematic and sufficient data, a countrywide assessment of POPs contamination and setting the standards is not possible at present. Department of Food Technology and Quality Control has developed some standards for the pesticide residue in legumes, pulses and mineral water and regularly monitors the food samples in densely populated areas. However, the department has not been able to expand its monitoring program for the whole country. The monitoring through other environmental samples (soil, water, air, and human health) is also not in the program.

The Pesticide Registrar Office of PPD and Entomology Division of NARC have also done some pesticides monitoring activities, but are limited only in few project areas.

Private laboratories have provided consultancy services in monitoring pesticide residues in vegetable and soil samples. NGOs have also analyzed pesticides /POPs contamination on issue basis.

Though there are very few studies conducted on environmental contamination with Pesticides and POPs, it shows the contamination of different components of environment such as soil, water, vegetables, etc., as listed in Table 2.24 given below. For more details please see the Annex II Tables 1 to 7. Such findings in samples collected by POPs project is given in Annex III, Tables 1-11.

There is an urgent need to upgrade most of the existing laboratories for the monitoring of release of pesticides and POPs. Their capacity should also be strengthened for better assessments of the impact on human health and environment.

2.3.7.3 Assessment of current monitoring practices with results

Though there is no regular and systematic monitoring of POPs, the finding s of some studies give clear indication of POPs presence in the Nepalese environment quite above the recommended and allowed levels (see Table 15)

2.3.7.4 Evidence of presence of POPs in the environment, food, feed and humans

There is no data on the presence of PCBs in environmental samples, human tissues and in food and feed. Likewise, no study on the presence of dioxin and furans in the biota and different environmental compartments is available. There are however, some studies conducted on the pesticides and the data which show that some POPs are present in soil, water and in different biota.

Table 2.24: Available monitoring data (environment, food, human) and health impacts in Nepal

S. No.	Pollution/ Effects	Examples (with reference)
1	Air	Annual total release of PCDD/PCDF 335.972 g TEQ (PCCD/F Inventory, MOEST 2005)
2.	Water	Among 25 water samples from lakes of Pokhara Valley in 1997, 0.01 to 0.10 ppm of γ–BHC, highest in Begnas Lake sample from 2.5 m depth; No DDT detected (NARC, Entomology Division 1998)
3.	Soil	Low level of organichlorine residues in soil from vegetable growing areas; some isomers of γ and α–BHC (γ-BHC -0.001 ppm and α – BHC 0.003 ppm) in some samples. Aldrin was detected in 1 sample (NARC, Entomology Division, 2002) In 5 Composite soil samples from the school ground adjacent to Amlekhgunj warehouse HCH, DDD, DDE, DDT, Dieldrin, chlorpyrifos, were detected; also mercury was present in 4 samples (Pro Public, 2006) 17 soils samples from Kavre, Kathmandu, and Bhaktpur districts found contaminated with pesticides (NEFEJ 2005)
4.	Bee Population	Severe pesticide effects on pollinators (Gautam, 1991; Sharma, 1994; Thapa, 1994, 1999) Domesticated bees wiped out in Ilam, Nuwakot and Chitwan districts after heavy use of chemical fertilizers and pesticides (Gautam, 1991; Sharma, 1994; Thapa, 1994, 1999) Many honeybee colonies destroyed by pesticide poisoning at Khumaltar (Entomology Division, 1997).
5.	Wild life	Migratory birds and other wild animals fall victims to pesticides; Four one-horned rhinos killed by poachers using pesticides in Narayani river (Kandel and Mainali, 1993).
6.	River Fish	A school of fish found floating in the Bargandi river near Palpa killed by chemicals (Kandel and Mainaili, 1993 & Sharma, 1994) Use of Endosulfan to kill fish in the Koshi and Narayani rivers. People affected after consuming fishes killed by liquid pesticides near Rapti and Bagmati rivers (Proc. of POPs Inception Workshop 2004).
7.	Resistance	In Nepal, first record of dieldrin resistance in Anopheles culifacies in Parsa and Bara districts in 1960 (White, 1982). DDT resistance reported in 1962 shortly after the malaria eradication campaign launched in 1959 (White, 1982). Malthion resistance in stored grain pests, Sitophilus sp. and Rhizopertha sp. (Sharma 1994) Grown up larvae of soybean hairy caterpillar, Spilarctia casignata reportedly developed resistance to organochlorine, organophosphate and carbamate pesticides (Neupane and Thapa, 1985). Helicoverpa armigera confirmed to be resistant (up to 126 times) to different insecticides (Armes and Pandey, 1995).

8.	Food contami-nation	94% of the food articles analyzed were contaminated with DDT in 1981, but reduced to 75% in following years coinciding with decreasing use of DDT in agricultural and heath sectors. But in both the cases, residue levels were above the MRL set by FAO/WHO (Mrs. Urmila Joshi, 1988) 83% of 163 samples were contaminated with DDT residues (ranging between 0.001 to 5.05 ppm), of which 76% of the samples had DDT residue above the tolerance limit (CFRL, 1988). In 1992/93, 28 of 31 samples contained pesticide residues indicating an increasing trend of pesticide residues in fresh vegetables (CFRL, 1993). Two buffaloes died in the early sixties due to application of ethyl parathion to control Boophilids in Gokarna VDC. Two calves died when the farmers fed the grasses, which were treated with pesticides to control Sogatella furcifera epidemic in Katmandu valley during 1982, to the animals ignoring the instructions of DOA (Sharma, 1994). In the mid 1970s CFRL detected pesticide residues in many food samples, among which 87.5 % of milk samples contained DDT (Klarman, 1987). A study carried out in 1984 also showed a number of food items including meat contaminated with DDT at a level above the FAO/WHO standards (Giri, 1990). Similarly chlorinated hydrocarbons were detected by Joshi (1984) in milk samples taken from the dairy. NEFEJ, in a pesticide residues analysis in potatoes from Kathmandu, Kavre, and Bhaktpur districts, found the samples contaminated with pesticides (NEFEJ 2005)
9	Human health	Poisoning cases mostly due to pesticides have been observed in different hospitals (Sharma, 1994; Sayami and Shrestha, 1995) Various types of ailments are reported by retailers and farmers. Similarly, survey reports of Entomology Division (2002) indicated various poisoning symptoms like headache, skin irritation, nausea, eye irritation, vomiting, diarrhea, dizziness, low appetite, stomach pain in farmers at different commercial vegetable growing area. Of the total 668 peoples poisoned with pesticides in 2002, 27 people were dead (Bhoj Raj Bhatt in Department of Health Annual Report 2002.)
Source: Sanjay Bista, Sunil Aryal,and Rameshwor Maharjan, Entomology Division, NARC, Paper presented in MOPE workshop on "Pesticde stock inventory and possible contamination in Nepal", January 14-15 , 2004, NEFEJ (2005), PRO PUBLIC (2005)		

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

Summary

Nepal does not have any comprehensive public information policy and practices directly related to POPs issues. General public is not well aware of pollutant gases and their impacts on human and environmental health. Also, the authorities of stakeholder organizations were quite unaware of the adverse effects of PCBs and PCDD/F. A system for disseminating information on agriculture production technologies, environment and few POP related issues are provided through certain communication media/tools to the targeted groups only.

2.3.8.1 Introduction

Since 2001 POPs pesticides are no more in use in agriculture and public health sector in Nepal. Instead, oraganochlorines, organophosphates, carbamates, synthetic pyrethroids etc. have been used. Annual consumption of these pesticides is equivalent to 184 metric tons of a.i. formulations (Sharma 2004). The national average consumption of pesticides is very low (142 gm/hector) compared to other South Asian countries ranging from 750 to 5700 gm/hector. The residues of the pesticides are found in food grains (0.3-7.5 ppm), fresh vegetables (0.30-6.4 ppm) (CFRL 1993), animal milk, fish, wild life, predators and parasites. There is no standard permissible level of pesticide residues. There are some evidence of accidental pesticide poisoning in food, suicide cases due to consuming heavy dose of pesticides and occupational accidents in farmers while dusting/spraying pesticides.

Nepal has never produced and exported PCBs, however, there is a significant amount of imported dielectric fluid which contains PCBs or is contaminated with PCBs. This is due to the import of PCBs containing dielectric fluid along with the import of electrical equipments (namely transformer, capacitors, welding machines etc.) as well as in building materials and paints. An inventory of PCBs in Nepal identified a stock of 1,06,185.3 litres of contaminated old transformer oil. A significant amount is expected to be present in welding workshops in their welding machines. Not only the general public, but also the authorities of stakeholder organizations were quite unaware of the adverse effects of PCBs. Application of this old oil in muscle pain, joint pain and weapons protection without knowing its adverse effects on human and environment is very alarming.

In Nepal there is yearly release of about 335.97 gTEQ of Dioxin and Furans by different sources. There is a trend of burning of wastes containing plastics and paper, and in urban areas burning of rubber tyres during times of political disturbances. The general public is not aware of such pollutant gases and their impacts on the human and environmental health.

It is therefore necessary to make various groups of people aware of the adverse impacts of POPs in human health and environment by conducting various awareness and educational activities. The mechanism of conducting these activities may be effective in close collaboration between the concerned stakeholder ministries and organizations such as MOEST, MOAC, NEA (MOWR), MOHP, MOICS, MOLD, Municipalities, NGOs and private sectors.

2.3.8.2 Overview of public information policy and practice related to environment

Nepal Government does not have any comprehensive public information policy and practices directly related to POPs issues. However, the government has formulated the Pesticide Act 1991 and the Pesticides Rules 1994, the Industrial Enterprises Act 1992 and the Environmental Protection Act (EPA) 1997 and the Environment Protection Rules (EPR) 1997. The Pesticides Acts and the Rules were formulated for the purpose of regulating the import, export, production, distribution and use of pesticides. The Industrial Enterprises Act 1991 was formulated to promote industry and for the provision of taking permissible amount of the adverse impact on the environment and human health. The EPA and EPR were formulated to reduce adverse impacts on the environment and ensure the proper use of natural resources for environmental conservation. These Acts and the Rules are relevant for the management of pesticides, industrial chemicals and unintentionally produced POPs and also specify development projects for which IEE and EIA are necessary to carry out and also the procedure to be followed for these activities. But the enforcement of these acts and rules was not effective.

In accordance with the provision of Environment Protection Acts 1997 and Environment Protection Rules 1997, government authorities are obliged to make environmental information available to everybody. In the Ministry of Agriculture and Cooperatives (MOAC), there is a unit "Agriculture Information Division" responsible to raise awareness on agriculture issues including pesticide problems.

In 2005, Agriculture Information and Communication Centre (under AICC) developed Guidelines and Directories for Information and Communication Technology (ICT) in agriculture. The above guidelines and directives of AICC may be applicable in communicating the information with some modification, if necessary, about environment and POPs related issues.

Similarly, in the MOEST, there is a "Environment Promotion and Extension Section", which is responsible to create public awareness on environment issues through different publications, workshops, television programs, etc. Television broadcasting of a documentary film on the hazards of POPs chemicals was a significant awareness campaign. Likewise, in different line ministries and departments, there are units responsible for providing information on critical environmental issues to the public.

2.3.8.3 Present public information tools and mechanisms

The available information on POPs related issues such as misuse and overuse of pesticides, unregulated use of PCB contaminated transformer oil and unintentionally produced pollutants and the problems associated with these issues should be disseminated to the general people through existing communication systems. MOEST, as National Focal Point for the implementation of Stockholm Convention, through POPs Enabling Activities Project is disseminating the information on POPs through workshops actively participated by representatives from concerned government ministries and departments, stakeholder organizations, private sectors and NGOs working on POPs issues, academic and research institutes, pesticides dealers and retailers. MOAC is making the farmers and general public aware of the misuse and overuse of pesticides and its environmental consequences. Some NGOs such as NEFEJ, ENPHO, and CEAMP are disseminating information and raising awareness about the hazardous chemicals and their adverse impacts on human health and environment among the general public by conducting various activities and by using possible means of communication such as electronic media, printed media, seminars, workshops etc. The higher

academic institutions have also included this topic in their curricula and are thus laying due emphasis on the protection of environment and human health from hazardous and toxic chemicals, including the POPs. Government has also started the environmental education at the school level with an objective of raising Awareness, increasing Knowledge, Attitude, Skill, Evaluation ability and Participation (AKASEP) by introducing the subject "Environmental Science" through National Education System (NES). Apart from basic studies, school children and students are also encouraged to actively participte in environment clubs and environment camps to save the environment from adversely affecting substances and activities.

A system for disseminating information on agriculture production technologies, environment and few POP related issues are provided through certain communication media/tools to the targeted groups within the country by different stakeholders/organizations through:-

- Electronic media such as radio, and television
- Internet websites.
- Printed media such as publications (scientific research articles and reports, booklets, pamphlets, flipcharts, articles in newspaper).
- Illustrative materials such as calendars, posters.
- Distributing the publication material such as journals, research report, newsletter, leaflets etc. to other institution within and outside the country.
- Promoting environmentally sound activities, e.g.
    - organizing exhibitions/fair on environment and related sector
    - conducting regular training on IPM technologies.
- cleaning-up during the world environment day celebration.

Detail available information and its dissemination system on environment and other aspects by concerned stakeholders are presented in Table 2.25.

Table 2.25: List of ministries and other stakeholders involved in information dissemination system:

Ministries/ Stake Holders	Type of activities	Type of information	Communications media/tools	Mechanism of information dissemination	Clients	Time frame
MOEST	World environment day celebration	Environment related themes	Exhibition,posters, and rally	Posters, bulletins, TV, Radio and placards	Decision makers, donor agencies, scientists, students	Once a year.
	Poster publication, Report on state of environment	Conditions of environment and pollution	Posters, reports	Posters, reports publication and distribution	Decision makers, donor agencies, scientists, students and public	Once a year
	Publication of environmental journal	Research articles on environment and POPs	Journals	Journal	Decision makers, donor agencies, scientists, students	Once a year.
	Public hearing during EIA	Possible impacts of project on environment	Public notice	Discussion on site	Local community, government officials	As and when needed.
	Documentary film, Radio spot, TV Aid	Information on critical environmental issues including POPs	Documentary film, Radio spot, TV Aid	TV and Radio broadcasting	General public	Once a year

MOAC -AICC	Publication and distribution of educational materials	Agriculture information and production technologies in agriculture and animal science	Leaflet, booklets, books, pamphlets, calendars, diary	Educational materials distribution.	farmers, extension workers, scientists, teachers, field staffs, other stakeholders, NGOs	Regularly
	Production and telecast of video documentary	Information and production technologies in agriculture and animal science	NTV, Radio	Telecast through NTV, Radio	Farmers, extension workers, scientists, teachers, field staffs, NGOs	Daily 20 mins evening program
	Production and broadcasting of agriculture program	Information and production technologies in agriculture and animal science	Radio	Radio	farmers, extension workers, scientists, teachers, field staffs, NGOs	Daily
	Agriculture information service	Agriculture information and production technologies in agriculture and animal science	Internet/ email	Websites	farmers, extension workers, scientists, teachers, field staffs, NGOs	Regularly
MOWR -DWIDP	Conduct training	Climatology, geology, disaster prevention,	Spot visit, lecture, discussion, workshop	Lecture, seminars/ workshop	Government officials of different levels	one month per year
	Roving seminar at district level on natural disaster mitigation	Water induced disaster, identification of disaster spots, time of natural disaster and its management, landslides, preplanning of disaster area	Books, posters, pamphlets, documentary films and video, hording boards, advertise	Group discussion with local organizations	Community development group, leader- farmers group, forestry users group, water users group	Two days
	Information and social mobilization	Formation of group process, technical measures to prevent streams and rivers	Miking, street drama and songs	Coordination activities at the time of disaster	Local NGOs, CBOs, school teachers, women development groups	As and when required
MOFSC -King Mahendra Trust for nature conservation	Resource conservation	Forest, wildlife, soil and water	Exhibitions, demonstrations, field visit, poster, leaflets	Poster, leaflet; Discussion during visit	Women, farmers, school children, community users group	Frequently
	Information dissemination and awareness camp	Tourism development and health	General meeting, folk songs and dance	Meeting and discussion	House wives, community people, hotel and restaurant personnel, local leaders	Regularly
	Health and sanitation, biogas and solar energy	Installation of biogas, toilets, solar energy	General meeting, folk song and dance	Meeting and discussion; poster	Community people, housewives	Regularly
	Seed and seedling distribution	Fresh vegetable production	Leaflet, demonstration	Leaflets and discussions	Women, farmers	Regularly
	Conducting training	Vegetable and life stock farming	Leaflets, demonstration	Leaflets and discussion	Women, farmers	Regularly
	Documentary film show	Soil and water conservation in marginal sloppy hills	Documentary film	Documentary films	District VDC staffs, farmers, students	Occasionally
-DSWC	Plantation in marginal land	Amriso plantation in marginal sloppy land	Leaflet, meeting	Leaflets and meetings	Farmers, forest users group, community people	Frequently
	Publication of	Water conservation	Calendar	Distributing	Government officers,	Every year

	calendar	in hills and mountains; small check dams; gully erosion control; vegetation for soil conservation		calendars	district VDC staffs, farmers	
MOHP	Awareness program	HIV/AIIDS, family planning, malaria eradication	Radio, TV, hording boards	Advertisement	General public	Regularly
KMC	School children and environment	Conservation and environment	Metro FM Radio	Radio Broadcasting	School children	Once a week
	Establishing environmental club	Recycling of waste, heritage conservation	Panel discussion, educational tour and camp	Tour and camp	School children	Occasionally
	Mass education program	Awareness about environment and health, heritage conservation	Poster, pamphlets, exhibitions and TV	NTV; posters and pamphlets	General public of municipality	Regularly
	Training	Waste management and handling; recycling of kitchen waste; compost making	Demonstration, discussion, lectures, posters	Collaboration with local clubs and ward development committees	Housewives	Occasionally
IUCN	Formal and non formal education, environment and natural resources management	Issues in conservation and environment	Books, reports	Collaboration with MOEST, University, Administrative Staff College	School and university students, researchers, government officials	Regularly
ENPHO	Training and capacity building	Rain water harvest, environment, water and sanitation	Lectures, discussion, slide show, pamphlets, video show	Discussion and social mobilization	Researchers, students, general public, NGO personnel	Frequently
	Research on technology development and dissemination activities	Water treatment technology (Solar water disinfection - sodis, piyus, and kanchan arsenic filter); cleaning the site of natural water resources, management of toilet	Reports, leaflets	Leaflets, reports, seminar and workshop	Government officers, researcher, personnel of enterprises and NGO; general public, farmers	Occasionally
CARE/N	Family health program, natural resource management	Nutrition and health, environment management	Posters and leaflets	Poster, leaflets	Housewives, NGOs, Aama Samuha	Frequently
NESS	Research, environmental services, EIA studies	Environmental quality, Impacts of projects on environment	Analysis and study reports	Analysis and study reports	General public, project proponents and researchers	Frequently
CEAMP	Awareness activities	Environmental issues, resource conservation	Street drama, folk songs, talk program	During ceremonies, market days	Men, women, school children, community people	Frequently
	Training	Agriculture and soil conservation, water sanitation and health, forestry fuel and energy	Handouts, observation tours, group discussion / presentation	Discussion on site during tours, question answering	Men, women, school children, community people	Frequently
CEPHED	Research and public awareness	Medical waste management; technologies and safety measures of	Poster, leaflets, pamphlets, reports	Seminar, group discussion, poster	NGO personnels	Occasionally

		environment and public health sector				
	Production of resource materials	Waste production and release	Reports, posters	Posters and reports	NGO personnel	Occasionally
	Capacity building and policy dialogue	In the field of environment and public health; pesticides and POPs management	Hotspot study report	Reports	NGO personnel; community people	Occasionally
Forum for Justice	Environment justice and equity justice	POPs and pesticides in the line of Stockholm Conventions	Handouts and bulletins	Bulletins	Academicians, general public	Occasionally
	Interaction program	Pesticides and POPs management	Reports	Distributing reports	Academicians	Occasionally
SHELGA	Interaction program	On pesticides and POP management	Reports	Distributing reports	Academicians, decision makers	Occasionally
	Hotspot study and reporting	Pesticides and POP hotspots	Reports	Distributing reports	Academicians	Occasionally
NEFEJ	Research and information dissemination	Identification of POP hotspots, calculation of hospital waste generation	Booklets, newspaper, FM radio, TV	Booklets, Sagarmatha radio broadcasting	Scientists, stakeholders, school teachers, general public, decision makers	Regularly
	Public information and awareness activities	Pesticides and POPs	Booklets, newspaper, FM radio, TV	Booklets, Sagarmatha radio broadcasting	Scientists, stakeholders, school teachers, general public, decision makers	Regularly
	Publication of news articles and booklets, research papers	Pesticides and POP issues	Newspaper, booklets	Distributing booklets	Scientists, stakeholders, school teachers, general public, decision makers	Regularly
	Advocacy and policy dialogue	Safe disposal of absolute pesticides; POPs issue	Newspaper, TV	Newspapers; dialogue; telecast through NTV	Researchers, government officers, general public	Occasionally
CEAPRED	Socio economic impact study	Pesticides and pesticide management	Reports	Seminar, reports	Farmers, pesticide dealers	Occasionally
PRO public	Good governance, pressure build up	Good governance in pesticide issue related articles	Newspaper and TV	Public hearing in TV	Concerned stakeholders, general public	Occasionally
	Advocacy and litigation	Solid waste and medical waste management; safe disposal and management of obsolete pesticides	Newspaper	Advocacy with all concerned stakeholders	Concerned stakeholders, general public	Occasionally
Jagriti Vikash Manch in Amlekhjung	Health check-up camps and awareness raising	Health check-up of affected local people and school children	Pamphlets, newspaper, visit	Group discussion at sites; pamphlets	Local community, school children, administrators	Occasionally
	Pressure group	Health impacts due to stockpiles of pesticides	Newspaper	Jointly with pro public	Local and national authorities	Occasionally
	Networking	Pesticide issues	Internet	Making websites	Personnel of national and international organizations	Regularly
NRCT	River and heritage conservation	River and heritage condition	Leaflets, river guides	Leaflets, river guides, discussions	Tourists, general public	Occasionally
SEF	Awareness raising	Environmental conditions and conservation	Reports and pamphlets	Group discussions	General public, students	Occasionally

FOB	Advocacy, awareness raising, river quality monitoring	River condition and water quality	Exhibitions, visits and discussions	Group discussions	General public, students, researchers	Occasionally

It is found that the government organizations conduct various activities related to their ministries, whereas, other stakeholders such as Municipalities and NGOs are typically concerned with environment and POPs related programs. Such programs in the future should target the following groups, in specific:

- The younger generations including school-level children up to university students.
- Workers in facilities where PCB contaminated oils were/are used or stored.
- Workers who are exposed to pesticides, either farmers or those dealing with pesticides.
- Upper or mid-managerial level officials in government and other organizations having influence on the application of pesticides and PCBs regulations in given areas.
- The general public, including representatives from political parties at various levels.
- Women.
- Least educated sector of the community.

2.3.8.4 Assessment of environment as public policy

State of Environment Report 2001 highlights the five key environmental priorities for Nepal (forest depletion, soil degradation, solid waste management, water quality and air pollution). This report will serve as a valuable input and will help planners, policy-makers and decision-makers to develop plan and formulate policies for the sustainable development of natural resources in Nepal without compromising in environmental issues. These environmental resource bases are described in terms of pressure-state-impact-response framework.

2.3.8.5 Chemical contaminant and pollutant release public information programs

Actually the people of Nepal are not very well aware of the pollutants, except for some pesticides, and their effects on the environment and human health. So the country does not have chemical contaminants and pollutant release public information programs yet. However, the communities around the pesticides warehouses (e.g. Amlekhgunj), dumping site of municipalities (particularly KMC) and the industrial area (particularly the Vrikuti paper mills of Nawalparasi district) are demanding the earliest disposal or removal of obsolete pesticides, and protesting against the dumping site, and against the pollutant release such as ashes.

2.3.8.6 Mechanism for information exchange

Since Nepal has recently ratified the Convention, there is a need to develop a mechanism for information exchange among the Parties to the Convention and among the concerned stakeholders in the country. Nepal does not have any comprehensive policy and guidelines regarding the information exchange system. However, the mechanism for information exchange among the various stakeholders and targeted groups within the country are through meetings, seminars/workshops, distribution of educational materials such as journals, reports, poster, calendar, booklets and also through websites and by establishing cooperation with local organizations. The mechanism for information exchange at international level, particularly with SAARC member countries and other countries, is in practice, especially on production technologies in agriculture development. In 2004, the meeting of the Governing Board (GB) of SAARC Agricultural Information Centre (SAIC) recommended the following specific policy for the use of ICT:

- Governments should review the existing laws and regulations for creating the enabling environment for use of ICTs which ensures the right to information.
- Most of the internet backbone is restricted to urban areas. The policy of broadband internet connectivity in the rural and semi-urban areas should be implemented immediately.
- Government policy should encourage public-private partnerships and promote the investment of different stakeholders in ICT projects.
- Institutionalizing government-private-cooperate and people partnership in all ICT efforts especially at the grassroot levels.

2.3.8.7 Recommendations on strengthening in support of NIP implementation

During the workshops organized by the POPs Enabling Activities Project, one of the issues always discussed was raising public awareness on POPs chemicals. It was emphasized that the approach for the public and that for directly exposed workers should be elaborated and the media and NGOs working on such issues should be involved in this process for effective implementation of the NIP. Some NGOs like Nepal Forum of Environmental Journalists (NEFEJ), Environment and Public Health Organization (ENPHO), Save the Environment Foundation (SEF) and other NGOs are involved in disseminating and raising awareness about the hazardous chemicals for the general public.

2.3.9 Relevant activities of non-governmental stakeholders

Summary
About one fourth of all NGOs registered in Nepal have at least Environment Conservation as one of their main objectives. Very few of such organizations are undertaking research or awareness program on POPs chemicals.

2.3.9.1 Non governmental organizations (NGOs) in Nepal

It is estimated that more than 16,000 NGO's are working in various sectors in Nepal. The NGOs play a pivotal role in the socioeconomic development, advocacy and awareness raising in the country. They are actively working in various sectors like environment, agriculture, forestry, public health, legal aids, destitute and orphan children, women empowerment, welfare of senior citizens, etc. About one fourth of all NGOs registered in Nepal have at least Environment Conservation as one of their main objectives.

NGOs work in association with Social Welfare Council (SWC), a government body established to coordinate and facilitate NGOs, and they focus on the protection of the environment through research, advocacy, lobbying and litigation, organizing public campaigns, round tables discussions and talk programs. They are involved in conducting research, disseminating research findings through organizing symposiums, public meetings for local problems, direct actions, protests, publishing leaflets, brochures, posters, bulletins, newsletters, training, workshops, running radio and TV programs, lectures in primary and secondary schools etc.

Some of the active NGOs, which are also the members of several international environment groups, are Friends of the Earth - International (FoEI), International Union for Conservation of Nature (IUCN), World Wildlife Fund (WWF), Environmental Law Alliance Worldwide (ELAW), Global Alliance of Incinerator Alternative (GAIA), etc.

The POPs Enabling Activities Project under the MOEST is supporting various NGOs, which are working to raise the public awareness in this sector. The POPs project participates in various programs organized by NGOs and also presents the views of the ministry. The NGO is represented by a member in the Steering Committee of the POPs project and the communication between the MOEST and the NGOs is thus maintained. NGOs representatives are also invited whenever their technical support for the management of obsolete pesticides and POPs chemicals is required, or/and when developing NIP is required.

The following table (Table 2.26) summarizes some of the main NGOs and their activities directly related to the Pesticides, POPs problems and environmental issues, as a whole.

Table 2.26: NGOs involved in the POPs and Waste Management

S.No	NGOs and their activities related to environment and POPs
	Nepal Forum of Environmental Journalists (NEFEJ) Formulation and Functioning as Pesticide Watch Group Review of related existing policies, guidelines and legislations. Public information and awareness rising through mass media and building pressure for safe disposal. Research and Information Dissemination. • Identification of POPs hotspots • Calculation of hospital waste generation • Quantification of PCDD/F emissions • Awareness material preparation on the waste incinerators of the Kathmandu valley on the and on the releases of PCDD/F and its implication to the health of exposed population Newsletter, Radio and TV program (Production of video features) Publication of Various. Publication of Different Books, and research documents and News Articles on Pesticide and POPs Capacity building and funding arrangement to local level pesticide related activities. Interaction programs on Pesticide Management.
	PRO PUBLIC Research on Pesticide contamination. Litigation filled in Supreme Court to prevent excess importation of DDT from Indonesia and for the Safe Disposal and Management of obsolete pesticides. Litigation to stop dumping of solid wastes along the Bagmati River bank. Watch dog and Pressure build up Raise Public health issues related to Pesticides and POPs (dioxin and Furan) Solid Waste and Medical waste management related research, advocacy, workshop and litigation. Raising critical environmental issues for proper action to be taken by the government
	Jagriti Vikash Manch , Birganj, Parsa Consultation with local affected people and school children. Organize health camps in pesticide affected areas in Amlekhgunj. Awareness raising among school children, administrators and local people. Pressurize the concerned local and national authorities up to Prime Minister's Office on the pesticide issues. Join hand in launching petition together with PRO PUBLIC for safer and environmentally friendly management of pesticides. Pamphlet production, workshop and seminar on pesticide problems.
	CEAPRED Socio-Economic Impact Studies of Pesticides uses in Nepal Research on pesticide related problems
	Center for Public Health and Environment Development (CEPHED) Research and Public awareness Production of resource materials, posters in English and Nepali languages on medical waste management issues in relation with unintentional POPs (Dioxin and Furan). Capacity building of NGOs in Pesticide and POPs management. Conducting of Biomedical Hotspot study in relation with POP production and release.
	Forum for Justice Briefing paper on POPs and Pesticides in line with Stockholm Convention published and distributed. Interaction program on Pesticide and POPs management. Information dissemination
	SHELGA Interaction program on pesticide and POPs management. Pesticide and POPs hotpots study and reporting. Awareness raising
	Society of Environmental Journalists (SEJ)- Nepal Organize workshops on Environmental Challenges, Management of Pesticides, Chemical Fertilizers and Solid Waste Issues in Nepal Interaction programs on pesticides problems - Minimization or Alternatives
	Environment and Public Health Organization (ENPHO) Research, technology development and dissemination Pollution monitoring in water, air, soil Training and capacity building in the area of environment especially on water and sanitation sector
	Friends of Bagmati (FoB) Conserve the Degradation of the Bagmati River. River Water Quality Monitoring Public awareness on causes of river degradation
	Nepal River Conservation Trust (NRCT) Restore, conserve and protect the rivers of Nepal through affirmative actions and education, whilst maintaining the cultural integrity of local river side communities.
	Women Environment Preservation committee (WEPCO) Work with local communities to create clean and hygienic urban environment Empowerment of women to manage solid wastes in their localities Increase awareness among urban communities and school children with emphasis on "3-R" Concept.
	Environment Camp for Conservation Awareness (ECCA) River monitoring Provide regularly river quality data from two targeted river segments Awareness raising activities

2.3.10 Overview of technical infrastructure for POPs assessment, measurement, analysis, alternatives and prevention measures, management, research and development – linkage to international programs and projects.

Summary
The analytical laboratories in the country have little experience in analyzing organo-chlorine residues in water, soil, sediment and vegetable samples both in private and public laboratories. However no laboratory is equipped to analyze PCDD/F samples in the country.

2.3.10.1 Introduction

The overall technical capacity (human resources and technical infrastructure) for POPs assessment, measurement, analysis, research and development are very limited in the country. There are several laboratories, either government owned or private, but none of them are fully equipped laboratories with full strength of human resources capable of doing all the above activities. Not a single laboratory can assess, measure or analyze the presence of any congeners of polychlorinated dibenzo-p-dioxins and any congeners of polychlorinated dibenzofurans in any of the environmental samples. There is no dedicated laboratory for this particular analysis.

There are no engineered landfill sites for hazardous wastes and no waste treatment facilities. The Health Care Institutes are burning their wastes in drums or in low quality locally built incinerators. Only few hospitals have relatively good quality incinerators to deal with hazardous medical wastes. Some cement kilns are available but none of them are adequately equipped with air pollution control devices. Also, being located in the proximity of the densely populated areas, these kilns are not recommended for the incineration of hazardous wastes.

2.3.10.2 Contaminated site remediation

There are no specialized services for the contaminated site remediation. However, the trained human resources in Pesticide Registration and Management Office under Department of Agriculture can support the government in decontamination of the polluted sites. Similarly, NARC with its experienced scientists can contribute substantially in research activities on POPs. There are also some waste water treatment facilities in Kathmandu and in some industrial areas to treat the municipal and industrial sewerage, respectively.

2.3.10.3 Environmental monitoring

Ministry of Environment, Science and Technology has set up about six Air Pollution Monitoring Stations only in the Kathmandu Valley under the support of DANIDA. However, the regular readings and analysis of data are carried out by ENPHO, which has the capacity to undertake this part of the job. There is no regular monitoring for soil, water and noise. This is basically due to lack of manpower and infrastructure within the ministry.

2.3.10.4 Health monitoring capability

There is no regular health assessment done by the Ministry of Health and Population (MOHP), except that some annual health reports have listed the pesticide poisonings and death cases. Forensic laboratory under the MOEST however is accessing and detecting the health impacts due to pesticides poisoning.

Thus there is a strong need of technical support to establish necessary facilities so that monitoring, mitigation, research and development can be possible.

2.3.10.5 POPs measurement capacities of analytical laboratories

There are several laboratories in public, private and academic institutions; however these laboratories are limited to analyze range of pollutants up to the ppm levels only and only in some cases up to ppb level. The high precision and trace analysis equipments these laboratories possess are:

Atomic absorption spectroscopy: flame and graphite furnace
Gas chromatography: flame ionization detector; electron capture detector
High Performance Liquid Chromatography: UV and diode array detectors
Nuclear Magnetic Resonance Spectroscopy
Infra Red Spectroscopy (FT)
UV-Visible spectroscopy, flame photometers etc

No laboratories in Nepal have mass and fluorescence detectors in either GC or HPLC. Besides, no laboratory has ICP and thermo-desorption facilities. There are 5 accredited private laboratories for different analysis under the Nepal Laboratory Accreditation Scheme (NEPLAS). These are:

- Nepal Environmental and Scientific Services (NESS)
- Environment and Public Health Organization (ENPHO)
- Soil Test (P.) Ltd., material testing laboratory
- CEMAT laboratory
- Water Analysis Services (WAS)

Among these private laboratories the NESS laboratory had been involved in assessing and measuring POPs pesticides in different vegetable and soil samples.

Besides these laboratories the following public laboratories have facilities of analyzing trace components.

- Laboratory of Department of Food Technology and Quality Control
- Laboratory of Entomology Division, NARC
- Chemical Laboratory of Nepal Bureau of Standards and Metrology
- Chemical Laboratory of Department of Mines and Geology
- Laboratory of Department of Plant Resources

Department of Food Technology and Quality Control had been involved in the analysis of pesticide residue including POPs pesticides in different food samples. Nepal Bureau of Standards and Metrology had made the preliminary assessment of the PCB contamination in the transformer oil in Nepal in 2001.

Under the University Grant scheme supported by foreign donors (World Bank), central departments of different faculties of Tribhuvan University have acquired sophisticated equipments recently. These departments in relevance to POPs analysis are:

- Central Department of Chemistry
- Central Department of Physics
- Central Department of Environmental Science, etc

There are large numbers of analytical chemists working both in public and private laboratories. Most of these chemists have received training on analysis of ultra trace components in different samples including environmental samples from abroad.

Table 2.27: Summary table of the list of equipments and laboratories capable of analyzing POPs chemicals

Institutions with facilities for pesticides analysis	**POPs pesticides analyzed so far**	**Equipment**
NARC	Aldrin; (α-, δ- & γ- BHC)	GC (FID, ECD, TID)
DFTQC	DDT, BHC	GC; UV Cabinet
DMG		
NFL	Insecticides	GC; GC-MS
NBSM		GC; HPLC; HPTLC
CDC/TU		UV-Vis spectrophotometer; GC
DEEBS/KU	Organochlorine residues	UV-Vis spectrophotometer; GC (FID, ECD, TID); HPLC
NESS	DDT, Aldrin, Endrin, HCB, Mirex	GC (ECD, FID, TID, FPD, TCD); UV-Vis Spectrophotometer; AAS
ENPHO		GC; AAS; Spectrophotometer
Soil Test	DDT	GC (FID, TCD); TLC
NAST		HPLC
Institutions with facilities for PCBs analysis	**PCBs**	**Equipment**
NBSM		Na-fusion method
MOEST/POPs	PCBS	Dexil Kit (from Connecticut, USA)
Institutions with facilities for PCDD/F analysis	**PCDD/Fs**	**Equipment**
None	None	None

2.3.10.6 Research capacity in POPs management

There are several studies made by NGOs and academic institutions on POPs release and related subjects. But these studies are in bits and pieces and not coordinated. There is no established system of providing government grant to academic institutions for focused scientific researches intended for policy formulation, for instance like POPs assessment. However, depending upon the interest of student and availability of faculty the academic institutions sometimes make such studies. NGOs too if successful on securing funds from international agencies, most of the time, carry out the studies in this line. Some of the examples of this process are,

- ENPHO made the survey on the health care waste generation and incineration practices
- NESS made an assessment of POPs pesticide residue in vegetable and soil samples.
- NARC made an assessment of some POPs pesticide in vegetable, soil, sediment and water samples
- Academic institutions also made the assessment of PCDD/F generation from health care institutions and few industries as a graduate thesis.

2.3.11 Identification of impacted populations or environments, estimated scale and magnitude of threats to public health and environmental quality and social implications for workers and local communities

Summary
Nepal has no declaration and reporting systems of POPs release. The POPs inventory gives preliminary information on the potential sources of POP chemicals, their amount of stockpiles and release into the environment, as well as the rough estimation of impacted populations and contaminated areas in Nepal. It is suggested that the exposed populations should be made aware of the adverse impacts of such chemicals and recommend them to apply precautionary measures or safety gears.

2.3.11.1 Introduction

According to the preliminary information collected during the inventory preparation, the adoption of the Stockholm Convention will have a positive impact on the public health, environmental quality, and local communities, and there will be no significant social implication for workers. As explained in various sections in previous subsections (2.3.1, 2.3.2) there is no detailed and systematic information on the impact assessment of the affected population, estimated scale and the magnitude of threats to public health and environmental quality. However, based on the information colleted during inventory preparation by MOEST and occasional studies done by some non-governmental organizations, the severity of environmental contamination and impacts on human health seems to be significantly high.

2.3.11.2 Declaration and reporting of priority pollutant releases

Except for Ambient Air Quality Standard for Particulate Matter, Nepal has no declaration and reporting systems of POPs release, and also there are no recommended guideline values for such pollutants in environmental compartments (air, water, soil) and in human beings and their food resources. In case of pesticides however, there is a system of declaration and reporting to the concerned authorities about the demand and supply of pesticides, stockpiles of obsolete pesticides and their residues in food resources.

2.3.11.3 Background on potential sources of POPs impacts

In Nepal, there are stockpiles of about 74.5151 metric tonnes of obsolete pesticides including the POPs pesticides stored in 25 differently located warehouses/stores, some of which are very close to school, residential and urban area. The communities around the warehouses (including the teachers and 800 students of Nepal Madyamik Vidyalaya, just behind the warehouse at Amalekhjung) are continuously protesting against the storage there and are demanding the earliest removal or disposal of these pesticides.

General public and also those working very closely with dielectric oil (including old transformer oil, significant quantity of which is found PCB contaminated) do not know about the PCBs yet. The findings during inventory shows that 59% of the employees of NEA and only 14.3% employees of private workshops knew about the PCBs and its adverse impacts on environment. Out of these only 10.8% of NEA and 4% of private workshop employees had observed ill effects of old transformer oil on human health. Welding workshops seem to be another potential source of PCB contamination. These workshops, 10-12 thousands throughout the country, preferably buy the old transformer oil at cheaper rate to fill in their welding machines, which are almost open equipment (open applications!!). The employees, roughly 30 thousand, in such workshops are thus directly handling PCB contaminated oils. Dismantling, replacement and cleanup of the contaminated equipment (transformers and welding machines) and

replacement of old oil would result in an increase in the financial load of the NEA and workshops leading indirectly to the social implications in the population in general.

Similarly, the people are not aware of the unintentionally produced Annex C chemicals (Dioxin and Furans) and it is very difficult to quantify their amount and thus difficult to predict the impacts on the social part. There is an overall influence of Dioxin/Furan on the society but it is not studied yet. The preliminary inventory of Dioxin & Furans, however, estimates a release of 335.972 g TEQ/yr in Nepal.

Of the 129 Health Care Institutions (HCI), including hospital plus medical centers, more than 60 are located in capital and produce a total of 7.3 tons/day (82.2% non infectious and 17.8% hazardous) of wastes, which are mixed with municipal wastes. Majority of municipalities dump their wastes in temporary open piles or along the river banks. No municipality and HCI have the facility for complete incineration of the solid and/or hazardous wastes. Adoption and implementation of BAT & BEP though would cause initial higher expenditure, but in the long run it will positively balance with the environmental and public health benefits.

The potential sources of POPs, some estimation about impacted population and contaminated sites are presented in Table 2.28.

Table 2.28: POPs stockpiles, affected population size and contaminated sites and area in Nepal

POPs	Amount	Affected population size	Contaminated sites	Affected area
Pesticides	75 metric tons.	Approximately 1 million people around the 24 locations.	75X4 sq meter cemented floor of 4 warehouses	1 km radius around the warehouse
PCB contaminated oil.	106 thousand litres of old transformer oil in NEA and private workshops	159 workers of transformer maintenance workshop.	A surface area about 100 sq.m covered by stockpiled transformers	NA
	800-900 thousand litres of PCB contaminated oil in welding workshop.	Approximately 30 thousand workers in welding workshops and other people (no estimation possible!!) who use such oil for massage.	NA	NA
Dioxin/Furans	325 g TEQ/yr.	People around the industrial area. General public of rural areas and municipalities using firewood Public and workers in waste management facilities Worker at municipality and Cement Industries. People around cement industries.	Temporary open piles of wastes • 33 in municipality • 23 in river bank • 7 dumping sites	The surrounding areas around dumping sites.

Following activities (Table 2.29) should be conducted to generate the baseline data, technologies etc. for further action.

Table 2.29:- Activities to be conducted by the concerned stakeholders for information collection

Activities	Expected output	Indicators of success	Responsible institutions	Implementing agency	Frequency
1) Study on impact assessment about POPs.	Basic information and data will be available	-Number of study -Types of information and data collected - Types of social and economic implications that may occur in the community	MOEST, MOAC	University, NAST, NGOs, NARC	5 per year
2) Preparation of technologies and technical work procedure.	Identification of technologies and preparation procedures.	- Number of technologies and procedures	MOEST, MOHP, MOAC	University, NAST, NGOs, NARC, PPD	Continuous
3) conduction of training on:		- Number of trained man power. - Number of people aware. - Number of people gained the	MOEST, MOAC	NGO, NARC, PPD	5 per yr.

- Application of pesticides - Proper handling of contaminated equipment -Management of contaminated waste, operation and maintenance of incinators.	Trained manpower. Minimize pollution. Trained manpower. Minimized pollution. Trained manpower. Minimized pollution.	knowledge. - Number of trained man power. - Number of people aware. - Number of people gained the knowledge. - Number of trained man power. - Number of people aware. - Number of people, who gained the knowledge.		NGO, NEA NGO, HCI, KMC	
4) Conduction of extensive awareness program.	-people will be aware.	- Number of people aware. - Number of communication tools used. - Number of awareness campaigns launched	MOEST, MOHP	In joint collaboration with NEA, NGO, KMC, HCI, Grill industries association.	Continuous
5) Conduction of research and survey on the impacts on population, public health, and its policy and social implication.	Impacted population data will be generated. Data on the Effect of POPs on public health generated. Opinion of people to form the policy on environment gathered. Information on the types of social implication generated.	- Number of people impacted. - Number of research and surveys conducted - Number and types of diseases identified. - Environment policy formulated. -Types of social implications identified.	MOEST, MOHP	NAST, University, NGO, NEA, KMC, HCI	At least 5 studies per year
6) Coonduction of a study on environmental awareness among population in each region.	-environment awareness among population in rural and urban areas will be known. - Recommendations provided to minimize the pollution.	- Number of people in rural and urban areas aware of environmental conditions - Number of study conducted. - Types of recommendations made	MOEST	University, NGO.	At least 5 studies every year.
7) Disposal of absolute pesticides.	The community around the warehouse may be free from pesticide pollution.	Warehouse will be completely vacant and clean - may be used for other purpose	MOEST, MOAC	Other institute or contractor who have good facility	immediately
8) Survey of Polluted Area	-Polluted area will be identified -Types of pollutants and their quantity will be known	-Number of studies conducted -Number of reports prepared -Level of pollution identified	MOEST	University, NGOs, KMC	Five study per year

2.3.11.4 Recommended current occupational safety measures

The following safety measures are recommended for pesticides handling:-
- select effective pesticides and do not use the pesticides unnecessarily.
- be careful about possible hazards.
- read and follow the instructions written in the label of pesticides.
- raise the awareness among the farmers about the safe use of pesticides and banned pesticide.
- use only recommended pesticides with proper dose whenever it is necessary.
- always keep in mind the principle “prevention is better than cure”.
- use proper safety or precautionary measures such as apron, face masks or dusk mask, impermeable gloves and boots while applying pesticides.
- keep pesticides out of reach of children.

- keep the duster/sprayer in good condition before applying the pesticides and keep it clean and check the whole part of the equipment for future.
- first aid materials-first aid box (bandages, disinfectant, etc), eyewash bottle and emergency shower.
- apply the pesticide when the temperature is cool.
- do not eat, drink and smoke while handling pesticides.
- wash properly the empty pesticides bottle before disposal.
- wash the clothes immediately after handling the pesticides.

2.3.11.5 Safety measures for PCBs

Generally very little safety measures are practiced, except for very limited workers wearing the impermeable gloves and boots during their work. This may be due to the lack of awareness and very poor economic conditions of workers, especially in welding workshops. It is highly recommended that the workers in the transformer workshops use proper health and safety measures.

2.3.11.6 Potential risk groups

The following people or groups of peoples are regularly exposed to the POPs chemicals

- vegetable growing farmers and their family members
- pesticides whole seller and retailers
- storekeepers in the pesticide warehouses
- workers in the transformer maintenance workshops
- workers in the welding workshops and inhabitants near welding workshops
- waste handling workers in municipalities and health care institutions
- communities and school children near pesticide warehouses

2.3.12 Details of any relevant system for the assessment and listing of new chemicals

Summary
The existing acts and regulations are not enough to address the overall chemicals being imported and used in the country except for some chemicals specified in the laws. There are some regulatory mechanisms/systems in place to assess and list new chemicals. For example Pesticide Act 1991, Pesticides Regulations 1994 have several provisions of registering, licensing and monitoring of pesticides and EPA 1997 and EPR 1997 have several provisions in giving clearance through IEE and EIA prior to import and production of any new pesticides. Moreover, there is also ODS related regulation which also governs the listing of new chemicals.

2.3.12.1 Introduction

There is no specific law that governs any assessment and listing of any new chemicals that are either imported to or exported from the country. However, there are ministerial decisions from different ministries that forbid the import of certain chemical compounds based on their end use and possible abuse. These are discussed in detail in subsequent section 2.3.13.

2.3.12.2 Existing regulatory schemes and processes for assessing new chemicals and Pesticides

In case of pesticides the Pesticide Act 1991 governs the import, production, and use of pesticides as follows:

Article 5: Functions, Duties and Responsibilities of the Committee

- Government can formulate a national policy for pesticide;
- Coordinate between public and private sectors on production and distribution of pesticides;
- Regularize or control the quality standard of the pesticides produced by pesticides industries operated under both private and public sectors;
- Determine the quality standard of pesticides.

Article 7: Establishment of pesticide Registration Agencies:
Government may establish pesticide registration agencies for registering the pesticides through publishing a notice in the Nepal *Rajpatra* (Gazette).

Article 8: Function, Duties and Responsibilities of the pesticide Registration Agencies
Pesticide Registration Agencies shall register appropriate pesticides and issue certificates after having scrutinized the applications submitted to get the pesticides registered;
Pesticide Registration Agency can prepare necessary guidelines for effective, thoughtful and proper use of pesticides.

Article 9: Certificate to be obtained after getting the pesticides registered
An individual, organization or agencies should obtain the certificate after getting the pesticide registered, on payment of prescribed fee to the agencies, prior to carrying out import, export, production, utilization and marketing of pesticides.

Article 10: Listed Pesticides
Name of pesticide registered as per the section 9 shall be listed and published in Nepal *Rajpatra* (gazette) by the government on recommendation of the committee.

Article 11: Restriction to use the pesticide other than the one listed
There shall be restrictions on the import, export, production, use, purchase or sale of any pesticide other than those listed by the government under Article 10.

Article 12: License to be obtained
It shall be necessary to obtain license from the Committee on payment of the prescribed fee by an individual for formulation, marketing or professional use of listed pesticides.

Article 13: Appointment of Pesticide Inspector
Government can appoint and/or delegate any staff with the responsibility of a pesticide inspector.

The Pesticide Regulation 1994 was formulated in line with Pesticide Act 1991(Article 18: Authority to formulate regulations) for effective execution to meet the objective of the Pesticide Act.

Pesticide Rules 1994
Article 3: Submission of application for pesticide registration
Article 4: Registration of the pesticides
Article 5: Denial of registering the pesticide
Article 6: Cancellation or suspension of Pesticide

Article 7: Furnishing the particulars of pesticides to be imported
Article 8: Approval of container and label
Article 10: Obtaining a license
Article 11: Submission of an application for the license
Article 12: Granting a license to Pesticides retailer
Article 13: Granting license to pesticide Spraying entrepreneurs
Article 14: Granting license to pesticides formulator
Article 15: The validity period of license and its
Article 16: Withdrawal of License
Article 17: Pesticide Inspectors to be provided with identity cards
Article 18: Right, duty and function of the inspector
Article 19: Right, duties and functions, and procedures of the meeting of sub-committee constituted under sub-Section (1) of section 6 of the Act
Article 20: Making and implementation of the directives

The Environment Protection Act (EPA), 1997 and the Environmental Protection Rules (EPR), 1997: The following provisions of EPA and EPR are relevant regarding the POPs chemicals.
Any activity or project depending upon its capacity or extent of adverse impacts requires carrying out IEE or EIA as per Section 3 of the EPA 1997 and Rule 3 of the EPR 1997.

IEE requiring activities:

- Establishment of acid, alkali and primary chemical industries with a production capacity of 100 Mt per year.
- Establishment of pulp and paper industries, except traditional cottage industries, with a production capacity of 100 Mt per day.
- Establishment of pesticide (blending) industry.
- Import of 1 to 10 tons of listed toxic substances.
- Sale, supply, storage and disposal of 100 kg to 1 ton of listed toxic substances.
- Use of 100 kg to 1 ton of listed toxic substances in a single area.

EIA requiring activities:

- Production of primary chemicals such as corrosive acid and alkali etc. (except citric, tartaric, acetic etc.) with a production capacity of more than 100 Mt per day.
- Production of ferrous and non-ferrous metals (except re-rolling, re-melting and fabrication) by the process of primary smelting.
- Selecting, picking, disposing and recycling waste through chemical, mechanical or biological techniques in an area spread over more than 2 hectares.
- Construction of a waste plant.
- Construction of waste recovery plant.
- Chemical processing of bones.
- Production of pesticides by the industry except through welding process.
- Import of more than 10 tons of listed toxic substances.
- Sale, supply, storage and disposal of more than one ton of listed toxic substance in a single area.
- Activities relating to listed insecticides, plants or toxic substances.

2.3.13 Details of any relevant system for the assessment and regulation of chemicals already in the market

Summary
Legal and institutional systems to regulate the import, production and use of hazardous and toxic chemicals are not effective as desired. EPA 97 and EPR 97 have made strong provision for hazardous substance management demanding a full scale environmental assessment for the recycling and recovering waste containing hazardous substances and for projects dealing with production, import, sale of pesticides. Department of Food Technology and Quality Control (under MOAC) has the mandate to analyze the pesticides residues as well as set the standards for the same in food items. Regarding POPs management there is no specific regulation for the management of chemicals in Nepal.

2.3.13.1 Existing regulatory schemes and processes for assessing chemicals already in the market

Legal and institutional systems to regulate the import, production and use of hazardous and toxic chemicals as such are not so effective, except that are used in formulation of narcotic drugs and explosives. However, there are some legal and institutional initiatives for regulating different chemicals in the country as discussed below. Pesticide Act 1991 has in Article 15 clearly mentioned different grades of Punishments to those who violate the regulations.

Ministry of Home Affairs has listed 33[5] different contraband chemicals that have potential to be used as precursors in narcotic drugs formulation. Any importer of these chemicals needs to obtain permission from Ministry of Home Affairs. The import of these chemicals is regulated by Department of Customs at the entry point.

Ministry of Defence has issued the list of chemicals that are forbidden for import that have potential to be used in formulation of explosives.

Ministry of Health and Population has regulated the import of pharmaceutical products by requiring registration and permission from the Department of Drug Administration before commercial import.

Ministry of Agriculture and Cooperatives is regulating the import of pesticides by requiring their registration and permission for commercial import from Pesticide Registration Office.

Department of Customs has listed 761[6] different chemicals as hazardous chemicals. Based on the environmental and adverse impact on export there are 118[7] chemicals listed as azo-dyes that have been regulated for import.

Regarding POPs management there is no specific regulation for the management of chemicals in Nepal. The most relevant legislation regulating the POPs chemicals particularly that are used in agriculture is the Pesticide Act, 1991 and subsequent Regulation, 1994. The import specification issued by Nepal Electricity Authority on transformer oil simply mentions that the oil to be delivered to NEA should be PCB free.

The Pesticide Act, 1991 besides defining the terminology of pesticides and registered pesticides, it has also made the provision of constituting a pesticide committee at national level to provide policy feed back to the government.

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[5] circular compendium 2006 (updated), Department of Customs

[6] List of Hazardous Chemicals, Department of Customs, Laboratory Section 2004

[7] Circular Compendium (updated), Department of Customs 2006

Pesticide committee

Secretary, Ministry of Agriculture and Cooperatives	Chairperson
Joint secretary, Ministry of Environment, Science and Technology	Member
Director General, Department of Agriculture	Member
Director General, Nepal Bureau of Standard and Metrology	Member
Executive Director, Nepal Agriculture Research Council	Member
Head, Epidemiology and Disease Control Division, Department of Health Services	Member
Agriculture Scientist, nominated by government	Member
Head, Industrial Entomology Development Directorate, DOA	Member
Livestock Specialist, nominated by government	Member
Forest Scientist, nominated by government	Member
Pesticide Entrepreneur, nominated by government	Member
Consumer farmer, nominated by government	Member
Head, Food Quality Control Division, DFTQC	Member
Head, Plant Pathology Division, Nepal Agriculture Research Council	Member
Head, Entomology Division, Nepal Agriculture Research Council	Member
Head, Plant Protection Directorate, DOA	Member Secretary

As provisioned in Pesticide Act, 1991 the government of Nepal has commissioned the Pesticide Registration Office for regulating the pesticide sales in Nepal as nobody is allowed to import, export, manufacture, use and sell any pesticide without obtaining the registration certificate.

There are 40 Pesticides, 18 fungicides, 5 herbicides, 3 Rodenticides, 1 acaricide and 4 agrochemicals in other categories (altogether 71) registered in Nepal as of 2005 October for import, export, manufacturing, use and sales. The total consumption of these chemicals in Nepal is about 184 tons annually (PRO, 2005[8]). Among the 12 agrochemicals banned as per the notification published in Nepal Gazette 8 are POPs pesticides.

List of banned chemicals

Name of Pesticides	Reference
Chlordane	Persistent Organic Pollutants Pesticide
DDT	Persistent Organic Pollutants Pesticide
Dieldrin	Persistent Organic Pollutants Pesticide
Endrin	Persistent Organic Pollutants Pesticide
Aldrin	Persistent Organic Pollutants Pesticide
Heptachlor	Persistent Organic Pollutants Pesticide
Mirex	Persistent Organic Pollutants Pesticide
Toxaphene	Persistent Organic Pollutants Pesticide
BHC	
Lindane	
Phosphamindon	
Organo Mercury Chloride	

(Source: Plant Protection Directorate, Pesticide Registration Office, 2001)

[8] Pesticide Consumption for the year 2003, Pesticide Registration Office, Pesticide Management Guideline 2005

Besides, Environment Protection Regulation 1997, has made stringent provision for hazardous substance management. A full scale environment impact assessment is made mandatory for the recycling, recovering waste containing hazardous substances. The regulation reads: Full Scale EIA is required for Production of extremely hazardous substances such as Isocynite, mercury compounds

- Production of ferrous and non ferrous metals (except rerolling, remelting and fabrication) by process of primary smelting
- Production of chemical fertilizers and pesticides except produced through welding process.
- Emission and management of any toxic chemical with LD_{50} (? it doesn't mention how much in mg/kg body weight)
- Final disposal management of biological lethal (infectious and toxic) substances emitted from health centers, hospitals or nursing homes with at least 25 beds (capacity),
- Any activity relating to one hectare or more of land and energy for the purpose of incinerating or recycling any lethal substance
- Import of more than 10 tons of toxic substance
- Sale, supply, storage and disposal of more than one ton of toxic substance
- Use of more than one ton of toxic substance in a single area
- Activities relating to insecticide plants or toxic substances

The Financial Act of every year and also the current Financial Act 2006 has made provision for importing the waste solvents, pickling liquor, municipal waste sludge, health care waste etc. with 20% customs duty.

Ministry of Population and Environment (now Ministry of Environment, Science and Technology) had issued a circular in 1999 to control the import of 9 different ozone depleting substances. Ozone Depleting Substance Consumption and Control Regulation, 2000 has the provision of obtaining license from Department of Commerce for the import of such chemicals. After the import, as per the Rule, the importer needs to submit the inventory of the commodity to concerned government agency on the stock, buyer, quantity, purpose of purchase etc.

Being a party to Basel Convention, Nepal forbids the import of the wastes that are defined hazardous by the convention as listed in Annex I. The Treaty Act of Nepal has clearly spelled out that the provisions of the convention to which Nepal is a party are as good as domestic laws, and in the case of any contradiction with domestic law, the provision of convention will prevail. Thus the provision of Basel Convention is applicable as the domestic law in the country. However the efforts are underway to frame the hazardous substance (particularly waste) management rules under Environment Protection Act, 1997.

In addition to the legal provisions in Pesticide Act 1991 and Pesticide Regulation 1994, other provisions directly related to regulate the activities like pest risk assessment, pest eradication, pest surveillance related activities, adoption of sanitary and phytosanitary obligations of WTO, sharing the list of controlled pest to all the WTO member countries and concerned business partners, effective monitoring of import and export of pest infected plant and plant products, monitoring and treatment of entry and outbreak of pests, declaration of pest affected and pest free zones, examination, production, import, etc. are also carried out from different Plant Quarantine and Animal Quarantine offices located in different parts of the country. However, all the quarantine offices are not well equipped with the necessary infrastructures required to carry out above activities.

The DFTQC has the mandate to analyze the pesticides residues as well as set the standards for the same in food items. Under MOEST there are two national level institutions: One is Nepal Academy of Science and Technology (NAST), an apex scientific institution in the country, to carryout scientific research and develop and disseminate technology. The other is the Forensic Laboratory which is capable enough to detect and analyze the pesticide contamination in accidental cases.

3. Strategy and action plan elements of the national implementation plan

3.1 Policy statement

In order to safeguard human health and environment from the adverse effect of POPs, realizing the persistency, bioaccumulation, toxicity and long range transport of these compounds and reaffirming the commitment made as a signatory and party to implement the provision of Stockholm Convention in Nepal particularly to fulfil the obligation as per the article 7 of the Convention, the NIP for POPs management involves wider participation of all concerned stakeholders in every step of NIP preparation and implementation process to ensure the effective implementation of the Plan in collaboration with national and international agencies.

For the coordination and implementation of the provisions of the Stockholm Convention, Nepal as a signatory, has formulated a high level steering committee for the smooth coordination and as an policy guidance body to overview and evaluate and guide the POPs Enabling Activities Project for the preparation of National Implementation Plan. National Implementation Plan for POPs are prepared with the consultation and coordination with all the concerned stakeholders so that it is a national document for implementation of the provisions and activities as identified by the NIP under Stockholm Convention. There was representation from NGOs and civil society in the Steering Committee so that the public issues were raised and addressed properly during the preparation of NIP.

The endorsement of the NIP for the Stockholm Convention will be done in phases as follows:
Phase I: Expert review of the NIP
Phase II: the discussion and approval by the stakeholders during a workshop
Phase III: NIP endorsement by the Steering Committee
Phase IV: NIP endorsement by the Ministry (MOEST)
Phase V: Submission to Cabinet Secretariat for final Approval

3.1.1 Objective

Develop an effective POPs Management System to ensure the protection of human health and environment from the impacts of POPs by implementing a sustainable policy.

3.1.2 Guiding principles of the policy

- Collect detailed information on the risk caused by POPs chemicals to the human and environment by identifying the location of contaminated sites and exposed populations;
- Protect human health and the environment from the harmful impact of POPs by reducing and decreasing POPs emissions and leakages, as well as gradually stopping the use of POPs or POP-containing equipment;
- Promote the cooperation between stakeholders that are directly or indirectly involved in POPs created problems or contribute in solving these problems;
- Attract investments from international donors for measures to decrease or eliminate the risks caused by POPs to human health or the environment.

3.1.3 National objectives for POPs

i. Develop the legislative basis and institutional system to reduce and prevent the impacts of POPs on human health and the environment.

ii. Develop and implement preventative measures to prevent the formation of new POPs sources and to restrict or ban the import of POPs chemicals.
iii. Ensure, along with other Party members, a significant decrease of the global pollution generated by POPs in accordance with the Convention, Protocol and other international treaties.

Based on the above objectives and to achieve the goals of the Stockholm Convention, the Government of Nepal will take the appropriate policy decision to reduce and/or eliminate POPs by undertaking adequate activities as mentioned in the NIP submitted by the MOEST. To meet the Stockholm Convention provisions at the same time the Government, as included in the NIP Action Plans, will:

- Strengthen institutional capacities to provide adequate POPs management,
- Improve system for monitoring of the POPs presence and release,
- Create a comprehensive legal framework governing the POPs issue,
- Raise public awareness.

This Policy Decision, on behalf of the Government of Nepal, was made by the Cabinet Committee on External Affairs, Social and Development headed by the Deputy Prime Minster of Nepal and this committee decided to endorse the National Impementation Plan for the Stockholm Convention on 21 March 2007 (Annex I).

3.2 Implementation strategy

3.2.1 Overview

Nepal has signed the Stockholm Convention, but it is not yet ratified. Parallel to the ratification process, the arrangement for implementation of different Action Plans by establishing a body to coordinate this should be made in time. It is suggested that a POPs Management Technical Committee under the Ministry of Environment, Science and Technology will be established to coordinate the activities mentioned in the Action Plans, while a Project Manager will be nominated to execute the action plan. PMTC will review the implementation of these activities.

For proper implementation of the provisions of the Convention, the existing situation should be known on the basis of the available data. Based on the information obtained so far, a SWOT analysis (Table 3.1) has been carried out and this shows that Nepal has good professional and organization basis to fulfil the Convention obligations, but the laboratory (technical) basis is not adequate. The few obstacles are:

- Inadequate information on the level of environmental contamination by and exposure to POPs chemicals
- Low or no public awareness on the health hazards, especially by PCBs and PCDD/PCDF
- Lack of sufficient financial resources to eliminate these substances from the environment

Table 3.1: SWOT analysis of possibilities to fulfill the provisions of the Stockholm Convention in Nepal

Strengths	Weaknesses
• No POPs production and import • POPs pesticides banned • Obsolete stock of POPs pesticides stored in warehouses • Good cooperation between stakeholder ministries and organizations • Government highly committed to the proper management of POPs • Good professional and organizational basis • Pesticide Act and Pesticide Regulation in existence • EPA and EPR in place	• Incomplete data for the assessment of POPs releases into soil, wastewater, solid waste, etc. • Lack of data on soil pollution by POPs • Lack of data on POPs emission into the air • Weak enforcement of Acts and Regulations • Inadequate regulatory and executive mechanisms on POPs • Lack of standards for PCDD/PCDDF, PCBs in food products and such emissions standards for industrial sources • No data on POPs levels in hazardous, municipal and industrial wastes • Lack of data on health hazards of PCBs and PCDD/Fs. • Lack of information about number and distribution of electrical equipment containing PCBs • No monitoring on POPs levels in environment and humans • Lack of financial resources for research and monitoring • Low awareness of the public and decision makers about the hazards of POPs • Uncontrolled burning of wastes in households and hospitals • Lack of technologies for decontamination of equipment and preparations containing POPs
Opportunities	**Threats**
• Political will of the Government to solve the POPs problem shown: • Stockholm Convention signed and ratified • National Environmental Policy in place • Legislative framework • Environment Protection Act in the process of amendment • Act on Waste to be formulated • Modern labs with technical capacity to be established • New technologies and BAT implementation	• Poor economic condition of the country • High illiteracy • Lack of necessary financial resources for inventory and elimination activities • Difficult financial situation of the enterprises, both state-owned and private • Limited financial and human resources • Lack of political stability • Conflict situation in the country

3.2.2 Identification of information barriers, implementation and data gaps:

There could be several barriers for the effective implementation of the National Implementation Plan on Persistence Organic Pollutants in Nepal. Such conceivable major barriers are:

Policy Barrier

i. Lack of National Policy on Environment Protection

Integrated National Policy on Environment is yet to be formulated in Nepal. In the absence of this guiding document the environment protection activities are carried out on a piecemeal basis. Absence of this is also being felt in sector coherence in environment protection task.

ii. Lack of adequate legal regime (Act, Regulation, Standards, guidelines, etc)

No environmental standards for air, water, food quality have the limit value for POPs. There are no adequate legal provisions for controlling POPs release neither from industrial and commercial sectors nor from agriculture sectors. The POPs contaminated materials, for instance, PCB contaminated transformer oil is believed to be sold or bought as such act has not been made illegal as of today.

iii. Lack of harmonization among the legal arrangements for different sectors

The legal arrangements made to achieve the sector mandate sometime conflict to each other. The newer Act and Regulation are being promulgated however the older legal provision contradicting the newer provision are still in force, for example, the γ- Lindane is banned in Nepal as per the Pesticide Act, 1992 but the same compound is in the essential drugs list in Department of Health Services as the medicine for scabies.

Institutional Barrier

i. Lack of institution for environmental administration

Enforcement of any legal provision requires the monitoring of the compliance with such provisions. However, in the absence of implementing agency there is no such monitoring and hence one can question the enforcement of the said provision.

ii. Disjointed sector mandates and inadequate interagency coordination

Though there are several committees made in Acts, Regulations and in the institutional memory but these committees remain largely unrepresentative and the coordination is not obligatory for bringing out new policies, laws, projects.

Technological barrier

Technological barrier exists in the establishment of electrical crematoria, promotion of BAT and BEP in industries, effective utilization of agricultural residue. Besides technological there could be financial, cultural and other barriers too.

Cultural barrier

Cremation of dead body of a Hindu person is culturally to be performed by burning a lot of wood in an open fire. Similarly, people in the terai area are culturally burning agriculture biomass to fumigate the ambience for flies control and to produce heat in winter. It is way of life for people to burn biomass waste generated from kitchen garden in order to get rid of it. Thus to ban open burning will create a lot of cultural anxieties.

Knowledge and awareness barrier

For the exception of a limited number of people in the country all others, from the highest echelon such as Prime Ministers/Ministers level to the lowest echelon, a farmer dwelling in countryside are wanting in knowledge of human health and Environmental impact of the POPs.

Financial barrier

Financial barrier comes while opting to any alternative technology which has low POPs release potential. For example, for the establishment of an effective health care waste incinerator, opting for non elemental chlorine bleaching in pulp industry etc. incur large amount of financial burden.

The following are some gaps, which will be eliminated during the execution of the NIP.

- Lack of sufficient data on release of POPs to different environmental media.
- No data on emissions factors for environmental releases of POPs from their unintentional production.
- Incomplete information on the amounts of POP-pesticides, imported in the past.
- Incomplete databases on PCB-contaminated equipment and dielectric fluid.
- No information on waste landfills owned by industrial companies, which used to produce or still produce chlorine containing organic compounds.
- Scarce data on POPs levels in humans, animals and food materials.

3.2.3 NIP Policy basis and implementation objectives

Enabling Activities to Facilitate Early Action on the Implementation of Stockholm Convention on Persistent Organic Pollutants (POPs), a GEF funded MOEST/UNIDO project, has developed a National Implementation Plan on POPs reduction and elimination (disposal) based on the obligation in Article 7 of the Stockholm Convention.

The objective of the implementation of the NIP is to solve the POPs related problems. Moreover, with the implementation of the separate action plans covering different POPs issues, the specific provisions of the Stockholm Convention will be fulfilled.

Protection of the human health and the environment from the harmful POPs impacts is the main objective of NIP implementation. NIP activities will also be directed towards improvement of the management of POPs at the country level.

3.2.4 Implementation principles

The National Implementation Plan for the Stockholm Convention will be based on the following principles:

- Ensuring compliance with the "National Environmental Policy" and the "Long-term Strategy for sustainable development" agenda.
- Adoption of the particular rules and guidelines in line with Convention provisions.
- Integration with overall environmental management and sustainable development policies.
- Adherence to and use of technologies and applications of international standards.
- Commitment regarding public awareness and education activities during the NIP implementation.
- Adherence to "the polluter-pays" principle.
- Consistency and accountability as well as transparency in information sharing and exchange during the implementation process.
- Inclusion of public and stakeholder participation, and providing information to the general public.
- Taking into account the participation of NGOs and other social groups.
- Taking into consideration the actual economic situation of enterprises.
- Compliance with BEP/BAT.

3.2.5 Priorities and conditionality

The priorities of national significance between the various POPs categories were defined at a workshop held on May 31-June 1, 2006 during POPs Priority Validation Workshop. The workshop was attended by participants from stakeholder ministries, NGOs, scientific research institutions and enterprises.

Within the priority setting process discussions were held on various POPs issues, including the stockpiles of POPs- and obsolete pesticides and their disposal; the quantity of PCB waste and equipment, management and potential spills; POPs emissions and their toxicity; significance and potential impact of POPs polluted sites on human health; legislative requirements to be developed by the Government of Nepal and their regulation, etc. As a result of the discussions, define the following priorities among POPs categories were defined:

Priority 1 . POPs pesticides;
Priority 2 . PCBs containing wastes and equipment;
Priority 3 . POPs emissions.

The first step to develop the National Implementation Plan (NIP) was to prepare the inventory of the POPs chemicals. On completion of the inventory works, a prioritization workshop was organized to set the priorities for pesticides, PCBs and unintentional products. During another workshop, Priority Validation Workshop, these three sets of priorities were considered together against some criteria such as severity of the issues, immediate health impacts of the exposed population, awareness, etc. and final set of priorities was developed to consider for the POPs management. These priorities after thorough discussion during the Steering Committee meeting were finalised (Table 3.2) as follows.

Table 3.2: Final Priorities for the management of POPs chemicals in Nepal

Activities	Final Priority
Pesticides • Safe packaging , safe storage, and disposal of obsolete pesticide • Remediation and site stabilization	1
PCBs • Manage stockpiles of PCBs and appropriate measures for handling and disposal of articles in use • Identification of Stockpiles of PCB contaminated article in use and waste • Ban on sell of PCB contaminated transformer oil	2
POPs • Public awareness raising, information and education	2
PCDD/F • Complete ban on elemental chlorine bleach to start with pulp industries • Integrated waste management policy, legislation with special reference to reduce, reuse, and recycle of wastes • Complete ban on open burning of kitchen and garden waste in municipality area aimed to put complete ban on open burning throughout the country	3
Legislative framework/ Capacity building • Institutional strengthening, legislation/policy formulation on POPs • Harmonization of sector legislation • Human resource development, research and development	4
Environmental monitoring (pre and post disposal)	5
BAT/BEP • Alternative energy program for household energy need	6
Promotion of intermediate technological solution on hazardous waste disposal	7
Release reduction from industrial process/establishment with the utilization of **CP/EE/EM technology**	8
Establishment of **electrical crematoria**	9

Nepal has limited qualified experts, whose service alone may not be sufficient in implementing the different action plans. International assistance to supplement the expertise would be desirable. Moreover, Nepal does not have facilities, where POPs chemicals can be disposed of. Therefore to implement this part of the action plan either the disposal facilities of international standard should be established in the country itself or transported to other countries where such facilities are available. Here assistance from international communities is highly desirable.

3.2.6 Major Milestones

Within each Action Plan the specific milestones are planned. When the organizational and financial conditions will be optimum for the implementation of the NIP, the major milestones would be 2020 for complete replacement of PCBs contaminated oil and equipment with PCB free ones and 2025 for complete phasing out and 2028 for destruction of such oil and equipment.

3.2.7 Institutional/Organisational Arrangements and Assignment of Responsibility

The MOEST, as focal point to the Stockholm Convention on POPs, developed the NIP and it is responsible for coordination and implementation of different activities. Roles and responsible of other implementing agencies and stakeholder ministries and organizations will be as follows (Table 3.3)

Table 3.3: Institutional involvement in NIP implementation

Action plans on	Institutions	Roles & Responsibilities	Remarks
POPs	MOEST	Focal point; Coordination; Env. Rules & Regulations; Monitoring; Guidelines and standards	
Pesticides	MOAC	Implementation agency; Pesticide Act & Regulations; Import & use	
	NARC	Residue analysis, Research, Alternative Technology, awareness programs	
	AIC, NSC	Safe storage, Disposal	
	MOHP	Import & use	
PCBs	MOWR	Legislation, Regulations	
	NEA	Import, use and management of contaminated transformer oil & equipment	
	NBSM	Laboratory analysis	
	Industry (FNCCI)	Transformer manufacture; import and use of dielectric fluid	
PCDD/F	MOICS	Legislations; Monitoring	
	NBSM	Accreditation	
	MOLD	Solid wastes management; regulations	
	FNCCI	BAT,BEP, Alternative technology	
	Municipalities	Solid Waste management;	
	Industries	BEP;BAT; CP/EE/EM technology	
Awareness and Education	Line ministries	Relevant awareness programs; Publication of awareness materials	
	Academic institutions	Course curricula, research	
	NGOs	Information publication & propagation	
Research and Development	Academic institutions	Course curricula, research	
	NAST, DFTQC, NARC	Research	
	Pvt. Labs	Research	
Legislative frameworks	MOLJPA	Acts, Rules in relevant sectors	
	Line ministries	Work in collaboration with MOLJPA for necessary rules and regulations	

The MOEST will designate a POPs officer, who will look after the POPs Unit established under the Law and Convention Division (L & C Division) within the Ministry. This Unit will coordinate the overall activities during the NIP implementation. This Unit will be responsible for updating the NIP and reporting to the Convention Secretariat on a periodic basis.

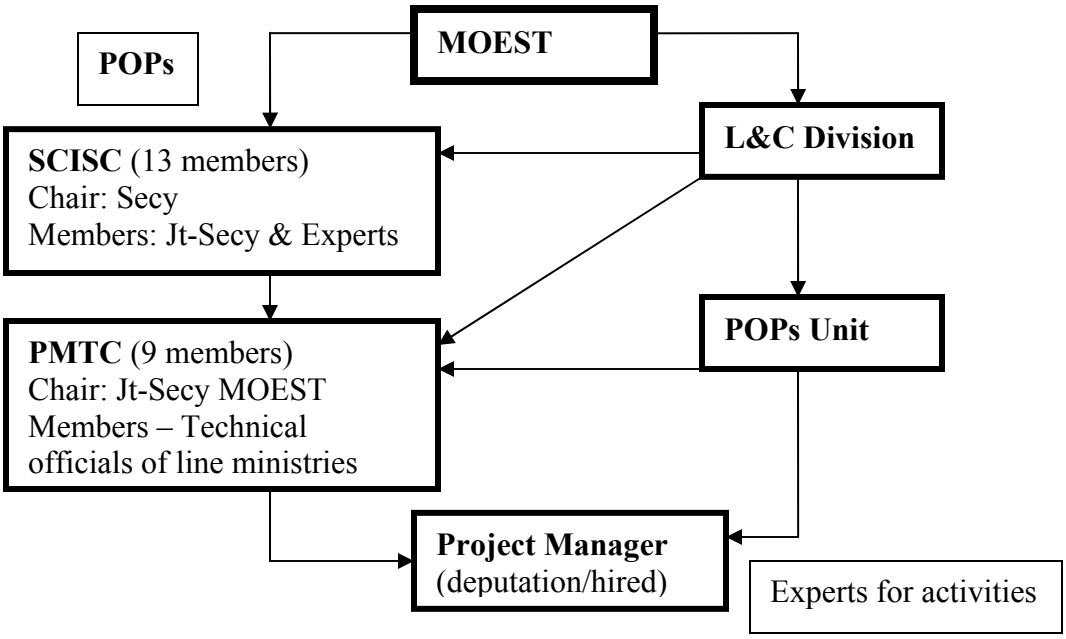

Figure 3.1: Organogram for the implementation of the NIP

A Steering Committee on Implementation of Stockholm Convention (SCISC) will coordinate the implementation process of the Action Plans. The same Steering Committee, which was coordinating the NIP development, will be reconstituted as SCISC during the implementation. Chaired by the Secretary at the MOEST, this 13-member Committee has the Joint-Secretary level representations from various ministries, representatives from stakeholder organizations, university and NGOs, along with a UNIDO representative for Nepal. The SCISC will review, comment on and approve the work plan.

There will be a POPs Management Technical Committee (PMTC) formed under the SCISC for day to day execution of the implementation plan. The Committee formed under the Chair of Chief of the Law and Convention Division will have POPs officer as member secretary.

The POPs Management Technical Committee (PMTC) will comprise the representation of

Chief Law and Convention Division, MOEST	Chair
Chief Environmental Standards and Monitoring	Member
Chief Environment Assessment (EIA)	Member
Chief Environment Promotion	Member
Desk officer, Stockholm Convention	Member
Technical representative from MOICS	Member
Technical representative from MOAC	Member
Technical representative from MOLD/SWMRMC	Member
Technical representative from MOFSC	Member
POPs Officer, POPs Unit	Member Secretary

The PMTC will hold its regular sessions throughout the implementation but additional meetings can be held if necessary. The SCISC will oversee the project-related work of the PMTC and the implementation team. The SCISC will review, comment on and approve the work plan. All decisions of the committee, such as respective responsibilities, timelines and the budget will be clearly communicated to those concerned. Activities will be implemented through subcontracts. Submitted tenders will be reviewed and evaluated by the PMTC subject to approval by SCISC.

The POPs Officer (PO) will report to the SCISC and to the POPs Unit. As a technically qualified person he/she will work in close coordination with the Project Manager and will provide overall guidance on the management process, monitoring of NIP execution and will also have the financial control over the process.

The POPs Office will have a Project Manager, who will work as the coordinator of the NIP activities. The Strategy will be implemented through the different action plans. Therefore, a coordination mechanism is needed in order to harmonize the execution of the separate activities. The Project Manager in the POPs office, who will be appointed by the Ministry for the implementation of different action plans, will be a technical person. The POPs unit in consultation with Project Manager as required can take the service of the experts on contract basis during the NIP implementation.

Due to the complexity of the NIP coordination, the POPs officer may appoint experts to assist in the implementation activities. The expert/s will work on a contract basis and will report to the Steering Committee and the POPs Officer.

The NIP execution process will be implemented through subcontracts. Subcontracts will be signed between the POPs officer and the project manager of each of the action plans.

The responsibilities of the SCISC will be to:

- approve working arrangements and implementation plans with the POPs Officer;
- oversee the work of the POPs office in coordinating different action plans set out in the NIP;
- lead stakeholders' workshops to develop consensus and commitment and to meet the objectives of the NIP.

The POPs Officer will

- maintain an office within its premises charged with the successful coordination of the NIP;
- work with day-to-day responsibility for the management and coordination of the NIP activities and reporting to the Steering Committee for the Implementation of Stockholm Convention (SCISC).
- work as member-secretary to the Project Management Technical Committee.
- coordinate with principal stakeholders of the SCISC for the successful implementation of the NIP.
- have day-to-day responsibility for the management and coordination of the implementation activities, including subcontracts, budgets, and reporting to the SCISC.
- appoint national experts as necessary to undertake the various actions required during the course of the work, using terms of reference agreed by the SCISC and ensure the quality of their work.
- provide a secretariat function to the SCISC and PMTC and stakeholder workshops.
- report regularly to the PMTC and SCISC on the progress of the implementation and the expenditure of the funds.

3.2.8 Implementation approach and work plan summary

Implementation approach

The implementation approach is detailed in the previous section 3.2.6 with organizational arrangements and Assignment of Responsibilities. It also indicates that the NIP should be revised on a periodic basis and be reported to the Convention Secretariat

Work plan of the coordination activities
The SCISC (already established during the preparatory phase as Steering Committee) will control overall technical and financial aspects of the NIP realization. The Secretary of the Ministry of Environment, Science and Technology will hold the chair of the Committee. The SCISC is the primary decision making body. Depending on meeting schedules and the action plans project managers can participate at the meetings. The work plan for the coordination activities will depend on the action plans, which are under implementation. The period and duration of the coordination activities will thus correspond to the time period planned for each action plan. The complete work plan thus can stretch as far as 2028.

Budget:
The budget includes only the cost of the coordination activities as well as the cost of the revision of the NIP. The financial sources for the budget allocation will be mainly multilateral/bilateral funding. The budget for coordination is estimated as 7% of the amount planned for each action plan, and the sum total for coordination thus will be USD 2,739,590 (please refer Column "Coordination" in chapter 3.6 Resource Requirements).

3.2.9 Implementation strategy, review mechanisms

Technical and financial reports prepared by the project managers will be the basis for the monitoring of the Strategy implementation for each of the Action Plans of the Strategy. The Project Managers will submit these reports to the PMTC. Project Managers will take corrective actions based on the comments and evaluations of PMTC.

The SCISC will also evaluate the efficiency of strategy implementation, including outcomes, the budget and timelines for each of the Action Plans of the Strategy. Their frequency will be decided, when the subcontract is developed between the POPs Unit and the respective Project Managers.

The Expert/s when needed will, on contracted bases, assist the POPs Unit in evaluating these reports and the implementation progress. He/she will be nominated by the PMTC which is responsible for coordinating the implementation of all Action Plans in the NIP.

Respective Project Managers will take corrective actions based on the comments of the POPs Unit.

Specific Performance Monitoring Indicators and target dates for their achievement are clearly given in each of the Action Plans.

3.3 Activities, strategies and action plans

3.3.1 Activity: Institutional and regulatory strengthening measures

In order to facilitate effective implementation of the provisions of the Stockholm Convention in Nepal, there will be a need to establish new institution and a coordinating mechanism among the existing institution and also the harmonization of sector legislation. Thus the "Activity: institutional and regulatory strengthening measures" will encompass different sub-activities/actions within institutional arrangements and regulatory arrangements headings.

3.3.1.1 Objectives and priorities of the Action Plan

Nepal has given this action as the fourth priority in its plan and the main objectives are:

- Strengthened national institutions with interagency coordination
- Strengthened and updated or amended regulations in line with Stockholm Convention
- Open burning system and use of POPs generating chemicals banned
- Expanded scope of alternate energy programs

A. Institutional Strengthening

Controlling intentional import, generation and use of Annex A, part I and II and Annex B POPs and release reduction of unintended production of Annex C POPs will require not only establishing a coordinating mechanism among different public and private stakeholders but also the establishment of Pollution Control Agency as this would make the implementation task more streamlined.

The current Job Allocation Rules clearly stipulates that the Ministry of Environment, Science and Technology shall be responsible for following tasks,

- Formulating policy, plan and program on environment and their implementation
- Conduct research, study, survey, training on environment and participation in the national and international seminar and conferences
- Serve as a focal point and coordinate national and international environmental agencies
- Pollution control, environment protection and ecological balance
- Publication and dissemination of environment related materials
- Regular and periodic evaluation of work done by governmental and nongovernmental agencies on environment
- Preparing human resources on environment management

The efforts made at policy level to accomplish all the tasks mentioned above will be very difficult without an implementation agency. One can achieve certain level of improvement in environmental quality or environmental management itself through sector coordination. However, an agency with focused mandate of pollution control with adequate human resources and equipment is imperative.

In order to control environmental pollution, control the import, export, generation and release of POPs in the country, the following actions have been proposed under the Institutional Strengthening measures.

Activity 1. Establishment of the Enforcement Agency for Environmental Requirements under Ministry of Environment, Science and Technology.

POPs management issues are related with first four tasks of the Ministry's job allocation list, viz.

i. Formulate policy, plan and program on environment and their implementations
ii. Conduct research, study, survey, training on environment and participation in the national and international seminars and conferences
iii. Serve as a focal point for and coordinate between national and international environmental agencies
iv. Pollution control, environment protection and ecological balance

Establishment of new organization on pollution control will help implement the provision of National Implementation Plan and Action Plans of the Stockholm Convention, as well. The current inventory shows that the industrial waste constitutes the second biggest sources of unintended POPs release in the

country and accounts about one third (26.5%) of total generation. Thus the establishment of a focused institution for urban and industrial pollution control will certainly have the synergetic benefit on POPs release reduction efforts.

Coordinator/Responsible for Action: Ministry of Environment, Science and Technology
Cost: USD 200,000 (lump sum) for infrastructures excluding salaries
Source of Funding: State Budget
Deadline: 2007

Activity 2: Establishment of interagency coordination mechanism

As the import, use, store, disposal and release of all Annex A I and II, B and C POPs involve different public and private agencies, the efforts towards addressing the problem too needs joint efforts of the concerned sectors. Ministry of Agriculture and Cooperatives was involved in the import of POPs pesticides whereas Ministry of Water Resources was involved in the import of electrical transformers and the involvement of Ministry of Industry, Commerce and Supplies in this sequence is responsible for allowing use of POPs chemicals in the process and approving the industrial processes that may release unintentional POPs. Besides the issues of agricultural waste burning practices, solid waste and waste water disposal practices, control of forest fires, etc. are related with different public agencies as well as several community based organizations (CBOs)/user groups, NGOs etc.

A National Committee on POPs Management could be constituted in order to facilitate coordination among the varied stakeholders to achieve the goal of release reduction of POPs into environment. For this purpose the committee already in existence such as National Committee on Environmental Standards, Pesticide Management Committee or even the Steering Committee on POPs Enabling Activities Project (see Box), could be strengthened or elaborated in its scope for the task of POPs management as well.

Steering Committee of POPs Enabling Activities Project:

Secretary of Ministry of Environment, Science and Technology (MOEST)	Chairman
Joint secretary, Environment Division, MOEST	Member
Joint Secretary, Ministry of Agriculture and Cooperatives (MOAC)	Member
Joint Secretary, National Planning Commission	Member
Joint Secretary, Office of the Prime Minister and Council of the Ministers	Member
Director General, Nepal Bureau of Standards and Metrology	Member
Program Director, Plant Protection Directorate (MOAC)	Member
Director, Department of Health Services, Ministry of Health (MOH)	Member
Chief Entomologist, National Agriculture Research Council (NARC)	Member
Director, Environment & Social Study Department, Nepal Electricity Authority	Member
Expert, Prof. Emeritus Fanindra P. Neupane, PhD	Member
NGO Representative (from NEFEJ)	Member
National Coordinator UNIDO Nepal Office	Observer
National Project Coordinator, POPs Enabling Activity Project, MOEST	Member-Secretary

Committee on Environmental Standards:

Secretary, Ministry of Environment, Science and Technology,	Chairman
Joint Secretary, Ministry of Industry Commerce and Supplies	Member
Joint Secretary, Ministry of Local Development	Member
Joint Secretary, Ministry of Labor and Transport Management	Member
Joint Secretary, Ministry of Law, Justice and Parliamentary Affairs	Member
Joint Secretary, Office of the Prime Minister and Council of the Ministers	Member
Director General, Nepal Bureau of Standards and Metrology	Member

Head, Nepal Health Research Council	Member
Representative, Federation of Nepalese Chamber of Commerce and Industry	Member
Representative, Federation of Nepalese Cottage and Small Scale Industries	Member
Representative, Environmental Non Governmental Organization	Member
Representative, Environment Journalists Forum	Member
Experts (two experts as appointed by MOEST)	Member
Joint Secretary of Concerned Ministry (if different than listed above)	Member
Joint Secretary and Head Environment Division, MOEST	Member Secretary

However, to prioritize the POPs management activities, it may be necessary to include additional stakeholders and form a Steering Committee on Implementation of Stockholm Convention (SCISC) in Nepal. The committee will have all the members of the Environmental Standards Committee with additional members from POPs Steering Committee and Pesticide Committees.

Proposed Steering Committee on the Implementation of Stockholm Convention (SCISC)

Secretary, Ministry of Environment, Science and Technology	Chairman
Joint Secretary, Ministry of Industry Commerce and Supplies	Member
Joint Secretary, Ministry of Local Development	Member
Joint Secretary, Ministry of Labor and Transport Management	Member
Joint Secretary, Ministry of Law, Justice and Parliamentary Affairs	Member
Joint Secretary, Office of the Prime Minister and Council of the Ministers	Member
Director General, Nepal Bureau of Standards and Metrology	Member
Representative, Nepal Health Research Council	Member
Representative, Federation of Nepalese Chamber of Commerce and Industry	Member
Representative, Federation of Nepalese Cottage and Small Scale Industries	Member
Representative, Environment Journalists Forum	Member
Experts (two experts as appointed by MOEST)	Member
Joint Secretary of Concerned Ministry (if different than listed above)	Member
Director, Environment & Social Study Department, Nepal Electricity Authority	Member
Director, Department of Health Services, Ministry of Health (MOH)	Member
Joint Secretary, Ministry of Agriculture and Cooperatives (MOAC)	Member
Executive Director, Nepal Agriculture Research Council	Member
Director General Department of Food Technology and Quality Control	Member
Joint Secretary, Head Environment Division, Ministry of Forest	Member
Representative from Federation of Community Forest User Group	Member
Representative from Environmental NGO	Member
Joint Secretary and Head Law and Convention Dvision, MOEST	Member Secretary

This committee will be formed under the Ministry of Environment Science and Technology and is to be looked after by POPs Unit under the Law and Convention Division of Ministry of Environment, Science and Technology.
Responsible for Action: Secretary of Ministry of Environment, Science and Technology
Cost: USD 2000
Source of Funding: National Budget
Deadline: 2007

Activity 3: Implementation of Action Plan on Stockholm Convention

In order to ensure the implementation of different activities of the Action Plans, as a part for ensuring the compliance with the Stockholm Convention, it is necessary to launch this as a separate project with substantial external resources in the beginning. The activities, otherwise, may receive little attention and

resources due to different priorities of the government. Therefore a project manager with technical qualification suitable to the job is to be appointed. The project manager will be given TOR for the job and in guidance of the SCISC and POPs Management Technical Committee (PMTC) in Nepal, and also in close collaboration with POPs Unit of the MOEST, the manager will be responsible for implementing the activities of the action plan under auspices of the MOEST.
Responsible for action: Secretary of Ministry of Environment, Science and Technology
Cost: **41,876,590 USD** (This is the total amount that will be required for the implementation of all action plans and coordination).
Source: GEF/Bilateral
Deadline: 2028

Activity 4: Coordination and cooperation between Basel, Rotterdam, Stockholm Conventions in Nepal

Since Nepal is a party to Basel Convention and signatory to Stockholm Convention and participating actively in the PIC procedure, it is imperative to have a coordination mechanism between these three Conventions. This will help reduce any duplication in implementation and formulation of regulations and thus enhance the synergy. The purpose is to improve state of environment of Nepal by developing environmentally sound management of POPs contaminated wastes and adoption of methods for prevention of hazardous wastes generation including unintended by-products i.e., PCDD/F also addressing illegal import and transport of such wastes.

A desk under Joint Secretary of Law and Convention Division of MOEST will be designated as the coordinator for UNEP chemicals related conventions. This desk will coordinate the projects relating to management of hazardous chemicals including POPs management project and report to the Head of Law and Convention Division.
Responsible for Action: Secretary Ministry of Environment, Science and Technology
Cost: USD1500
Source of Funding: State Budget
Deadline: 2008

Activity 5: Cooperation and coordination of activities concerning promotion of BAT and BEP

There are several agencies related in the activities for reduction of unintended release of PCDD/Fs. The Ministry of Industry, Commerce and Supplies and its subsidiary bodies may be relevant agencies to issue BAT for different industrial processes, while the Ministry of Agriculture and Cooperatives is relevant for prescribing pesticides, composting of agricultural wastes that otherwise would be burnt off. Ministry of Forestry is relevant for controlling forest fire while Ministry of Local Development and the Municipalities are relevant for prescribing BAT and BEP for controlling unintended release of Annex C POPs from solid waste disposal. Ministry of Health and Population is related with regulating health care waste management among others. Hence a coordinating committee, POPs Management Technical Committee, is recommended to be formed with the representation of all the institutions mentioned above for identifying the appropriate BAT and BEP. The technical personnel of each of these institutions will identify and recommend the BAT and BEP in their respective areas. These recommendations will be forwarded to the SCISC to finalize them. The SCISC will eventually recommend the MOEST for adoption of these technologies.
Responsible for Action: Secretary of Ministry of Environment, Science and Technology
Cost: USD 2000
Source of Funding: State Budget
Deadline: 2008

B. Regulatory strengthening

Regulatory Strengthening needs two-pronged approaches, which include bringing new legislation or incorporation of some provisions in the existing legislation and harmonization of sector legislation.

Amending current legislation

There are ample opportunities for incorporating the provisions of Stockholm Convention in the current Environment Protection Act, 1997. For example, Subsection 3 of Section 7 of Environment Protection Act, 1997 has empowered the MOEST to forbid on the use of any substance, fuel, tools or device that has potential to cause significant adverse impacts to the environment by notifying in Nepal Gazette. Under this provision a list of POPs (pesticides, PCBs, HCBs, etc.) could be issued as forbidden chemicals. Similarly, the provision of Environmental Inspector in Section 8 of the same Act provides basis for compliance monitoring. In addition, Subsection 4 of Section 7 of the Act can be used or amendment of subsection 3 of the same section to include the prescription of certain tools, device and process such that it allows Ministry to issue BAT and BEP in industrial process, waste management and other areas of POPs release. Besides, Pesticide Act could also be used to forbid the POPs pesticides (particularly for new POPs).

Activity 6: Ban on the use of POPs containing materials

A ban with immediate effect will be made for use of PCB contaminated oil in welding machines and other operations. Based on the inventory, the PCB containing waste oil has been found in current use in welding operation. The oil may still be in use for direct health application.
Responsible for action: Ministry of Environment, Science and Technology
Cost: USD 1500
Funding source: State budget
Deadline: 2008

Activity 7: Ban on the use of chemicals potential for generating POPs

Use of elemental chlorine for bleaching in pulp and textile is known to generate PCDD/F. It is thus imperative to put a ban on such industrial process.
Responsible for action: Minister of Environment, Science and Technology
Cost: USD 1000
Funding source: State budget
Deadline: 2008

Activity 8: Ban on open burning of kitchen and garden wastes

Ban on the open burning of garden wastes and other household wastes particularly in the urban area, where air pollution is already an issue, is made with an immediate effect. Agriculture residue burning being the number one source of PCDD/F generation, the issue needs to be addressed.
Responsible for action: Minister of Environment, Science and Technology
Cost: USD 1000
Source of funding: State budget
Deadline: 2008

Activity 9: Formulation/Amendment of Integrated Waste Management Policy and Amendment of Solid Waste Management and Resources Mobilization Act

Current waste management policy and legislation (Act and Regulation) on waste management is to be amended towards incorporating all sorts of solid wastes (industrial, health care, commercial, institutional, electronic goods, batteries, etc. in addition to traditional waste categories) right from collection, transport,

resources recovery and final disposal. Guidelines need to be prepared for each stage of waste management, targeted among others, to reducing PCDD/F generation.

Formulation of more industry specific discharge standards in controlling direct discharge of untreated industrial waste water is made and enforced. The compliance plan and compliance monitoring mechanism is to be worked out.

Responsible for action: Ministry of Environment, Science and Technology in collaboration with Ministry of Local Development and Ministry of Industry, Commerce and Supplies
Cost: USD10,000.
Funding source: State budget and bilateral or multilateral assistance
Deadline: 2007

C. Bringing New Legislation

Similar to Ozone Depleting Substance Consumption (Control) Rules 2000 that had been framed under Environment Protection Act, Rules on the Management of Persistent Organic Pollutants could be framed. The separate rules on POPs can be comprehensive and the roles and responsibilities of each concerned partner could be defined in the same rules.

Activity 10: Formulation of Hazardous Chemicals Management Rules

Since there is no hazardous chemicals management legislation in the country, it is necessary to prepare one. These rules will not only incorporate the management of POPs chemicals but also chemicals relating to PIC and Basel conventions as well. This will help ensure compliance with the commitments made during international multilateral agreements.
Responsible for Action: Ministry of Environment, Science and Technology in collaboration with Ministry of Law, Justice and Parliamentary Affairs
Cost: USD 2000
Funding Source: State budget
Deaddline: 2007-2008

Activity 11: Harmonization of sector legislations

As the task of environmental management, particularly regulating the POPs import, use and release in the country, involves wide array of peoples, institutions and legislations, it is essential for the harmonization of the mandates of concerned sectors whether going into any of the options by amending the existing legislation or formulating new legislation for regulatory arrangement.

A high level committee representing each of the concerned Ministries is constituted and a team of legal experts are assigned for identifying duplication, gaps and overlaps of the mandates of each sector. The finding and recommendations by the legal experts are discussed in the high level committee. High level committee in its turn recommends required adjustments, fine tuning and added provisions in the sector legislation to each of the concerned ministries. The amendments of sector legislation are made within the decided time frame.
Responsible for action: Secretary of Ministry of Environment, Science and Technology
Cost: USD 5000
Funding source: State budget
Deadline: 2008

Activity 12: Establishment of Information Education and Communication (IEC) System with POPs Issues incorporated

Environment management task needs a wider public participation and support. To garner such support an effective IEC strategy, institution is to be established. Up till now different public agencies, private organization and NGOs have been involved in preparing and communicating on the environment protection issues. Ministry of Environment, Science and Technology is yet to establish such IEC system.

Ministry needs to create separate section for IEC and different materials are prepared for different target groups. An IEC strategy for different components such as audio visual materials are prepared for mass communication, school and university curricula are developed and joint project with universities are launched. Joint communication materials could be produced in consultation with different concerned sectors.

Responsible for Action: Secretary of Ministry of Environment, Science and Technology
Cost: USD 10,000
Funding sources: State budget plus bilateral and multilateral assistance
Deadline: 2008-2009

Activity 13: Further strengthening and expanding the scope of alternate energy program for household and industrial use

Promotion of wind, solar, water mill will reduce the consumption of fossil fuels and other biomass fuels which eventually will help reducing the release of PCDD/F in domestic as well as industrial and commercial settings. The current alternate energy program (AEPC) under the Ministry of Environment, Science and Technology is to be continued and further elaborated to cover industrial alternate energy utilization possibilities including incorporation of all possible alternate energy sources and expansion of the coverage.

Responsible for action: Minister of Environment, Science and Technology
Cost: USD 500,000/year till 2015
Funding sources: Bilateral and multilateral agencies

Table 3.4: Work plan for different actions under action plan 3.3.1

	Implementation Schedule in Years								
3.3.1 Activity: Institutional and Regulatory Strengthening Measures	2007	2008	2009	2010	2011	2012	2013	2014	2015
Activity 1. Establishment of the Enforcement Agency for Environmental Requirements									
Activity 2. Establishment of Interagency Coordination Mechanism									
Activity 3: Implementation of Action Plan on Stockholm Convention		Up to 2028							
Activity 4: Coordination and Cooperation between Basel, Rotterdam, Stockholm Conventions in Nepal									
Activity 5: Cooperation and Coordination of Activities Concerning Promotion of BAT and BEP									
Activity 6: Ban on the use of POPs containing materials									
Activity 7: Ban on the use of chemicals potential for generating POPs									
Activity 8: Ban on open burning of kitchen and garden waste in urban areas									
Activity 9: Formulation/Amendment of Integrated Waste Management Policy and Amendment of SWMRM Act									
Activity 10: Formulation of Hazardous Chemicals Management Rules									
Activity 11: Harmonization of sector legislation									
Activity 12: Establishing Information Education and Communication (IEC) System									
Activity 13: Further strengthening and expanding the scope of alternate energy program for household & industrial use									

3.3.1.2 Action Plan implementation process

Throughout the implementation of this action plan, there will be a Project Manager (PM), who reports to the Steering Committee on Implementation of Stockholm Convention in Nepal (SCISC) during the Action Plan Implementation of the project. The Project Manager will be a technically qualified person to provide overall guidance on the management of the process. The PM will ensure adherence to the work plan, which will be finalized during the first phase of the implementation. His/her main responsibilities will include giving advice and monitoring of all technical aspects of the Action plan implementation as well as the financial control over the execution. The PM will work in close cooperation with the POPs Unit of the Ministry. SCISC will be established and will act as the Steering and Coordinating Committee for the execution of this Action Plan. It will be chaired by the Secretary of the Ministry, with relevant ministries, representatives of the private sector and the NGO sector. The SCISC will decide on the frequency of the meetings and its working procedures. This is the forum where the NGO sector can also raise questions and comment on the discussion topics. There will be a POPs Management Technical Committee (PMTC) formed under the SCISC for day to day execution support.

The POPs Management Technical Committee will:

- develop its working procedures;
- monitor the execution by means of progress reports and close contact with the PM;
- evaluate the efficiency of the project management, including outcomes, the budget and timelines;
- provide technical support to the PM and working teams;
- approve the work plan with timelines and budget of the implementation of this Action Plan prior to submission to SCISC;
- have meetings on a regular basis (monthly);
- agree on working arrangements and implementation plans with the Project Manager and the POPs Officer;
- oversee the work of the national experts engaged to undertake various activities required by the Action Plan and receive and review their reports;

The Project Manager will:

- agree on a subcontract with the Action Plan Implementation Project for the terms set out in this Action Plan;
- coordinate with principal stakeholders of the PMTC for the successful implementation of this Action Plan;
- establish an office within its premises charged with the successful implementation of the Action Plan;
- have day-to-day responsibility for the management and coordination of the implementation activities, including subcontracts, budgets, and reporting to the PMTC and the SCISC;
- appoint national experts as necessary to undertake the various actions required during the course of the work, using terms of reference agreed by the SCISC and ensure the quality of their work;
- provide a secretariat function to the SCISC and PMTC;
- report regularly to the POPs Management Technical Committee, and to the SCISC, on the progress of the implementation and the disbursement of the funds.

3.3.1.3 Implementation performance monitoring and periodic review mechanisms

Reporting to the POPs Management Technical Committee (PMTC)
The monitoring of the project execution will be undertaken by technical and financial reports, which will be developed by the PM. He/she will submit these reports to the SCISC on a regular basis. The PM will take corrective actions based on the comments and evaluations of the PMTC

Reporting to the Steering Committee on Implementation of Stockholm Convention (SCISC)
Technical and financial reports will also be requested by the SCISC. These reports will evaluate the efficiency of project implementation, including outcomes, the budget and timelines. Their frequency will be decided, when the subcontract is developed between the PMTC and the PM. Payment distribution will also depend on these reports. An appointed Reviewer will, on a contracted basis, assist the PMTC in evaluating these reports and the implementation progress. He/she will be nominated by the PMTC which is responsible for coordinating the implementation of all Action Plans in the NIP. The PM will take corrective actions based on the comments of the PMTC.

3.3.2 Activity: measures to reduce or eliminate releases from intentional production and use

3.3.2.1 Present situation in Nepal

POPs pesticides were never produced in the country. But a substantial amount of POPs pesticides were imported for use in agriculture and vector control program and still some 75 tons of pesticides (of which 33 tons are POPs pesticides) remain as obsolete stocks in 24 different locations in the country. As the government of Nepal has already banned the import and use of the all POPs pesticides since 2001, there is legally no chance of production, import and use of any POPs pesticides.

Likewise, PCBs were never produced in Nepal but got into this country along with the dielectric fluid for use in the electrical transformers.

3.3.2.2 Summary of the current measures to reduce or eliminate releases from intentional production and use.

Nepal has neither produced any of the POPs pesticides in the past nor is there any plan to produce them in the future. However, a substantial amount of POPs pesticides imported in the past is lying as obsolete stock in different warehouses.

With reference to current measures to reduce or eliminate release from intentional production and use of POPs (Annex A), the MOAC according to Pesticide Act 1991 and Pesticide Regulation 1994 has banned the import, export and use of Chlordane, DDT, Aldrin, Dieldrin, Endrin, Heptachlor, Mirex and Toxaphene, all 8 POPs pesticides, since April 2001.
Moreover, the Ministry has banned some more non-POP pesticides such as BHC, Lindane, Fosfomidin, and Organomercury fungicides, which exhibit somewhat similar persistent characteristics.

Some pesticides companies found formulating and marketing pesticides illegally were penalized by the MOEST, because they were established without fulfilling the legal requirements as per the EPA 1997 and EPR 1997. It is important to note that none of the pesticides currently being formulated and produced in Nepal belongs to POPs category.

Last record of DDT imported for the application in the Public health sector was in the year 1994 and since mid-1980s the persistent pesticides were gradually replaced by the newer organophosphates such as malathion, ficon and actellic (Table 2.18). With the introduction of icon the synthetic pyrethroids also started to take the Nepalese market, though in very low quantity. Since mid 1990s α – cypermethrin was imported; however the recorded data could be obtained only from 2002. As DDT is already banned to import and use in the country, there is not any possibility to import and use it again without amending the existing laws. So there is no need of filing any exemption.

The management and regulation of currently used pesticides are covered by relevant regulations such as the Pesticide Act 1991 and Pesticide Regulation 1994, however obsolete pesticide management related regulatory provisions are not mentioned in current Pesticide Act and Pesticide Regulation.

The production, import, sale, supply and storage of the pesticides are also regulated through EPA 1997 and EPR 1997, though there are some difficulties in the implementation side. Sale, supply, storage and disposal of 100 kg to 1 ton of toxic substances, according to EPA & EPR1997, require IEE but no such provisions for amounts lesser than this. From environmental and human health aspect however, even small amount of some chemicals can be highly toxic. That is why it is important that the environmental laws be amendment.

The laws (Pesticide Act and EPA) are also silent towards controlling excessive importation of the pesticides (toxic substances) in absence of the actual demand analysis and hence there should be a balance between the import and demand.

3.3.2.3 Summaries of the result of POPs inventories (Pesticides, PCBs and PCDD/F)

As per the latest inventories carried out by POPs Enabling Project of MOEST/UNIDO, the total obsolete pesticides amount to be 74.257 M tons. The identified POPs pesticides is 10.058 M tons and mixed pesticides (mixed with POPs Pesticides) is 23.610 m tons. Thus the total POPs Pesticides quantity can be obtained as the sum of identified POPs Pesticides (10.058 tons) and Mixed Pesticides (23.610 tons) which are mostly POPs, Organochlorines and Organophosphates. Thus the total obsolete POPs Pesticides are 33.668 m tons. This is 45.34 per cent of the total obsolete pesticides stocks in Nepal.

Likewise the total PCBs contaminated transformer oils was found to be 106185.3 litres, out of which 90623 litres of oil contains more than 50 ppm of PCBs. This figure does not contain other possible sources of the PCBs in the country, thus a complete PCBs Inventory may be necessary for the exact quantification of PCBs contaminated oil, which may be present in welding machines and other PCBs contaminated appliances/sources.

The DDT import and use has been abandoned from the year 1995. The latest pesticide inventories though quantified importation and use of DDT till 1994. In the piled over stocks of pesticides, about 3.305 tons (Amlekhganj and Nepalganj) of DDT is identified.

3.3.2.4 Other international obligations related to POPs pesticides, PCBs, and DDT

The environmentally sound disposal and treatment options of the obsolete pesticides containing POPs pesticides as well as PCBs containing oils and equipments may require transporting these wastes to other countries, where safer disposal facilities are available. In such situations the provisions of the Basel convention, to Nepal is a party since 1996, need to be fulfilled.

3.3.2.5 Proposed regulatory strengthening measure to reduce or eliminate releases from intentional production and use.

MOAC has already banned all Annex A POPs pesticides since 2001 through cabinet decision.
MOAC has already banned some four non-POPs pesticides, as well, through cabinet decision which exhibit somewhat similar persistence properties.
MOEST through EPA/EPR obliges the entrepreneurs to carryout IEE or EIA when they produce, import, sell, distribute, store, use, dispose pesticides and the industries to have pollution control certification.
In health sector MOHP is applying non-POPs pesticides instead of DDT 1995 to get rid of vector insects.

There is no regulation that controls the import and use of PCBs legally, however, NEA has moved forward progressively not to import and use PCBs containing transformer oils as seen in their bid notice for transformer/oil procurement.

The new pesticides are being regulated under Pesticides Act 1991 and Pesticide Regulation 1994.
The ODS are regulated through ODS Consumption (control) Rule 2001.

The custom department is also controlling/regulating the import of industrial chemicals and hazardous chemicals.

The existing regulations are also adequate in regulating or reducing/eliminating the release from intentional production and use of POPs. Still there is a need to harmonize the sectoral laws (PA and EPA) as well as institutions (MOAC and MOEST) for effective implementation and monitoring of the regulatory provisions. At the same time these laws need to be amended, also inline with the POPs Convention Article 3, Sub-article 3 and 4 taking into consideration of Annex D: Information Requirements and Screening Criteria (chemical identities; persistence; bio-accumulation; potential for long-range environmental transport and adverse effects).

3.3.2.6 Objectives and priorities of Action Plan:

The Action Plan implementation strategy will be based on the following objectives:

- Harmonizing and amendment of relevant laws
- Establishing and strengthening of relevant institution (MOEST and MOAC)

3.3.2.7 Proposed Action Plan implementation process

Throughout the implementation of this action plan, there will be a Project Manager (PM), who reports to the Steering Committee on Implementation of Stockholm Convention in Nepal (SCISC) during the Action Plan Implementation of the project. The Project Manager will be a technically qualified person to provide overall guidance to the management of the process. The PM will ensure adherence to the work plan, which will be finalized during the first phase of the implementation. His/her main responsibilities will include advising on and monitoring of all technical aspects of the Action plan implementation as well as the financial control over the execution. The PM will work in close cooperation with the POPs Unit of the Ministry. SCISC will be established and will act as the Steering and Coordinating Committee for the execution of this Action Plan. It will be chaired by the Secretary of the Ministry, with relevant ministries, representatives of the private sector and the NGO sector. The SCISC will decide on the frequency of the meetings and its working procedures. This is the forum where the NGO sector can also raise questions and comment on the discussion topics. There will be a POPs Management Technical Committee (PMTC) formed under the SCISC for day to day execution support.

The PMTC will hold its regular sessions throughout the implementation but additional meetings can be held if necessary. The SCISC will oversee the project-related work of the PMTC and the implementation team. The SCISC will review, comment on and approve the work plan. All decisions of the committee, such as respective responsibilities, timelines and the budget will be clearly communicated to those concerned. Activities will be implemented through subcontracts. Submitted tenders will be reviewed and evaluated by the PMTC subject to approval by SCISC.

The POPs Management Technical Committee will:

- develop its working procedures;
- monitor the execution by means of progress reports and close contact with the PM;
- evaluate the efficiency of the project management, including outcomes, the budget and timelines;
- provide technical support to the PM and working teams;
- approve the work plan with timelines and budget of the implementation of this Action Plan prior to submission to SCISC;
- have meetings on a regular basis (monthly);
- agree on working arrangements and implementation plans with the Project Manager and the POPs Officer;
- oversee the work of the national experts engaged to undertake various activities required by the Action Plan and receive and review their reports;

The Project Manager will:

- agree on a subcontract with the Action Plan Implementation Project for the terms set out in this Action Plan;
- call principal stakeholders of the PMTC to oversee and coordinate the successful implementation of this Action Plan;
- establish an office within its premises charged with the successful implementation of the Action Plan;
- have day-to-day responsibility for the management and coordination of the implementation activities, including subcontracts, budgets, and reporting to the PMTC and the SCISC;
- appoint national experts as necessary to undertake the various actions required during the course of the work, using terms of reference agreed by the SCISC and ensure the quality of their work;
- provide a secretariat function to the SCISC and PMTC;
- report regularly to the POPs Management Technical Committee, and to the SCISC, on the progress of the implementation and the disbursement of the funds.

In order to achieve the objectives, the following measures should be undertaken:
Harmonizing of sectoral laws and amendment with respect to time requirement and in line with POPs convention Article 3 (point 3 & 4) and Annex D
Establishing and strengthening institutional aspect of both line ministries (MOAC and MOEST) for permanent set up of monitoring mechanism.

3.3.2.8 Implementation of Action Plan

Action Plan- 3.3.2 Activity: Measures to reduce or eliminate releases from intentional production and use		
Objectives	Harmonizing and amendment of relevant laws	Establishing and strengthening of relevant institution (MOEST and MOAC)
Activities	Harmonizing of sectoral laws and amendment with respect to time requirement and in line with POPs convention Article 3 (point 3 & 4) and Annex D.	Establishing and strengthening institutional aspect of both line ministries (MOAC and MOEST) for permanent set up of monitoring mechanism.
Expected Results	The comprehensive laws are in place	Stronger, Capable and Functional institutions will be in place
Responsible Institution	MOEST and MOAC	MOEST and MOAC
Time Period	2007-2008	2007-2010
Estimated budget	USD 5000	USD 100,000
Sources of Financing	State budget	State budget and donor agencies

3.3.2.9 Implementation Performance Monitoring and Periodic Review Mechanisms

Reporting to the POPs Management Technical Committee (PMTC)
The monitoring of the project execution will be undertaken by technical and financial reports, which will be developed by the PM. He/she will submit these reports to the SCISC on a regular basis. The PM will take corrective actions based on the comments and evaluations of the SCISC.

Reporting to the Steering Committee on Implementation of Stockholm Convention (SCISC)
Technical and financial reports will also be requested by the PMTC. These reports will evaluate the efficiency of project implementation, including outcomes, budget and timelines. Their frequency will be decided, when the subcontract is developed between the PMTC and the PM. Payment distribution will also depend on these reports. An appointed Reviewer will, on a contracted basis, assist the PMTC in evaluating these reports and the implementation progress. He/she will be nominated by the PMTC which is responsible for coordinating the implementation of all Action Plans in the NIP. The PM will take corrective actions based on the comments of the PMTC.

Activities	Expected Results	Indicators of Success	Period for achieving Results	Frequency of Monitoring
Harmonizing of sectoral laws and amendment with respect to time requirement and in line with POPs convention Article 3 (point 3 & 4) and Annex D.	Comprehensive laws are in place	Amended laws	2006-2007	Half yearly
Establishing and strengthening institutional aspect of both line ministries (MOAC and MOEST) for permanent set up of monitoring mechanism.	Stronger, Capable and Functional institutions will be in place	Monitoring mechanism	2006-2010	Half yearly

3.3.3 Activity: production, import and export, use, stockpiles and wastes of Annex A POPs pesticides (Annex A, part I chemicals)

3.3.3.1 Present situation in Nepal

Nepal has neither developed nor ever produced POPs pesticides. Some non-POPs pesticides produced in Nepal could not also fulfil the current country demand. So most of the pesticides, including POPs, were imported to Nepal either as grant assistance or procured by Nepal itself, to increase agro-products or to control insect vectors. In the past their effects on human health and the environment were not sufficiently known. Therefore, this problem was not seriously felt and no effective regulation to control their production, import, spread, use and liquidation existed. On knowing the adverse impacts of such chemicals and shared at wider scale, the efforts to sound management of such chemicals are seriously undertaken, both at international and national levels. Nepal, though late, has started with regulatory process by formulating Pesticide Act 1991 and Regulation 1994, to regulate/manage the production, importation, spread use of pesticides. The seriousness from the part of Government of Nepal is reflected in banning all POPs Pesticides to import, sale, distribute and use of POPs.

The details on the production, import and export, use, stockpiles of the POPs pesticides is given in previous chapter 2.3.1.

3.3.3.2 Objective and priorities of the Action Plan

The action plan implementation strategy will be based on the following objectives:

- Complete inventory of POPs pesticides prepared
- Obsolete pesticides safely packaged, stored, and disposed and contaminated sites remediated and stabilized
- Further accumulation of pesticides prevented

The Pesticide Act 1991, Pesticide Rule 1994 and Environment Protection Act 1997 and Environment Protection Regulation 1997 are amended and harmonized as per the time demand and spirit of the POPs convention by the year 2007.

Balancing the supply/import of pesticides being currently is use with the actual demand to avoid further accumulation, stockpiling and becoming absolute problem through necessary amendment and harmonizing the relevant laws.

3.3.3.3 Summary of Annex A POPs pesticides production, use, stockpiles, waste and contaminated sites.

According to the review on permitted pesticides and the evidence on pesticides in trade and use, it has been found that there were no POPs pesticides ever produced in the country, neither are there any POPs pesticides currently in trade, import or in use in agricultural, veterinary or in health sector in Nepal. POPs pesticides are being banned in Nepal since 2001.

The total POPs pesticides quantity can be obtained as the sum of identified POPs Pesticides (10.058 tons) and Mixed Pesticides (23.610 tons) which are mostly POPs, Organochlorine and Organophosphate. Thus the total obsolete POPs Pesticides are 33.668 tons. This is 45.34 percent of the total obsolete pesticides stocks in Nepal. Among which DDT had been estimated to be 3.305 tons.

In addition to these, there are 24 contaminated sites where pesticides have been stored since long back. There are also some contaminated sites where pesticides had been buried in the past as part of the disposal of obsolete pesticides (all were non-POPs), but their exact locations (coordinates) are not known. However, the tentative areas are as follows:

About 53 tons of obsolete pesticides were buried and sprayed in nearby forest in Amlekhganj, Nepalganj, Biratnaga, Saljhandi-Rupandehi, Janakpur, and Bhairahawa (Source: Politics in Poison , 2003, NEFEJ, page 5-6).

Likewise 64 tons of obsolete pesticides were mixed with lime and then buried. The location is unidentified.

The pesticides were buried in the Adhabar and Majona forest's eastern corner from the Amlekhganj in 1985 and after one year due to public protest, these buried pesticides were again retrieved and stored in the warehouses (Source: Politics in Poison, 2003, NEFEJ, page 5-6).

The obsolete pesticides contaminated sites are 24, and also the containers of all these obsolete pesticides need to be treated and disposed through environment-friendly manner.

In addition to these contaminated sites directly with the storage of pesticides including POPs pesticides, some of the sites are heavily contaminated with the PCBs containing transformer oils at least in the big NEA transformer repairing and maintenance workshops, private workshops in 1000-1200 numbers throughout the country.

There are various open dumping sites of the municipal waste in various municipalities throughout the country. So far, well known and documented contaminated sites from dumping of municipal solid waste are Gokarna landfill site, Bhaktpur landfill site, Teku transfer Station, Sisdol intermediate landfill sites, Pokhra landfill site and bank of the Bagmati River from Gokarna to Chovar span, Seti River in Pokhara, Singhiyahi River in Biratnagar, Sirsiya River in Birganj etc.

There are also a number of waste water treatment plants and the sludge drying beds may be considered as the contaminated sites. These are at Hetauda Industrial Estate and Guheshwary Waste Water Treatment sites. There are also 8 other different treatment sites/plants in and around the three cities of Kathmandu, Lalitpur and Bhaktpur for the sewerage treatment facilities of huge area and based on oxidation pond /biological treatment system. A detail of contaminated sites due to dumping of municipal waste including all kinds of domestic and hazardous waste from health care facilities are tabulated in the previous section.

The relevant national laws that attract the execution of safe disposal of obsolete pesticides and regulate the currently used pesticides are Pesticides Act 1991, Pesticide Regulation 1994, Environment Protection Act 1997 and Environment Protection Regulation 1997. The international laws related to this problem are the Basel Convention to which Nepal is a party and POPs Convention to which Nepal is signatory and preparing for the ratification.

Nine of the 12 chemicals identified in the initial list of Persistent Organic Pollutants (POPs) are pesticides. Chlordane and dieldrin are known to be endocrine disrupting chemicals. Six pesticides out of the nine initial POP pesticides are subject to the "Rotterdam Convention on the Prior Informed Consent (PIC) Procedure for Certain Hazardous Chemicals and Pesticides in International Trade." They have been banned in most industrialized and many developing countries, including in Nepal, though, Nepal has not yet signed this convention.

Assessment of Health and environmental impact has been listed in previous section.

Social and economic Impact of eliminating production and use of Annex A POPs pesticides is not relevant for Nepal at this stage, because all of Annex A POPs chemicals are already banned in 2001 and hence none of these are being used currently.

3.3.3.4. Strategy for identification of stockpiles, articles in use and waste

Summary of POPs Pesticides Inventory is presented in chapter 2.3.1.

3.3.3.5 Proposed operational measures for Annex A POPs Pesticides storage, handling, reduction and disposal

Throughout the implementation of this action plan, there will be a Project Manager (PM), who reports to the Steering Committee on Implementation of Stockholm Convention in Nepal (SCISC) during the Action Plan Implementation of the project. The Project Manager will be a technically qualified person to provide overall guidance on the management of the process. The PM will ensure adherence to the work plan, which will be finalized during the first phase of the implementation. His/her main responsibilities will include advising on and monitoring of all technical aspects of the Action plan implementation as well as the financial control over the execution. The PM will work in close cooperation with the POPs Unit of the Ministry. SCISC will be established and will act as the Steering and Coordinating Committee for the execution of this Action Plan. It will be chaired by the Secretary of the Ministry, with relevant ministries, representatives of the private sector and the NGO sector. The SCISC will decide on the frequency of the meetings and its working procedures. This is the forum where the NGO sector can also raise questions and comment on the discussion topics. There will be a POPs Management Technical Committee (PMTC) formed under the SCISC for day to day execution support.

The PMTC will hold its regular sessions throughout the implementation, but additional meetings can be held if necessary. The SCISC will oversee the project-related work of the PMTC and the implementation team. The SCISC will review, comment on and approve the work plan. All decisions of the committee, such as respective responsibilities, timelines and the budget will be clearly communicated to those concerned. Activities will be implemented through subcontracts. Submitted tenders will be reviewed and evaluated by the PMTC subject to approval by SCISC.

The POPs Management Technical Committee will:

- develop its working procedures;
- monitor the execution by means of progress reports and close contact with the PM;

- evaluate the efficiency of the project management, including outcomes, the budget and timelines;
- provide technical support to the PM and working teams;
- approve the work plan with timelines and budget of the implementation of this Action Plan prior to submission to SCISC;
- have meetings on a regular basis (monthly);
- agree on working arrangements and implementation plans with the Project Manager and the POPs Officer;
- oversee the work of the national experts engaged to undertake various activities required by the Action Plan and receive and review their reports;

The Project Manager will:

- agree on a subcontract with the Action Plan Implementation Project for the terms set out in this Action Plan;
- call principal stakeholders of the PMTC to oversee and coordinate the successful implementation of this Action Plan;
- establish an office within its premises charged with the successful implementation of the Action Plan;
- have day-to-day responsibility for the management and coordination of the implementation activities, including subcontracts, budgets, and reporting to the PMTC and the SCISC;
- appoint national experts as necessary to undertake the various actions required during the course of the work, using terms of reference agreed by the SCISC and ensure the quality of their work;
- provide a secretariat function to the SCISC and PMTC;
- report regularly to the POPs Management Technical Committee, and to the SCISC, on the progress of the implementation and the disbursement of the funds.

In order to achieve the objectives, the following measures should be undertaken:

- Preparation and adoption of a strategy for inventory completion, collection, and disposal of obsolete pesticide stocks;
- Preparation and establishment of control mechanisms and cooperation of inspection bodies to oversee POPs wastes;
- Development of schemes for positive influence in the business sector, having active roles and responsibilities in this area;
- Establishment of a system for control of illegal import and application of banned chemicals including Organochlorine Pesticide and ensure balance between import and demand of the pesticide to avoid further accumulation.
- Disposal of POPs pesticides in Nepal with state contribution, according to the principles of the Stockholm Convention

3.3.3.6 Implementation of Action Plan

Action Plan - 3.3.3 Activity: production, import and export, use, stockpiles and wastes of Annex A POPs pesticides (Annex A, part I chemicals)						
Objectives	Complete inventory of POPs pesticides prepared		Obsolete pesticides safely packaged, stored, and disposed			Further accumulation of pesticides prevented
Activities	Preparation and adoption of a strategy for complete inventory and collection of obsolete pesticide	Preparation and establishment of control mechanisms and cooperation of inspection bodies to oversee POPs wastes	Safe packaging and labelling and safe interim storage of obsolete pesticides until final disposal	Transport of obsolete pesticides and contaminated soil and containers to disposal site for disposal in line with Basel and Stockholm Conventions,	Site stabilization and remediation	Establishment of a system for control of illegal import, application and balance between import and demand of pesticides
Expected Results	-Prepared and adopted strategy for inventory completion -Obsolete pesticides confined in few warehouses	-Control mechanisms established -Inspection bodies cooperating	Obsolete pesticides safely packaged and properly labelled and safely stored	Stockpiles of obsolete pesticides including POPs pesticides, contaminated soil and containers transported for environmentally sound disposal	Contaminated sites remediated and stabilized	-Illegal import stopped -Stockpiling controlled by importing only required quantities of pesticides
Responsible Institution	POPs project in MOEST and MOAC	MOEST, MOAC and MOHP	MOEST and MOAC	MOEST and MOAC	MOEST and MOAC	MOAC
Time Period	2007	2007	2007	2007-2009	2007-2010	2007-2010
Estimated budget	USD 50,000	USD 10,000	USD 100,000	USD 400,000	USD 50,000	USD 50,000
Sources of Financing	Bilateral cooperation and foreign donations	State budget	Bilateral cooperation and foreign donations	Bilateral cooperation and foreign donations	State budget and bilateral cooperation	State budget

3.3.3.7 Implementation Performance Monitoring and Periodic Review Mechanisms

Reporting to the POPs Management Technical Committee (PMTC)

The monitoring of the project execution will be undertaken by technical and financial reports, which will be developed by the PM. He/she will submit these reports to the SCISC on a regular basis. The PM will take corrective actions based on the comments and evaluations of the SCISC.

Reporting to the Steering Committee on Implementation of Stockholm Convention (SCISC)
Technical and financial reports will also be requested by the PMTC. These reports will evaluate the efficiency of project implementation, including outcomes, the budget and timelines. Their frequency will be decided, when the subcontract is developed between the PMTC and the PM. Payment distribution will also depend on these reports. An appointed Reviewer will, on a contracted basis, assist the PMTC in evaluating these reports and the implementation progress. He/she will be nominated by the PMTC which is responsible for coordinating the implementation of all Action Plans in the NIP. The PM will take corrective actions based on the comments of the PMTC.

Activities	Expected Results	Indicators of Success	Period achieving Results	Monitoring Frequency
Preparation and adoption of a strategy for complete inventory and collection of obsolete pesticides	- Prepared and adopted strategy for inventory completion -Obsolete pesticides confined in few warehouses	Proposed actions; content of strategy; and amount of obsolete pesticides collected	2007	Six monthly
Preparation and establishment of control mechanisms and cooperation of inspection bodies to oversee POPs wastes	-Control mechanisms established -Inspection bodies cooperating	Inspection bodies/orgnizations cooperating	2007	Six monthly
Safe packaging and labelling and safe interim storage of obsolete pesticides until final disposal	Obsolete pesticides safely packaged and properly labelled and safely stored	Quantity of safely packaged pesticides with labelling	2007	Six monthly
Transport of obsolete pesticides and contaminated soil and containers to disposal site for disposal in line with Basel and Stockholm Conventions	Stockpiles of obsolete pesticides including POPs pesticides, contaminated soil and containers transported for environmentally sound disposal	Amount of pesticides and contaminated items transported for safe disposal	2007-2009	Six monthly
Site stabilization and remediation	Contaminated sites remediated and stabilized	Area remediated and stabilized	2007-2010	Once a year
Establishment of a system for control of illegal import, application and balance between import and demand of pesticides	-Illegal import stopped -Stockpiling controlled by importing only required quantities of pesticides	Number of illegal imports and pesticides import-use balance sheet	2006-2015	Once a year

3.3.3.8 Information dissemination and Education program

The overall information on Pesticides, Chemicals and POPs are limited to a limited general public. Governmental Agencies like MOAC through Department of Agriculture, Agriculture Information and Communication Centre, Pesticide Registration and Management Division have disseminated some information, through pamphlets, leaflets, Annual Report etc. Similarly NARC has also been producing and broadcasting programs on technology development trough television, posters, leaflets, and newsletters which have the least coverage on pesticides. Likewise, Ministry of Environment, Science and Technology through its POPs Enabling Project have continuously engaged various stakeholders in their workshops and training programs as well as those in the steering committee. Still the information dissemination is not enough to reach up to the grass root level or target audience on Pesticides and POPs. So far information disseminated by various organization have mostly covered on POPs pesticides, the information on PCBs and unintentional POPs (dioxin and furan) are still not reaching to the grassroots level and hence need massive program on it.

Civil Society/NGOs have been playing an important role towards information dissemination as well as educating people about the POPs and pesticide issue. The NGOs have adopted research, advocacy, litigation as well as organizing interaction programs, seminars, workshops, and training and also have produced and disseminated different IEC materials such as radio news, television program, posters, books, briefing paper throughout the country. Thus the role of civil society in the area of information dissemination and educating people need to be recognized by the government and partnership has been

developed with them while implementing this NIP activities in the information dissemination, awareness raising and mobilizing the local people required to execute the NIP.

Likewise, there is formal education on Environment Sciences from School level to University level. But there is still very limited and absolutely not any discussion on POPs and pesticides at the school level however, in the university level there is paper, Environmental Toxicology a the Bachelors and Masters Level which directly teaches about the overall toxic substances but not exclusively on the POPs. As such in the curricula there is no POPs inclusion. Thus the education on POPs completely depends upon the teachers acquainted with these issues, because the course does not offer the subject. Likewise Institute of Agriculture and Animal Science (IAAS) Rampur has its own Department of Entomology which offers the study of pesticides in its curriculum but not necessarily the study of POPs.

Thus at present there is no specific inclusion of POPs in the formal academic courses and hence need to be included in the Environment Science, Agricultural Sciences and Medical Sciences curriculum and in the academic programs of other technical institute's as well.

3.3.3.9. Criteria to be used for selecting POPs Management Options

- Eliminate inappropriate technologies (based on guidance / criteria) – e.g. Formation of POPs / POPs waste / landfill, etc.
- Destruction Efficiency (based on inputs vs. all outputs)
- Ability to contain all process streams
- Ability to reprocess materials, residues, gases, liquids, if required
- Availability of complete process information (analytical data)
- Track records / commercial availability
- Safety and protection of the workers
- Hazardous material use
- Community acceptability

3.3.3.10 Introduction of alternatives to POPs pesticides

Nuclear Polyhedrosis Virus (NPV) and Bacillus thuringiensis (BT) are microbial pesticides which are increasingly in use against lepidopteran pests, whereas extracts of Melia azederach, Azadiracta indica, native plants of Nepal, are used against wide range of insect pests and Acorus calamus is solely used against stored grain pests.

Synthetic products like parathion (e.g Metacid) and organophosphates (e.g. Monocrotophos), which are still widely used, are under consideration to be gradually replaced by safer but costly synthetic pyrethroides (e.g. cypermethrin) and systemics like carbamates.

3.3.4 Activity: production, import and export, use, identification, labeling, removal, storage and disposal of PCBs and equipment containing PCBs (Annex A, part II chemicals)

3.3.4.1 Present situation in Nepal

PCBs are among the most stable organic chemicals known. Their low dielectric constant and high boiling point make them ideal for use in dielectric fluids in electrical transformers and capacitors, and also used as additives for paints, copying paper and plastics. There is no PCB containing equipment production in Nepal. The import of dielectric fluid to be used in transformers is carried out by NEA and the major

wastes in the form of stockpiles (both fluid and old transformers) are also under the ownership of NEA and are stored in closed to open conditions in different workshops under NEA.

The inventory prepared by POPs Enabling Activities Project has identified the PCB-contaminated stock of transformer oil, using qualitative method followed by quantitative determination.

The labeling and storage of PCB contaminated oil and equipment is not covered by national legislation. As evidenced by the tender notice published for supply of transformer oil to NEA, NEA puts the precondition that the dielectric fluid must be PCB free. It is still possible to import the final products containing dielectric fluid into Nepal and such products can be potential PCB sources.

Major problems in getting rid of the PCB-wastes are inaccuracies and incompleteness of the documentation, unawareness of operators, lack of specific waste collecting centres and inappropriate storage facilities and sites, possible contamination of new oils and equipment, etc. Nepal has no facility for electromechanical devices clean-up by non-incineration processes. The demounting and reassembling of metal parts during repairing and maintenance of transformers may be expanding the contamination and in the meantime the handling of such metal parts without appropriate protective gears might be an issue regarding occupational health and safety.

3.3.4.2 Objectives and priorities of Action Plan

The main priority of the Action Plan is to meet the objective of elimination from use of PCBs in electrical equipment and other articles and decontamination of PCB-contaminated equipment.
In line with provisions of the Stockholm Convention, the final elimination of PCB-containing equipment from use should take place by 2025 and disposal by 2028. To meet this, the following tasks were defined:

- Stockpiles of PCBs and PCBs contaminated articles in use and waste identified
- Stockpiles of PCBs and PCBs contaminated articles managed and appropriate measures taken for their handling and disposal
- Develop a system for monitoring of contaminated areas and point sources.

3.3.4.3 Proposed operational measures for PCBs and equipment containing PCBs

Throughout the implementation of this action plan, there will be a Project Manager (PM), who reports to the Steering Committee on Implementation of Stockholm Convention in Nepal (SCISC) during the Action Plan Implementation of the project. The Project Manager will be a technically qualified person to provide overall guidance to the management of the process. The PM will ensure adherence to the work plan, which will be finalized during the first phase of the implementation. His/her main responsibilities will include advising on and monitoring all technical aspects of the Action plan implementation as well as have financial control over the execution. The PM will work in close cooperation with the POPs Unit of the Ministry. SCISC will be established and will act as the Steering and Coordinating Committee for the execution of this Action Plan. It will be chaired by the Secretary of the Ministry, with relevant ministries, representatives of the private sector and the NGO sector. The SCISC will decide on the frequency of the meetings and its working procedures. This is the forum where the NGO sector can also raise questions and comment on the discussion topics. There will be a POPs Management Technical Committee (PMTC) formed under the SCISC for day to day execution support.

The PMTC will hold its regular sessions throughout the implementation but additional meetings can be held if necessary. The SCISC will oversee the project-related work of the PMTC and the implementation team. The SCISC will review, comment on and approve the work plan. All decisions of the committee,

such as respective responsibilities, timelines and the budget will be clearly communicated to those concerned. Activities will be implemented through subcontracts. Submitted tenders will be reviewed and evaluated by the PMTC subject to approval by SCISC.

The POPs Management Technical Committee will:

- develop its working procedures;
- monitor the execution by means of progress reports and close contact with the PM;
- evaluate the efficiency of the project management, including outcomes, the budget and timelines;
- provide technical support to the PM and working teams;
- approve the work plan with timelines and budget of the implementation of this Action Plan prior to submission to SCISC;
- have meetings on a regular basis (monthly);
- agree on working arrangements and implementation plans with the Project Manager and the POPs officer;
- oversee the work of the national experts engaged in undertaking the various activities required by the Action Plan and receive and review their reports;

The Project Manager will:

- agree on a subcontract with the Action Plan Implementation Project for the terms set out in this Action Plan;
- call principal stakeholders of the PMTC to oversee and coordinate the successful implementation of this Action Plan;
- establish an office within its premises charged with the successful implementation of the Action Plan;
- have day-to-day responsibility for the management and coordination of the implementation activities, including subcontracts, budgets, and reporting to the PMTC and the SCISC;
- appoint national experts when necessary, to undertake the various actions required during the course of the work, using terms of reference agreed by the SCISC and ensure the quality of their work;
- provide a secretariat function to the SCISC and PMTC;
- report regularly to the POPs Management Technical Committee, and to the SCISC, on the progress of the implementation and the disbursement of the funds.

In order to achieve the objectives, the following measures should be undertaken:

- Preparation and adoption of a strategy for inventory completion, collection and disposal of PCBs
- Preparation and establishment of control and monitoring mechanism for PCBs contaminated wastes
- Explore suitable place/country where appropriate technology for safe disposal of PCBs and PCBs contaminated wastes is available
- Secure effective support for the safe disposal of PCBs contaminated wastes from bilateral cooperation or foreign loans
- Establish a control system to check illegal import and application of PCBs.

3.3.4.4 Implementation of Action Plan

Action Plan - 3.3.4 Activity: production, import and export, use, identification, labeling, removal, storage and disposal of PCBs and equipment containing PCBs (Annex A, part II chemicals)									
Objectives	Stockpiles of PCBs and PCBs contaminated articles in use and waste identified		Stockpiles of PCBs and PCBs contaminated articles managed and appropriate measures taken for their handling and disposal				Developed system for monitoring of contaminated areas and point sources		
Activities	Updating of transformer database along with labeling and tagging of decommissioned and in use transformers	Collection of information on retrofilling	Construction of warehouses to store PCB wastes (articles and oil)	Replacement of PCBs contaminated oil and articles	Formulation of Guidelines for collection, storage, further use and transportation	Disposal of PCB wastes	Ask welding workshops to stop using old oil and to return	On-site testing by portable Test-kit	Control of illegal import and use of PCBs contaminated oil
Expected Results	Complete inventory of transformers prepared	Brand and quantity of transformer oil known	Five warehouses constructed for safe storage of PCBs wastes	Replaced oil and equipment stored in warehouses ready for disposal	Guidelines effectively implemented	PCBs wastes (articles and oil) disposed safely	Contaminated oil and equipment replaced with new ones	Suspected samples analyzed for PCBs presence	Illegal import and use of PCBs stopped
Responsible Institution	NEA, MOEST	NEA, MOEST	NEA	NEA	NEA	NEA, MOEST	MOEST, Workshop owners	NEA, MOEST	NEA, MOEST
Time Period	Regularly till 2020	Regularly till 2020	2007-2008	Till 2020	2007-2010	2020-2028	Latest by 2020	Regularly till 2020	2007
Estimated budget USD	USD 70000	USD 14000	USD 250000	USD 70000	USD 12000	USD 1500 000	USD 300 000	USD 70000	USD 20000
Sources of Financing	POPs Project /MOEST, NEA	POPs Project /MOEST, NEA	NEA	NEA and Foreign donations	State budget	Foreing donations	Welding workshops	POPs Project/MOEST	MOEST, NEA

3.3.4.5 Implementation Performance Monitoring and Periodic Review Mechanisms

Reporting to the POPs Management Technical Committee (PMTC)

The monitoring of the project execution will be undertaken by technical and financial reports, which will be developed by the PM. He/she will submit these reports to the SCISC on a regular basis. The PM will take corrective actions based on the comments and evaluations of the SCISC.

Reporting to the Steering Committee on Implementation of Stockholm Convention (SCISC)
Technical and financial reports will also be requested by the PMTC. These reports will evaluate the efficiency of project implementation, including outcomes, the budget and timelines. Their frequency will be decided, when the subcontract is developed between the PMTC and the PM. Payment distribution will also depend on these reports. An appointed Reviewer will, on a contract basis, assist the PMTC in evaluating these reports and the implementation progress. He/she will be nominated by the PMTC, and will be responsible for coordinating the implementation of all Action Plans in the NIP. The PM will take corrective actions based on the comments of the PMTC.

Activities	Expected Results	Indicators of Success	Period for achieving Results	Monitoring Frequency
Updating of transformer database along with labeling and tagging of decommissioned and in use transformers	Complete inventory of transformers prepared	Updated and complete database	Regularly till 2020	Once a year
Collection of information on retrofilling	Brand and quantity of transformer oil known	Updated information	Regularly till 2020	Once a year
Construction of warehouses to store PCB wastes (articles and oil)	Five warehouses constructed for safe storage of PCBs wastes	Five warehouses constructed	2007-2008	Six monthly
Replacement of PCBs contaminated oil and articles	Replaced oil and equipment stored in warehouses ready for disposal	Replaced equipment and old oil stockpiled in warehouses	Till 2020	Once a year
Formulation of Guidelines for collection, storage, further use and transportation	Guidelines effectively implemented	Guidelines followed by stakeholders	2007-2010	Six monthly
Disposal of PCB wastes	PCBs wastes (articles and oil) disposed safely	Amount of PCB wastes disposed	2020- 2028	By 2025-2028
Ask welding workshops to stop using old oil and to return	Contaminated oil and equipment replaced with new ones	Number of equipment and amount of old oil collected	Latest by 2020	Once a year
On-site testing by portable Test-kit	Suspected samples analyzed for PCBs presence	Number of samples tested	Regularly till 2020	As and when required
Control of illegal import and use of PCBs contaminated oil	Illegal import and use of PCBs stopped	Number of cases of illegal import and use	2007	As and when required

3.3.5 Activity: production, import and export, use, stockpiles and wastes of DDT (Annex B chemicals) if used in the country

DDT was never produced in Nepal and since 2001 it has not been imported too. Thus, there is no possibility of further use of DDT legally. Ministry of Agriculture and Corporative (MOAC) has banned the import and use of DDT in the year 2001 and Ministry of Health and Population (MOHP) has also confirmed that DDT is not in use anymore since 1995 and is replaced with other non-POPs pesticides. There is however 3.305 tons of DDT as obsolete stock (MOEST/POPs, May 2005), which needs proper disposal and this is explained in chapter 3.3.3.

3.3.6 Activity: register for specific exemptions and the continuing need for exemptions (article 4)

Nepal has not filed any specific exemptions to Annex A or Annex B chemicals and there is no plan at government level to file such exemptions in the future either. It is therefore not necessary to address the obligations of Article 4 of the Convention.

3.3.7 Action plan: measures to reduce releases from unintentional production (article 5)

3.3.7.1 Present situation of unintended POPs release in Nepal

The project titled "Enabling activities to facilitate early action on the implementation of the Stockholm Convention on Persistent Organic Pollutants (POPs) in Nepal" is the first step at the national level initiatives for the identification and inventory making of unintentionally produced POPs. Unfortunately, there is no national legislation on Annex C POPs emission reduction or control. The provision of prescribing standards for waste emission under section 7 of Environmental Protection Act 1997 and Rules 15 of Environment Protection Rules 1997, gives possibilities for addressing this issue, for instance, the proposed stack emission standard for brick kilns, industrial boilers and cement industries to be in effect in the near future.

The emission inventory for the major potential sources for PCDD/F emission has been made and presented in section 2.3.4 of this report. As per the findings of PCDD/PCDF inventory for each source category and sub- category for Nepal, the total releases found to be 312.5568 (335.972 revised estimate) g TEQ per year from all environmental compartments. The largest emission source of dioxin and furans seems to be from uncontrolled combustion process, elemental chlorine bleaching in pulp and paper production, domestic fuel use, secondary metal production, crematoria, open waste burning, forest fires etc.

3.3.7.2 Objectives and priorities of Action Plan

The objectives of preparing this action plan is to take action pursuant to article 5 of the convention to reduce the unintended release of PCDD/F, HCB and dioxin like PCBs formed during combustion of carbonaceous matter and certain industrial processes. This will be achieved through:

- Complete and updated inventory of all Annex C POPs;
- Increased awareness and skills among concerned people;
- Establish system/infrastructure for control of releases from unintentional production;
- Establish system for long-term permanent monitoring and reporting on the releases from unintentional production.

The convention requires parties to develop such action plans within two years of the date of entry into force of the convention. However, though Nepal has not yet ratified the convention and the requirement is not mandatory till Nepal accomplishes the ratification/accession of the convention, the preparation of NIP is already in progress. Moreover, Nepal has signed the convention intending to ratify it in due course and then the article 5 of the Convention will be binding. It is therefore pertinent that Nepal prepares the National Implementation Plan and Action Plans so that it will have the documents ready for implementation.

3.3.7.3 Measures for reduction of PCDD/Fs

In order to reduce the releases from above mentioned sources several initiatives should be taken. These initiatives may include awareness raising activities; continual improvement in combustion technologies; application of air pollution control devices; switching over to cleaner fuels. The action plan therefore, proposes activities that reduce the potential release of PCDD/F from all these sectors. The current inventory of unintended POPs release however does not incorporate PCBs and HCB releases. The actions proposed for this action plan will consist following activities break downs.

3.3.7.4 Action Plan implementation process

Throughout the implementation of this action plan, there will be a Project Manager (PM), who reports to the Steering Committee on Implementation of Stockholm Convention in Nepal (SCISC) during the Action Plan Implementation of the project. The Project Manager will be a technically qualified person to provide overall guidance on the management of the process. The PM will ensure adherence to the work plan, which will be finalized during the first phase of the implementation. His/her main responsibilities will include advising on and monitoring of all technical aspects of the Action plan implementation as well as financial control over the execution. The PM will work in close cooperation with the POPs Unit of the Ministry. SCISC will be established and will act as the Steering and Coordinating Committee for the execution of this Action Plan. It will be chaired by the Secretary of the Ministry, with relevant ministries, representatives of the private sector and the NGO sector. The SCISC will decide on the frequency of the meetings and its working procedures. This is the forum where the NGO sector can also raise questions and comment on the discussion topics. There will be a POPs Management Technical Committee (PMTC) formed under the SCISC for day to day execution support.

The PMTC will hold its regular sessions throughout the implementation but additional meetings can be held if necessary. The SCISC will oversee the project-related work of the PMTC and the implementation team. The SCISC will review, comment on and approve the work plan. All decisions of the committee, such as respective responsibilities, timelines and the budget will be clearly communicated to those concerned. Activities will be implemented through subcontracts. Submitted tenders will be reviewed and evaluated by the PMTC subject to approval by SCISC.

The POPs Management Technical Committee will:

- develop its working procedures;
- monitor the execution by means of progress reports and close contact with the PM;
- evaluate the efficiency of the project management, including outcomes, budget and timelines;
- provide technical support to the PM and working teams;
- approve the work plan with timelines and budget of the implementation of this Action Plan prior to submission to SCISC;
- have meetings on a regular basis (monthly);
- agree on working arrangements and implementation plans with the Project Manager and the POPs Officer;
- oversee the work of the national experts engaged to undertake various activities required by the Action Plan and receive and review their reports;

The Project Manager will:

- agree on a subcontract with the Action Plan Implementation Project for the terms set out in this Action Plan;

- call principal stakeholders of the PMTC to oversee and coordinate the successful implementation of this Action Plan;
- establish an office within its premises charged with the successful implementation of the Action Plan;
- have day-to-day responsibility for the management and coordination of the implementation activities, including subcontracts, budgets, and reporting to the PMTC and the SCISC;
- appoint national experts when necessary to undertake the various actions required during the course of the work, using terms of reference agreed by the SCISC and ensure the quality of their work;
- provide a secretariat function to the SCISC and PMTC;
- report regularly to the POPs Management Technical Committee, and to the SCISC, on the progress of the implementation and the disbursement of the funds.

In order to achieve the objectives, the following measures should be undertaken:

- Promotion of selective waste collection;
- Gradual substitution of wood with renewable energy resources (hydroelectricity and biogas);
- Introduction of a system for control of open burning (household, agricultural and forest fires);
- Introduction of protection and technical measures concerning existing installations;
- Establishment of a national body for long-term permanent monitoring and reporting on the Annex C POPs;
- Definition and adoption of maximum permitted levels of Annex C POPs releases;

3.3.7.5 Implementation of Action Plan

Action Plan – 3.3.7 Activity: measures to reduce releases from unintentional production (article 5)									
Objectives	Complete and updated inventory of Annex C POPs	Increased awareness and skills among concerned people		Established system/infrastructure for control of releases from unintentional production			Established system for long-term permanent monitoring and reporting on the releases from unintentional production		
Activities	Updating/revising inventory of Annex C POPs in Nepal	Household energy switch for controlling emission of PCDD/Fs	Capacity building activities	Controlling open burning of agriculture residues and forest fires	Establishment of Electrical Crematoria	Establishment of hazardous waste management facility	Establishing system for long-term permanent monitoring and reporting on Annex C POPs	Regulatory framework for release limit values	Economic instruments for release reduction
Expected Results	Updated inventory prepared	Traditional biomass energy replaced by renewable energy	Human resource required for evaluation prepared	-Control mechanism established -Reduced open burning	Electrical crematoria as major mode of cremation	Sound hazardous waste management system established	National body for monitoring and reporting established and operational	PCDD/F release limit value formulated and enforced	Private sectors and health care institutions switch over to BAT
Responsible Institution	MOEST	MOEST, MOFSC, MOWR	MOEST	MOEST, MOAC-NARC, MOFSC	MOEST	MOEST, SWMRMC, MOICS	MOEST, SWMRMC, MOICS	MOEST	MOEST, MOICS, FNCCI/FNCSI,MOF

Time Period	2007	2010	2009	2009	2010	2010	2008	2009	2009
Estimated budget	USD 20,000	USD 21000	USD 10000	USD 40000	USD 100000	USD 30 million	USD 30000	USD 12000	USD 30000
Sources of Financing	State budget & donor funding	National budget & donor funding	National budget & donor funding	National budget & donor funding	Donor funding	National budget & donor funding	National budget & donor funding	State budget	National budget & donor funding

3.3.7.6 Implementation Performance Monitoring and Periodic Review Mechanisms

Reporting to the POPs Management Technical Committee (PMTC)
The monitoring of the project execution will be undertaken by technical and financial reports, which will be developed by the PM. He/she will submit these reports to the PMTC on a regular basis. The PM will take corrective actions based on the comments and evaluations of the PMTC.

Reporting to the Steering Committee on Implementation of Stockholm Convention (SCISC)
Technical and financial reports will also be requested by the SCISC. These reports will evaluate the efficiency of project implementation, including outcomes, the budget and timelines. Their frequency will be decided, when the subcontract is developed between the PMTC and the PM. Payment distribution will also depend on these reports. An appointed Reviewer will, on a contract basis, assist the PMTC in evaluating these reports and the implementation progress. He/she will be nominated by the SCISC which is responsible for coordinating the implementation of all Action Plans in the NIP. The PM will take corrective actions based on the comments of the PMTC.

Activities	Expected Results	Indicators of Success	Period for achieving Results	Monitoring Frequency
Updating/revising inventory of Annex C POPs in Nepal	Updated inventory prepared	Revised inventory	2007	Quarterly
Household energy switch for controlling emission of PCDD/Fs	Traditional biomass energy replaced by renewable energy	Number of biogas plants and expanded electrification at affordable tariff	2009	Yearly
Capacity building activities	Human resource required for evaluation prepared	Number of trainings	2009	Yearly
Controlling open burning of agriculture residues and forest fires	-Control mechanism established -Reduced open burning	Number of fire incidences	2009	Yearly
Establishment of Electrical Crematoria	Electrical crematoria as major mode of cremation	Number of crematoria	2010	Yearly
Establishment of hazardous waste management facility	Sound hazardous waste management system established	-Publication of hazardous waste Guidelines -Established high temperature kiln and landfill site	2010	Quarterly
Establishing system for long-term permanent monitoring and reporting on Annex C POPs	National body for monitoring and reporting established and operational	Published annual reports	2008	Yearly
Regulatory framework for	PCDD/F release limit	Gazette notification of	2009	Quarterly

release limit values	value formulated and enforced	limit values		
Economic instruments for release reduction	Private sectors and health care institutions switch over to BAT	-Number of applications seeking Tax/VAT waive -Fees collected from waste generators	2009	Quarterly

3.3.8 Activity: measures to reduce releases from stockpiles and wastes (article 6)

3.3.8.1 Present situation in Nepal

POPs Pesticides and PCBs have been used extensively over previous decades with increased agricultural practices and electricity development. Those different obsolete pesticides including POPs pesticides that were imported were not all used and hence accumulated over time and have been stored in warehouses in 24 different locations. These locations have been identified as contaminated sites. Significant contaminations are suspected at those locations where PCB contaminated older transformers had been repaired/maintained, or are currently being maintained. Latest inventory showed that the amount of stockpiled old transformer oil is contaminated with PCBs. Moreover, such PCB contaminated oils is widely used in the welding machines in about 10000-12000 welding workshops throughout the country. Therefore, a thorough survey needs to be undertaken at the maintenance locations as well as welding workshops. There are certain industrial facilities and activities, where, due to their previous and present activities, POPs contaminations are suspected, e.g. pulp and paper industries are still using elemental chlorine as bleaching agent. Likewise various health care institutes are found using either low grade incinerators or just open burning for disposing medical and hazardous wastes. Detailed information can be found in chapter 2.3.5 which includes pesticides warehouses, earlier dumped/disposed area, waste water treatment facilities, waste incineration etc.

3.3.8.2 Objectives

The action plan implementation strategy will be based on the following objectives:

- Prepared assessment of current situation with releases from stockpiles and wastes;
- Established procedures for elimination of releases from stockpiles and wastes.

3.3.8.3 Current measures to reduce and release from stockpiles and wastes

- MOAC has already banned all Annex A POPs Pesticides since 2001 through cabinet decision.
- MOAC has even banned some four non POPs Pesticides as well, through cabinet decision.
- The four pesticides (Monochrotophos, Quinalphos, Phorate and Ethion) according to the decisions of Pesticide Committee are also banned since 2003 in the tea plantations.
- EPA 1997 and EPR 1997 oblige the producers and wholesaler/retailers IEE or EIA to be carried for the import, sale, distribution, or use of pesticides.
- In the health sector DDT has been replaced with Non-POPs pesticides since 1995.
- MOAC and MOEST have various licensing and approval procedures to register new pesticides and chemicals.
- Chemicals and hazardous substances also resulting under Customs and ODS rule.

3.3.8.4 Action Plan implementation process

Throughout the implementation of this action plan, there will be a Project Manager (PM), who reports to the Steering Committee on Implementation of Stockholm Convention in Nepal (SCISC) during the Action Plan Implementation of the project. The Project Manager will be a technically qualified person to provide overall guidance on the management of the process. The PM will ensure adherence to the work plan, which will be finalized during the first phase of the implementation. His/her main responsibilities will include advising and monitoring all technical aspects of the Action plan implementation as well as the financial control over the execution. The PM will work in close cooperation with the POPs Unit of the Ministry. SCISC will be established and will act as the Steering and Coordinating Committee for the execution of this Action Plan. It will be chaired by the Secretary of the Ministry, with relevant ministries, representatives of the private sector and the NGO sector. The SCISC will decide on the frequency of the meetings and its working procedures. This is the forum where the NGO sector can also raise questions and comment on the discussion topics. There will be a POPs Management Technical Committee (PMTC) formed under the SCISC for day to day execution support.

The PMTC will hold its regular sessions throughout the implementation but additional meetings can be held if necessary. The SCISC will oversee the project-related work of the PMTC and the implementation team. The SCISC will review, comment on and approve the work plan. All decisions of the committee, such as respective responsibilities, timelines and the budget will be clearly communicated to those concerned. Activities will be implemented through subcontracts. Submitted tenders will be reviewed and evaluated by the PMTC subject to approval by SCISC.

- The POPs Management Technical Committee will:
- develop its working procedures;
- monitor the execution by means of progress reports and close contact with the PM;
- evaluate the efficiency of the project management, including outcomes, the budget and timelines;
- provide technical support to the PM and working teams;
- approve the work plan with timelines and budget of the implementation of this Action Plan prior to submission to SCISC;
- have meetings on a regular basis (monthly);
- agree on working arrangements and implementation plans with the Project Manager and the POPs Officer;
- oversee the work of the national experts engaged to undertake various activities required by the Action Plan and receive and review their reports;

The Project Manager will:

- agree on a subcontract with the Action Plan Implementation Project for the terms set out in this Action Plan;
- call principal stakeholders of the PMTC to oversee and coordinate the successful implementation of this Action Plan;
- establish an office within its premises charged with the successful implementation of the Action Plan;
- have day-to-day responsibility for the management and coordination of the implementation activities, including subcontracts, budgets, and reporting to the PMTC and the SCISC;
- appoint national experts as necessary to undertake the various actions required during the course of the work, using terms of reference agreed by the SCISC and ensure the quality of their work;
- provide a secretariat function to the SCISC and PMTC;
- report regularly to the POPs Management Technical Committee, and to the SCISC, on the progress of the implementation and the disbursement of the funds.

In order to achieve the objectives, the following measures should be undertaken:

- Mapping out all ecological burdens containing POPs (locate current information in accessible data sources and validation);
- Preparation of an Inventory of Sewage Treatment Plants in terms of released POPs concentrations, quality levels, establishment of technological priorities and parameters for detoxification, evaluation of needed investment demands on technological adjustments;
- Determination of the extent of the contaminated area and determination of the level of contamination;
- Establishment of procedures for elimination of releases from stockpiles and wastes;
- Preparation of economical analyses for the sustainability of the process of recycling-burning-dumping technology

3.3.8.5 Action Plan implementation performance monitoring, periodic review mechanisms and budget

Action Plan - 3.3.8 Activity: measures to reduce releases from stockpiles and wastes (article 6)					
Objectives	Prepared assessment of current situation with releases from stockpiles and wastes		Established procedures for elimination of releases from stockpiles and wastes		
Activities	Identify and Mapping of Stockpiles, Products, and articles consisting of or containing chemicals listed either in Annex A, B and C.	Preparation of an Inventory of Sewage Treatment Plants	Determination of the extent of the contaminated areas and determination of the level of contamination	Establishment of procedures for elimination of releases from stockpiles and wastes	Preparation of economical analyses for the sustainability of the process of recycling-burning , dumping technology
Expected Results	National level Mapping will be in place	Inventory of Waste Treatment plant is in place	Extent of area and contamination will be known	Procedures for elimination of releases established	Economical analysis finalized
Responsible Institution	MOEST	MOEST	MOEST/MOAC	MOEST/MOAC/MOHP /MOLD	MOEST
Time Period	2007	2007	2007-2010	2007-2010	2007-2008
Estimated budget	10000	1000	10000	50000	10000
Sources of Financing	Foreign Aid	State budget	Foreign Aid	State budget and Foreign aid	Foreign Aid

3.3.8.6 Implementation Performance Monitoring and Periodic Review Mechanisms

Reporting to the POPs Management Technical Committee (PMTC)
The monitoring of the project execution will be undertaken by technical and financial reports, which will be developed by the PM. He/she will submit these reports to the PMTC on a regular basis. The PM will take corrective actions based on the comments and evaluations of the PMTC.

Reporting to the Steering Committee on Implementation of Stockholm Convention (SCISC)
Technical and financial reports will also be requested by the SCISC. These reports will evaluate the efficiency of project implementation, including outcomes, the budget and timelines. Their frequency will be decided, when the subcontract is developed between the SCISC and the PM. Payment distribution will also depend on these reports. An appointed Reviewer will, on a contracted basis, assist the PMTC in evaluating these reports and the implementation progress. He/she will be nominated by the PMTC which is responsible for coordinating the implementation of all Action Plans in the NIP. The PM will take corrective actions based on the comments of the PMTC.

The following table details the reporting requirements of this Action Plan. The reporting mechanism has been also shown in the above diagram.

Activities	Expected results	Indicators of success	Time Period	Monitoring frequency
Identify and Mapping of Stockpiles, Products, and articles consisting of or containing chemicals listed either in Annex A, B and C.	National level Mapping will be in place	Proposed actions / content of the strategy	2007	Quarterly
Preparation of an Inventory of Sewage Treatment Plants Number of sewage treatment plants that are in the inventory	Inventory of Waste Treatment plant is in place	Number of sewage treatment plants that are in the inventory	2007	Twice a year
Determination of the extent of the contaminated areas and determination of the level of contamination	Extent of area and contamination will be known	Report from the activity	2007-2010	Twice a year
Establishment of procedures for elimination of releases from stockpiles and wastes	Procedures for elimination of releases established	Number of initiatives from elimination of the releases undertaken	2007-2010	Twice a year
Preparation of economical analyses for the sustainability of the process of recycling-burning dumping technology	Economical analysis finalized	Report from the analysis	2007-2008	Quarterly

3.3.9 Strategy: identification of stockpiles, articles in use and wastes

3.3.9.1 Current situation in Nepal

The POPs Enabling Activities Project under MOEST with support from GEF/UNIDO has completed the inventory of POPs chemicals including non-POPs obsolete pesticides. The inventory needs periodic updating for all POPs. This work is continuing with further inventory, safe packaging, labelling and collection to few locations (instead of 24) of the obsolete pesticides. Tables 2.11 and 2.12 in chapter 2.3.1.1 provide the details of these pesticides. From the latest inventory, the total quantity of POPs pesticides is 33.668 m tons including identified POPs pesticides (10.058 tons) and mixed pesticides (23.610 tons), which are mostly POPs, organochlorines and organophosphates. This makes 45.34 percent of the total obsolete pesticides stocks in Nepal.

Likewise the total PCBs Contaminated transformer oils was found to be 106185.3 litres. Out of which 90623 litres of oil contains more than 50 ppm of PCBs. This figure does not contain other possible sources of the PCBs in the country. This indicates PCBs inventory to be updated for the exact quantification of PCBs, not only from contaminated transformers and oils, but also from other PCBs contaminated appliances/sources.

The annual production of PCDD/F, as given in the first inventory, from different sources is estimated to be 335.972 g TEQ, which is very high for the country like Nepal.

Chapter 2.3.3 (Table 2.18) gives the detailed inventory of DDT, which was imported for vector control in the public health sector. Since 1995 there has not been any import and use of DDT for any purpose in Nepal. There is about 3.305 tons of DDT identified and stored in warehouses in Amlekhgunj and Nepalgunj.

The Ministry of Health and Population (MOHP) declared the prohibition of the import of DDT in 1995. But there still remains possibilities of DDT is being brought in illegally through 1200 km long porous border with India, a country which still produces and uses DDT. The current inventory has failed to trace out such illegal imports, sales, distributions and use of DDT in the country. Stronger and rigorous approaches seem needful to trace out the illegal imports of DDT.

3.3.9.2 Objectives and priorities of the Action Plan

Development of the action plan implementation strategy will be based on the following objective:

- Prepared inventories of stockpiles, articles in use and wastes.

3.3.9.3 Proposed operational measures for Annex A POPs pesticides storage, handling, reduction and disposal

Throughout the implementation of this Action Plan, there will be a Project Manager (PM), who reports to the Steering Committee on Implementation of Stockholm Convention in Nepal (SCISC) during the Action Plan Implementation of the project. The Project Manager will be a technically qualified person to provide overall guidance on the management of the process. The PM will ensure adherence to the work plan, which will be finalized during the first phase of the implementation. His/her main responsibilities will include advising on and monitoring of all technical aspects of the Action Plan implementation as well as the financial control over the execution. The PM will work in close cooperation with the POPs unit of the Ministry. SCISC will be established and will act as the Steering and Coordinating Committee for the execution of this Action Plan. It will be chaired by the Secretary of the Ministry, with relevant ministries, representatives of the private sector and the NGO sector. The SCISC will decide on the frequency of the meetings and its work procedures. This is the forum where the NGO sector can also raise questions and comment on the discussion topics. There will be a POPs Management Technical Committee (PMTC) formed under the SCISC for day to day execution support.

The PMTC will hold its regular sessions throughout the implementation but additional meetings can be held if necessary. The SCISC will oversee the project-related work of the PMTC and the implementation team. The SCISC will review, comment on and approve the work plan. All decisions of the committee, such as respective responsibilities, timelines and the budget will be clearly communicated to those concerned. Activities will be implemented through subcontracts. Submitted tenders will be reviewed and evaluated by the PMTC subject to approval by SCISC.

The POPs Management Technical Committee will:

- develop its work procedures;
- monitor the execution by means of progress reports and close contact with the PM;
- evaluate the efficiency of the project management, including outcomes, the budget and timelines;
- provide technical support to the PM and working teams;
- approve the work plan with timelines and budget of the implementation of this Action Plan prior to submission to SCISC;
- have meetings on a regular basis (monthly);
- agree on working arrangements and implementation plans with the Project Manager and the POPs Officer;
- oversee the work of the national experts engaged to undertake various activities required by the Action Plan and receive and review their reports;

The Project Manager will:

- agree on a subcontract with the Action Plan Implementation Project for the terms set out in this Action Plan;
- call principal stakeholders of the PMTC to oversee and coordinate the successful implementation of this Action Plan;
- establish an office within its premises charged with the successful implementation of the Action Plan;
- have day-to-day responsibility for the management and coordination of the implementation activities, including subcontracts, budgets, and reporting to the PMTC and the SCISC;
- appoint national experts as necessary to undertake the various actions required during the course of the work, using terms of reference agreed by the SCISC and ensure the quality of their work;
- provide a secretariat function to the SCISC and PMTC;
- report regularly to the POPs Management Technical Committee, and to the SCISC, on the progress of the implementation and the disbursement of the funds.

In order to achieve the objectives, the following measures should be undertaken:

- preparation and adoption of a strategy for inventory completion;
- preparation and establishment of control mechanisms and cooperation of inspection bodies to oversee stockpiles, articles in use and wastes;
- development of schemes for positive influence in the business sector, having active roles and responsibilities in this area

3.3.9.4 Implementation of the Action Plan

Action plan - 3.3.9. Strategy: identification of stockpiles, articles in use and wastes			
Objective	Prepared inventories of stockpiles, articles in use and wastes		
Activities	Preparation and adoption of a strategy for inventory completion;	Preparation and establishment of control mechanisms and cooperation of inspection bodies to oversee stockpiles, articles in use and wastes;	Development of schemes for positive influence in the business sector, having active roles and responsibilities in this area;
Expected Results	Prepared and adopted strategy for inventory completion	Control mechanisms established Inspections bodies cooperating	The scheme developed, accepted and implemented
Responsible Institution	MOEST	MOEST/MOAC/MOHP	MOEST
Time Period	2007	2007	2007-2010
Estimated Budget	USD 75000	USD 5000	USD 10000
Source of Financing	State budget & Donor funding	State budget	State budget and + private business

3.3.9.5 Implementation Performance Monitoring and Periodic Review Mechanisms

Reporting to the POPs Management Technical Committee (PMTC).
The monitoring of the project execution will be undertaken by technical and financial reports, which will be developed by the PM. He/she will submit these reports to the PMTC on a regular basis. The PM will take corrective actions based on the comments and evaluations of the PMTC.

Reporting to the Steering Committee on Implementation of Stockholm Convention (SCISC)
Technical and financial reports will also be requested by the SCISC. These reports will evaluate the efficiency of project implementation, including outcomes, budget and timelines. Their frequency will be decided, when the subcontract is developed between the PMTC and the PM. Payment distribution will also depend on these reports. An appointed Reviewer will, on a contract basis, assist the PMTC in evaluating these reports and the implementation progress. He/she will be nominated by the PMTC which is responsible for coordinating the implementation of all Action Plans in the NIP. The PM will take corrective actions based on the comments of the SCISC.

Activities	Expected Result	Indicator of success	Period for Achieving results	Frequency of Monitoring
Preparation and adoption of a strategy for inventory completion;	Prepared and adopted strategy for inventory completion	Proposed actions/content of the strategy	2007	Quarterly
Preparation and establishment of control mechanisms and cooperation of inspection bodies to oversee stockpiles, articles in use and wastes	Control mechanisms established Inspections bodies cooperating	-Number of cases cooperation among bodies	2007	Quarterly
Development of schemes for positive influence in the business sector, having active roles and responsibilities in this area	The scheme developed, accepted and implemented	-Number of meetings with business sector -Number of initiatives undertaken by the business sector	2007-2010	Six monthly

3.3.10 Activity: manage stockpiles and appropriate measures for handling and disposal of articles in use

3.3.10.1 Current situation in Nepal

Nepal till date has no comprehensive National Policy and Strategy for waste management, nor has a National Waste Act and Rules to cover the hazardous wastes definition and management, including transboundary movement. Thus this might be difficult in categorizing the wastes. Also, there is no hazardous waste recycling and recovering facility in the country. Chapter 2.3.5 contains the information regarding the stockpiles of POP chemicals in the country. Chapter 3.3.3 contains the action plan on the management of stockpiles of Annex A POPs pesticides and detailed actions regarding PCB-contaminated equipment are presented in chapter 3.3.4.

There are also no hazardous waste recycling and recovery facilities which can deal with large quantities of hazardous wastes. However, there are several recycling and composting initiatives at local and

organizational level for the household wastes. The Pharmaceutical companies have adopted incineration practices and very few health care facilities (few hospitals in Kathmandu valley) have better incinerators, but others are disposing their medical wastes by openly burning them. However, some of the hospitals also separate wastes, e.g. separate the saline bottles and sell them out.

The detailed inventory on contaminated sites will establish a solid basis for the development of remediation strategy and an opportunity to assess correctly the existing capacities.

3.3.10.2 Objectives and priorities of the Action Plan (Article 6)

Based on the stockpiles of wastes and articles in use, the following objectives were defined for the proper management of the stockpiled equipment and disposal of the articles in use:

- Prepare technical standards for handling and disposal of articles in use;
- Develop a system for monitoring of handling and disposal of articles in use.

3.3.10.3 Proposed operational measures for POPs pesticides, containers, PCBs and equipment containing PCBs

Throughout the implementation of this action plan, there will be a Project Manager (PM), who reports to the Steering Committee on Implementation of Stockholm Convention in Nepal (SCISC) during the Action Plan Implementation of the project. The Project Manager will be a technically qualified person to provide overall guidance on the management of the process. The PM will ensure adherence to the work plan, which will be finalized during the first phase of the implementation. His/her main responsibilities will include advising on and monitoring of all technical aspects of the Action plan implementation as well as the financial control over the execution. The PM will work in close cooperation with the POPs Unit of the Ministry. SCISC will be established and will act as the Steering and Coordinating Committee for the execution of this Action Plan. It will be chaired by the Secretary of the Ministry, with relevant ministries, representatives of the private sector and the NGO sector. The SCISC will decide on the frequency of the meetings and its working procedures. This is the forum where the NGO sector can also raise questions and comment on the discussion topics. There will be a POPs Management Technical Committee (PMTC) formed under the SCISC for day to day execution support.

The PMTC will hold its regular sessions throughout the implementation but additional meetings can be held if necessary. The SCISC will oversee the project-related work of the PMTC and the implementation team. The SCISC will review, comment on and approve the work plan. All decisions of the committee, such as respective responsibilities, timelines and the budget will be clearly communicated to those concerned. Activities will be implemented through subcontracts. Submitted tenders will be reviewed and evaluated by the PMTC subject to approval by SCISC.

The POPs Management Technical Committee will:

- develop its working procedures;
- monitor the execution by means of progress reports and close contact with the PM;
- evaluate the efficiency of the project management, including outcomes, budget and timelines;
- provide technical support to the PM and working teams;
- approve the work plan with timelines and budget of the implementation of this Action Plan prior to submission to SCISC;
- have meetings on a regular basis (monthly);
- agree on working arrangements and implementation plans with the Project Manager and the POPs officer;

- oversee the work of the national experts engaged to undertake various activities required by the Action Plan and receive and review their reports;

The Project Manager will:

- agree on a sub-contract with the Action Plan Implementation Project for the terms set out in this Action Plan;
- call principal stakeholders of the PMTC to oversee and coordinate the successful implementation of this Action Plan;
- establish an office within its premises charged with the successful implementation of the Action Plan;
- have day-to-day responsibility for the management and coordination of the implementation activities, including subcontracts, budgets, and reporting to the PMTC and the SCISC;
- appoint national experts as necessary to undertake the various actions required during the course of the work, using terms of reference agreed by the SCISC and ensure the quality of their work;
- provide a secretariat function to the SCISC and PMTC;
- report regularly to the POPs Management Technical Committee, and to the SCISC, on the progress of the implementation and the disbursement of the funds.

In order to achieve the objectives, the following measures should be undertaken:

- preparation and adoption of a strategy for handling and disposal of articles in use;
- preparation and establishment of control mechanisms and cooperation of inspection bodies concerning handling and disposal of articles in use;
- development of schemes for positive influence in the business sector, having active roles and responsibilities in this area.

3.3.10.4 Implementation of the Action Plan

Action plan - 3.3.10 Activity: manage stockpiles and appropriate measures for handling and disposal of articles in use			
Objective	Prepared technical standards for handling and disposal of articles in use		Developed system for monitoring of handling and disposal of articles in use
Activities	Preparation and adoption of a strategy for handling and disposal of articles in use;	Development of schemes for positive influence in the business sector, having active roles and responsibilities in this area	Preparation and establishment of control mechanisms and cooperation of inspection bodies concerning handling and disposal of articles in use
Expected Results	Prepared and adopted strategy for handling and disposal of articles in use	The scheme developed, accepted and implemented	Control mechanisms established
Responsible Institution	MOEST	MOEST	MOEST/MOAC/MOHP/NEA

Time Period	2007	2007-2010	2007
Estimated budget	USD 7000	USD 50000	USD 5000
Sources of Financing	State budget and Donor agencies	State budget and Private Entrepreneurs	State budget

3.3.10.5 Implementation Performance Monitoring and Periodic Review Mechanisms

Reporting to the POPs Management Technical Committee (PMTC)
The monitoring of the project execution will be undertaken by technical and financial reports, which will be developed by the PM. He/she will submit these reports to the PMTC on a regular basis. The PM will take corrective actions based on the comments and evaluations of the PMTC.

Reporting to the Steering Committee on Implementation of Stockholm Convention (SCISC)
Technical and financial reports will also be requested by the SCISC. These reports will evaluate the efficiency of project implementation, including outcomes, the budget and timelines. Their frequency will be decided, when the subcontract is developed between the PMTC and the PM. Payment distribution will also depend on these reports. An appointed Reviewer will, on a contracted basis, assist the PMTC in evaluating these reports and the implementation progress. He/she will be nominated by the PMTC which is responsible for coordinating the implementation of all Action Plans in the NIP. The PM will take corrective actions based on the comments of the SCISC.

The following table details the reporting requirements of this Action Plan. The reporting mechanism has also been explained in the above diagrams.

Activities	Expected Result	Indicator of success	Period for Achieving results	Monitoring Frequency
Preparation and adoption of a strategy for handling and disposal of articles in use;	Prepared and adopted strategy for handling and disposal of articles in use	Responsibilities of the National Focal Point Rights of the National Focal Point	2007	Quarterly
Development of schemes for positive influence in the business sector, having active roles and responsibilities in this area	The scheme developed, accepted and implemented	Quality and quantity of information provided to the National Focal Point	2007-2010	Quarterly
Preparation and establishment of control mechanisms and cooperation of inspection bodies concerning handling and disposal of articles in use	Control mechanisms established	Structure of formats for provision of information	2007	Quarterly

3.3.11 Strategy: identification of contaminated sites (Annex A, B and C Chemicals) and remediation in an environmentally sound manner

3.3.11.1 Situation in Nepal

Most of the POPs chemicals were initially synthesized and commercially produced by the industrial countries with higher technological development. Such chemicals entered into developing countries like Nepal, where production infrastructure was not present, either in the name of grant assistance or technology transfer. Accordingly, the knowledge on the effects of such chemicals on human health and environment and specific remediation technologies, known first in the developed countries, were shared later also with the developing countries.

Past inventory have come up with 24 pesticides warehouses, which can be considered as the contaminated sites for Annex A (Part I chemicals) and Annex B Pesticides. In addition to these, sites where obsolete pesticides, other than POPs, were buried could be taken as contaminated sites.

The transformer maintenance/repairing workshops, both under NEA and private ownerships, as well as the storage sites of PCBs contaminated oils, can be taken as the contaminated sites. The welding workshops using PCBs contaminated oils in welding machines are other hotspots, which are till now not seriously taken.

For Nepal, hotspot of PCDD/F contamination has not been identified in detail during inventory preparation, however sites such as current and closed landfills, cremation sites like Aryaghat and others in Kathmandu, sludge storage sites and discharge points of Bhrikuti Pulp and Paper Industry (at Gaidakot), Everest Papers (Aurahi river) and that of Reliance Papers could be considered as hotspots subject to further confirmation. Likewise, there are several health care institutes, which are using open burning or incinerating their hazardous wastes. Such sites of burning or improper incineration are also contaminated sites, which would need remediation. Once these places are identified as hotspots of PCDD/F contamination, an action plan needs to be developed for remediation tasks. However in case of absence of information on the level and extent of contamination, there is no basis for developing remediation action plan for these sites.

Obligations relevant to contaminated areas are listed in part 1.2 of the Convention. The Stockholm Convention requires that all parties develop their own strategy for identification of areas contaminated by POPs compounds listed in Annexes A, B or C. Moreover, if remediation of these areas is planned, this should be carried out in an environmentally appropriate manner.

3.3.11.2 POPs contaminated sites identification inventory

Information on the sites contaminated by different POP chemicals is presented in subsections 2.3.1, 2.3.2, 2.3.3, 2.3.4, 2.3.5, 2.3.11 and 3.3.9.

3.3.11.3 Prioritisation of Identified POPs Contaminated Sites for Action

Activities related to the remediation of the contaminated sites in an appropriate manner are mentioned in Chapters 3.3.3, 3.3.8 and 3.3.9.

3.3.11.4 Objectives for identification of contaminated sites

The action plan implementation strategy will be based on the following objectives:

- Prepared environmental assessment of contaminated areas;
- Prepared strategy for contaminated areas recovery;
- Realized decontamination activities.

3.3.11.5 Action Plan implementation process

Throughout the implementation of this action plan, there will be a Project Manager (PM), who reports to the Steering Committee on Implementation of Stockholm Convention in Nepal (SCISC) during the Action Plan Implementation of the project. The Project Manager will be a technically qualified person to provide overall guidance on the management of the process. The PM will ensure adherence to the work plan, which will be finalized during the first phase of the implementation. His/her main responsibilities will include advising on and monitoring of all technical aspects of the Action plan implementation as well as the financial control over the execution. The PM will work in close cooperation with the POPs Unit of the Ministry. SCISC will be established and will act as the Steering and Coordinating Committee for the execution of this Action Plan. It will be chaired by the Secretary of the Ministry, with relevant ministries, representatives of the private sector and the NGO sector. The SCISC will decide on the frequency of the meetings and its working procedures. This is the forum where the NGO sector can also raise questions and comment on the discussion topics. There will be a POPs Management Technical Committee (PMTC) formed under the SCISC for day to day execution support.

The PMTC will hold its regular sessions throughout the implementation but additional meetings can be held if necessary. The SCISC will oversee the project-related work of the PMTC and the implementation team. The SCISC will review, comment on and approve the work plan. All decisions of the committee, such as respective responsibilities, timelines and the budget will be clearly communicated to those concerned. Activities will be implemented through subcontracts. Submitted tenders will be reviewed and evaluated by the PMTC subject to approval by SCISC.

The POPs Management Technical Committee will:

- develop its working procedures;
- monitor the execution by means of progress reports and close contact with the PM;
- evaluate the efficiency of the project management, including outcomes, the budget and timelines;
- provide technical support to the PM and working teams;
- approve the work plan with timelines and budget of the implementation of this Action Plan prior to submission to SCISC;
- have meetings on a regular basis (monthly);
- agree on working arrangements and implementation plans with the Project Manager and the POPs officer;
- oversee the work of the national experts engaged to undertake various activities required by the Action Plan and receive and review their reports;

The Project Manager will:

- agree on a subcontract with the Action Plan Implementation Project for the terms set out in this Action Plan;
- call principal stakeholders of the PMTC to oversee and coordinate the successful implementation of this Action Plan;

- establish an office within its premises charged with the successful implementation of the Action Plan;
- have day-to-day responsibility for the management and coordination of the implementation activities, including subcontracts, budgets, and reporting to the PMTC and the SCISC;
- appoint national experts as necessary to undertake the various actions required during the course of the work, using terms of reference agreed by the SCISC and ensure the quality of their work;
- provide a secretariat function to the SCISC and PMTC;
- report regularly to the POPs Management Technical Committee, and to the SCISC, on the progress of the implementation and the disbursement of the funds.

In order to achieve the objectives, the following measures should be undertaken:

- preparation of an implementation strategy for these activities;
- preparation of a methodology of the assessment;
- prioritization of contaminated areas for their recovery, taking into account mainly the impact of contamination on human health or their environmental risk;
- preparation of technological and technical work procedures;
- carrying out decontamination activities.

3.3.11.6 Action Plan Implementation Performance Monitoring, Periodic Review Mechanisms and budget

Action plan - 3.3.11 Strategy: identification of contaminated sites (Annex A, B and C Chemicals) and remediation in an environmentally sound manner					
Objectives	Prepared environmental assessment of contaminated areas		Prepared strategy for contaminated areas recovery	Realized decontamination activities	
Activities	Preparation of an implementation strategy for these activities	Preparation of methodology of assessment in line with EIA/IEE format of EPA/EPR	Prioritization of contaminated areas for their recovery, taking into account mainly the impact of contamination on human health or its environmental risk	Preparation of technological and technical work procedures	Carrying out the decontaminatio n activities
Expected Results	Prepared strategy	Methodology for assessment defined	Priorities set	Prepared procedures	Decontaminatio n activities realized
Responsible Agencies	MOESTMOAC/N EA	MOEST and relevant ministires	MOEST/MOAC/NEA	MOEST/ MOAC/NEA	MOEST /MOAC/NEA
Time Period	2007	2007	2007-2010	2008-2009	2009-2012
Estimated Budget	USD 5000	USD 10000	USD 5000	USD 10000	USD 100000
Financing Source	Government and Foreign Aid	Government and Foreign Aid	Government and Foreign Aid	Government and Foreign Aid	Government, Foreign Aid, business community

3.3.11.7 Implementation Performance Monitoring and Periodic Review Mechanisms

Reporting to the POPs Management Technical Committee (PMTC)

The monitoring of the project execution will be undertaken by technical and financial reports, which will be developed by the PM. He/she will submit these reports to the PMTC on a regular basis. The PM will take corrective actions based on the comments and evaluations of the PMTC.

Reporting to the Steering Committee on Implementation of Stockholm Convention (SCISC)
Technical and financial reports will also be requested by the SCISC. These reports will evaluate the efficiency of project implementation, including outcomes, the budget and timelines. Their frequency will be decided, when the subcontract is developed between the SCISC and the PM. Payment distribution will also depend on these reports. An appointed Reviewer will, on a contracted basis, assist the PMTC in evaluating these reports and the implementation progress. He/she will be nominated by the PMTC which is responsible for coordinating the implementation of all Action Plans in the NIP. The PM will take corrective actions based on the comments of the SCISC.

The following table details the reporting requirements of this Action Plan. The reporting mechanism is also shown in the diagram above.

Activities	Expected Results	Indicators of Success	Period for achieving result	Monitoring Frequency
Preparation of an implementation strategy for these activities	Prepared strategy	Proposed action. content of strategy	2007	Quarterly
Preparation of a methodology of the assessment	Methodology for assessment defined	Structure of the methodology	2007	Quarterly
Prioritization of contaminated areas for their recovery, taking into account mainly the impact of contamination on human health or its environmental risk	Priorities set	List of priorities Identified environmental and human health impacts	2007-2010	Six monthly
Preparation of technological and technical work procedures	Prepared procedures	Procedures adopted	2008-2009	Quarterly
Carrying out the decontamination activities	Decontamination activities realized	Number and area of decontaminated sites	2009-2012	Six monthly

3.3.12 Activity: facilitating or undertaking information exchange and stakeholder involvement

3.3.12.1 Present situation in Nepal

Nepal does not have any comprehensive public information policy and practices directly related to POPs issues. However, as mentioned in EPA 97 & EPR 97, the development projects while doing IEE or EIA must notify the public about the environmental conditions and extent and severity of the impacts of the proposed projects through public notices published in any of the National Daily Newspapers and through public hearings.

3.3.12.2 Objectives and priorities of the action plan

The main objectives of this activity will be:

- Establish National Focal Point (MOEST being the Focal Point for Stockholm Convention, it is recommended that the National Focal Point for POPs be established under this ministry) and list of stakeholders prepared
- Establish system of information exchange (on POPs related issue) between responsible National Focal Point and the responsible institutions (different organizations, I/NGOs, academic and research centres, etc.).

3.3.12.3 Action Plan implementation process

Throughout the implementation of this Action Plan, there will be a Project Manager (PM), who reports to the Steering Committee on Implementation of Stockholm Convention in Nepal (SCISC) during the

Action Plan Implementation of the project. The Project Manager will be a technically qualified person to provide overall guidance on the management of the process. The PM will ensure adherence to the work plan, which will be finalized during the first phase of the implementation. His/her main responsibilities will include advising on and monitoring of all technical aspects of the Action plan implementation as well as the financial control over the execution. The PM will work in close cooperation with the POPs unit of the Ministry. SCISC will be established and will act as the Steering and Coordinating Committee for the execution of this Action Plan. It will be chaired by the Secretary of the Ministry, with relevant ministries, representatives of the private sector and the NGO sector. The SCISC will decide on the frequency of the meetings and its working procedures. This is the forum where the NGO sector can also raise questions and comment on the discussion topics. There will be a POPs Management Technical Committee (PMTC) formed under the SCISC to support the day to day execution.

The PMTC will hold its regular sessions throughout the implementation but additional meetings can be held if necessary. The SCISC will oversee the project-related work of the PMTC and the implementation team. The SCISC will review, comment on and approve the work plan. All decisions of the committee, such as respective responsibilities, timelines and the budget will be clearly communicated to those concerned. Activities will be implemented through subcontracts. Submitted tenders will be reviewed and evaluated by the PMTC subject to approval by SCISC.

The POPs Management Technical Committee will:

- develop its working procedures;
- monitor the execution by means of progress reports and close contact with the PM;
- evaluate the efficiency of the project management, including outcomes, the budget and timelines;
- provide technical support to the PM and working teams;
- approve the work plan with timelines and budget of the implementation of this Action Plan prior to submission to SCISC;
- have meetings on a regular basis (monthly);
- agree on working arrangements and implementation plans with the Project Manager and the POPs officer;
- oversee the work of the national experts engaged to undertake various activities required by the Action Plan and receive and review their reports;

The Project Manager will:

- agree on a subcontract with the Action Plan Implementation Project for the terms set out in this Action Plan;
- call principal stakeholders of the PMTC to oversee and coordinate the successful implementation of this Action Plan;
- establish an office within its premises charged with the successful implementation of the Action Plan;
- have day-to-day responsibility for the management and coordination of the implementation activities, including subcontracts, budgets, and reporting to the PMTC and the SCISC;
- appoint national experts as necessary to undertake the various actions required during the course of the work, using terms of reference agreed by the SCISC and ensure the quality of their work;
- provide a secretariat function to the SCISC and PMTC;
- report regularly to the POPs Management Technical Committee, and to the SCISC, on the progress of the implementation and the disbursement of the funds.

In order to achieve the objectives, the following measures should be undertaken:

- Prepare institutional and technical setup to establish a National Focal Point for POPs ;

- Establish a network for cooperation, data and information exchange among responsible institutions;
- Establish an internationally accepted system for an efficient information exchange;
- Capacity building of the concerned stakeholder institutions/organizations as needful;
- Prepare and regularly update information and list of stakeholders related to POPs;
- Establish formats for exchange of information related to POPs.

3.3.12.4 Action Plan Implementation Performance Monitoring, Periodic review Mechanisms and Budget

Action Plan – 3.3.12 Activity: facilitating or undertaking information exchange and stakeholder involvement				
Objectives	Established National Focal Point	Established system of information exchange between the National Focal Point and the responsible institutions / stakeholders		
Activities	Preparation of institutional and technical set up to establish National Focal Point	Preparation of stakeholders list	Development of a system for collection and exchange of information	Definition of formats for information exchange on POPs
Expected Results	-Established National Focal point with defined right and responsibilities	List of stakeholders with their activities prepared	Developed mechanism for provision of information	Formats developed
Responsible Institution	Government of Nepal and MOEST	Government of Nepal and MOEST	MOEST	MOEST
Time Period	2007	2007	2007	2007
Estimated budget	USD 10 000	USD 5000	USD 10000	USD 10000
Sources of Financing	State budget	State budget	State budget	State budget

3.3.12.5 Implementation Performance Monitoring and Periodic Review Mechanisms

Reporting to the POPs Management Technical Committee (PMTC)
The monitoring of the project execution will be undertaken by technical and financial reports, which will be developed by the PM. He/she will submit these reports to the PMTC on a regular basis. The PM will take corrective actions based on the comments and evaluations of the PMTC.

Reporting to the Steering Committee on Implementation of Stockholm Convention (SCISC)
Technical and financial reports will also be requested by the SCISC. These reports will evaluate the efficiency of project implementation, including outcomes, budget and timelines. Their frequency will be decided, when the subcontract is developed between the SCISC and the PM. Payment distribution will also depend on these reports. An appointed Reviewer will, on a contracted basis, assist the PMTC in evaluating these reports and the implementation progress. He/she will be nominated by the PMTC who will be responsible for coordinating the implementation of all Action Plans in the NIP. The PM will take corrective actions based on the comments of the SCISC.

Activities	Expected Results	Indicators of Success	Period for achieving Results	Monitoring Frequency
Preparation of institutional and technical set up to establish National Focal Point	-Established National Focal point with defined responsibilities and rights	Functional National Focal point	2007	Quarterly
Preparation of stakeholders list	List of stakeholders with their activities prepared	Number of stakeholder included in the list	2007	Quarterly
Development of a system for collection and exchange of information	Developed mechanism for provision of information	Quality and quantity of information provided to National Focal Point	2007	Quarterly
Definition of formats for information exchange on POPs	Formats developed	Structure of formats	2007	Quarterly

3.3.13 Activity: Public awareness, information and education (article 10)

3.3.13.1 Present situation in Nepal

Some level of knowledge on the pesticides is found among the general public in Nepal, but the very large section of the public is quite unaware of the nature and characteristics of POPs pesticides. It is alarming to note that the general public and even the people engaged in different public and private organizations are not aware of the sources and adverse impacts of PCBs and unintentionally produced PCDD/F on human health and environment. It is therefore necessary to make people of all spheres aware of the adverse impacts of POPs chemicals through various means as would be decided by the target groups. To deal with such health and environmental issues, an outline of public awareness, information and educational activities about POPs focusing on the misuse and overuse of pesticides, their problems, their negative impacts on human health and environment, proper handling of PCBs contaminated transformer oil, elimination or reduction of emission or release of dioxin and furan, PRTR, the alternative solutions, etc. should be developed in line with the Convention to implement through the National Implementation Plan. The National Priority Validation Workshop for POP chemicals in Nepal has given public awareness, information and education high priority (Chapter 3.2.4, Table 3.2). At present, very limited information on the above issues is available in the Nepalese context.

Major section of the Nepalese population, except for a few concerned government stakeholders and some NGOs conducting various activities related to environment and POP issues, do not know the national and international efforts in controlling or abolishing such chemicals. The primary visible environmental problems in Nepal are those caused by forest depletion, land degradation, solid waste disposal, water and air pollutions in urban areas. Therefore the problems due to POPs have been felt only recently. The base for national action on introduction to the general public and to directly involve them in the decision making process need to be developed in the strategy for raising public awareness as a main part of the NIP. The strategy foresees two (several) directions for acting: inclusion of the general public, inclusion of the concerned professionals (management and directly exposed workers) and inclusion of students at various levels.

3.3.13.2 Measurable public impact regarding the implementation of convention:-

A number of educational and training program and public awareness program are conducted by using the various communication methods/media/tools for different target groups but the actual impacted data is not yet available. The need for the development and implementation of a national action plan on education, training and raising awareness on POPs is thus a clearly defined obligation imposed on the Parties to the Convention. The main positive impacts regarding POPs will be to eliminate or at least to reduce the negative impacts due POPs emissions and releases.

3.3.13.3 Objectives and priorities of the action plan

This activity will be focused on the incorporation of an information package on POPs-related issues into the national educational system, pursuant to Article 10 of the Convention, to raise public awareness. The action plan implementation strategy will be based on the following objectives:

- Educated and trained government officials for implementation of the Convention;
- Educated and trained business sector representatives for implementation of the Convention;
- National education system incorporated POPs information and disseminated through education (curricula)
- Educated general public including women and least educated ones on principles and objectives of Stockholm Convention

3.3.13.4 Action Plan implementation process

Throughout the implementation of this action plan, there will be a Project Manager (PM), who reports to the Steering Committee on Implementation of Stockholm Convention in Nepal (SCISC) during the Action Plan Implementation of the project. The Project Manager will be a technically qualified person to provide overall guidance on the management of the process. The PM will ensure adherence to the work plan, which will be finalized during the first phase of the implementation. His/her main responsibilities will include advising on and monitoring of all technical aspects of the Action plan implementation as well as the financial control over the execution. The PM will work in close cooperation with the POPs Unit of the Ministry. SCISC will be established and will act as the Steering and Coordinating Committee for the execution of this Action Plan. It will be chaired by the Secretary of the Ministry, with relevant ministries, representatives of the private sector and the NGO sector. The SCISC will decide on the frequency of the meetings and its working procedures. This is the forum where the NGO sector can also raise questions and comment on the discussion topics. There will be a POPs Management Technical Committee (PMTC) formed under the SCISC for day to day execution support.

The PMTC will hold its regular sessions throughout the implementation but additional meetings can be held if necessary. The SCISC will oversee the project-related work of the PMTC and the implementation team. The SCISC will review, comment on and approve the work plan. All decisions of the committee, such as respective responsibilities, timelines and budget will be clearly communicated to those concerned. Activities will be implemented through subcontracts. Submitted tenders will be reviewed and evaluated by the PMTC subject to approval by SCISC.

The POPs Management Technical Committee will:

- develop its working procedures;
- monitor the execution by means of progress reports and close contact with the PM;
- evaluate the efficiency of the project management, including outcomes, budget and timelines;
- provide technical support to the PM and working teams;
- approve the work plan with timelines and budget of the implementation of this Action Plan prior to submission to SCISC;
- have meetings on a regular basis (monthly);
- agree on working arrangements and implementation plans with the Project Manager and the POPs Officer;
- oversee the work of the national experts engaged to undertake various activities required by the Action Plan and receive and review their reports;

The Project Manager will:

- agree on a sub-contract with the Action Plan Implementation Project for the terms set out in this Action Plan;
- call principal stakeholders of the PMTC to oversee and coordinate the successful implementation of this Action Plan;
- establish an office within its premises charged with the successful implementation of the Action Plan;
- have day-to-day responsibility for the management and coordination of the implementation activities, including subcontracts, budgets, and reporting to the PMTC and the SCISC;
- appoint national experts as necessary to undertake the various actions required during the course of the work, using terms of reference agreed by the SCISC and ensure the quality of their work;
- provide a secretariat function to the SCISC and PMTC;
- report regularly to the POPs Management Technical Committee, and to the SCISC, on the progress of the implementation and the disbursement of the funds.

In order to achieve the objectives, the following measures should be undertaken:

- Preparation of training manuals and materials for different target groups;
- Introduction of courses on POPs at school and university level;
- Preparation of awareness materials on POPs release, impact on human health and environment, handling of POPs contaminated materials and wastes, POPs management, etc.
- Preparation and realization of trainings for government officials at different levels and representatives from business sector;
- National Public Awareness campaign for the implementation of Stockholm Convention.

3.3.13.5 Implementation of Action Plan

Action Plan – 3.3.13 Activity: public awareness, information and education (article 10)				
Objectives	Educated and trained government officials for implementation of the Convention	Educated and trained business sector representatives for implementation of the Convention	National education system incorporated POPs information and disseminated through education	Educated general public for principles and objectives of Stockholm Convention
Activities	Preparation and realization of training for government officials of different levels for implementation of the Stockholm Convention	Preparation and realization of training for business sector representatives	Educational activities focusing on POPs , their sources, applications, uses and hazards and management of POPs wastes	Preparation and implementation of countrywide information and educational campaign concerning hazards of POPs
Expected Results	Trained officials	Trained business sector representatives	-School and University curricula incorporated POPs relared courses -Students aware of the POPs and their adverse impacts on human and environment -Students aware of principles of Stockholm Convention	Increased public awareness on the adverse impacts of POPs Public aware of principles of Stockholm Convention
Responsible Institution	MOEST and related ministries	MOEST, MOISC	MOEST, MOES, Universities	MOEST
Time Period	2007	2007	2007-2008	2007-2008
Estimated budget	USD 50000	USD 25000	USD 100000	USD 100000
Sources of Financing	State budget & donor support	State budget and business sector support	State budget and donor support	State budget and donor support

3.3.13.6 Implementation Performance Monitoring and Periodic Review Mechanisms

Reporting to the POPs Management Technical Committee (PMTC)
The monitoring of the project execution will be undertaken by technical and financial reports, which will be developed by the PM. He/she will submit these reports to the PMTC on a regular basis. The PM will take corrective actions based on the comments and evaluations of the PMTC.

Reporting to the Steering Committee on Implementation of Stockholm Convention (SCISC)
Technical and financial reports will also be requested by the SCISC. These reports will evaluate the efficiency of project implementation, including outcomes, budget and timelines. Their frequency will be decided, when the subcontract is developed between the SCISC and the PM. Payment distribution will also depend on these reports. An appointed Reviewer will, on a contracted basis, assist the PMTC in evaluating these reports and the implementation progress. He/she will be nominated by the PMTC which

is responsible for coordinating the implementation of all Action Plans in the NIP. The PM will take corrective actions based on the comments of the PMTC.

Activities	Expected Results	Indicators of Success	Period for achieving Results	Monitoring Frequency
Preparation and realization of training for government officials of different levels for implementation of the Stockholm Convention	Trained officials	-Number of trainings completed -Number of participants -Level of awareness and knowledge in officials of different levels	2007	Six monthly
Preparation and realization of training for business sector representatives	Trained business sector representatives	-Number of trainings completed -Number of participants - Level of awareness and knowledge gathered in trainings	2007	Six monthly
Educational activities focusing on POPs , their sources, applications, uses and hazards and management of POPs wastes	School and university students aware of the POPs and their adverse impacts on human and environment Students aware of principles of Stockholm Convention	-Curricula/Courses focused on POPs -Level of knowledge on POPs in teachers and students -Number of studies/researches on POPs	2007-2008	Six monthly
Preparation and implementation of countrywide information and educational campaign concerning hazards of POPs	Increased public awareness on the adverse impacts of POPs Public aware of principles of Stockholm Convention	-Number of people trained -Visible change in people's attitude on POPs	2007	Six monthly

3.3.14 Activity: Effectiveness evaluation (article 16)

At present there is no system or instrument for monitoring of POPs presence or production and releases established in Nepal. Nepal therefore needs to establish/create a monitoring system to facilitate effectiveness evaluation of the NIP and the provisions of the Stockholm Convention. This will help improve the assessment, data and information exchange and cooperation among the stakeholders (Nepal and international organizations) and ultimately in the management of POPs chemicals. This activity may need USD 10000 in 2012 and will be managed by the state budget.

3.3.15 Activity: reporting

3.3.15.1 Current reporting requirements and principles

It is necessary to establish a reliable information system ensuring the availability of sufficient and reliable data. Information provided by the system should cover two main areas:

i. Statistical data on the total production, import and export of all chemicals listed in Annexes A and B, which may be obtained from the public or from research institutes, including NGOs.
ii. Data on current and projected emissions and releases of POPs listed in Annex C of the Convention.

The evaluation of present and projected emissions and releases of POPs at the country level can be carried out within the framework of the national inventory of pollutants using average emission factors along with the simultaneous updating of registers of sources and release estimates. Nepal till now has no such register (e.g. PRTR), which needs to be developed and implemented at the earliest possible date.

Domestic need regarding information on POPs emissions and releases are fulfilled by:

- National inventory system of emissions and releases, and
- Developing registers of individual emission and release sources

International requirements that can be attracted in Nepalese condition is the PRTR register (paragaraph 5 of Artilce 10) of the Stockholm Convention, which states that "Each Party shall 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 chemicals listed in Annex A, B or C that are released or disposed of". Developing a countrywide environmental information system will determine efficient reporting on compliance with all environmental conventions, including the Stockholm Convention. Irrespective of the option, which will be selected, it is necessary to undertake the task of developing a methodology for determining pollutant emissions, especially for those pollutants that were not sufficiently estimated in Nepal so far.

The implementation of an information system for individual emission sources should involve:

- Developing and introducing adequate legal regulations;
- Ensuring financing;
- Developing and introducing an electronic information management system;
- Training of the staff, who operate the system.

3.3.15.2 Objectives and priorities of the Action Plan

The main objective of this activity is to meet the obligations of the Convention related to the reporting of information on POPs emission and release levels and on the progress in the implementation of the Convention and also to satisfy the national requirement in this field.

The main activities that will be undertaken:

- Preparation of national reports for the Conference of the Parties to the Convention;
- Inventory reports on POPs emission and release;
- Preparation of reports on progress in the elimination of PCBs;
- Development of data collection system concerning different activities and POPs emissions from different sources.

3.3.15.3 Proposed measures for reporting

As established by the Stockholm Convention, the reporting requirements that should be fulfilled by Nepal are given in the following table:

Convention Obligation	Description of Requirement	Period	Estimated budget	Source of Funding
Article 5, subparagraph (a) Measures to reduce or eliminate releases from unintentional production	Requires each Party to develop an action plan and subsequently to implement it as part of its national implementation plan specified in article 7, designed to identify, characterize and address the release of chemicals listed in Annex C of the Convention	Within two years of the date in which Convention enters into force for that Party	Included in 3.3.7.5	--
Article 5, subparagraph (a)(v) Measures to reduce or eliminate releases from unintentional production	Requires a review to be undertaken of those strategies pursuant to the development and success of action plan to address the unintentionally produced Annex C POPs	Every five years (altogether 5 times till 2030)	USD 15000	State budget and donor agencies
Article 7: Implementation plan	Requires each party to develop and to implement an implementation plan and transmit it to the Conference of the Parties, and requires each Party to review and update its plan on a periodic basis and in a manner	Transmission to the Conference of the Parties within two years of the date on which the	USD 5000 (for review and update the plan within 2010)	State budget and donor agencies

	to be specified in a decision to the Conference of the Parties	Convention enters into force for that Party.		
Article 15: Reporting	Each Party shall report to the Conference of the Parties on the measures it has taken to implement the provisions of the Convention and on the effectiveness of such measures in meeting the objectives of the Convention. Each Party shall provide to the Secretariat: (i) Statistical data on its total quantities of production, import and export of each of the chemicals listed in Annex A and Annex B or a reasonable estimate of such data; and (ii) to the extent practical, al list of the States from which it has imported each such substance and the States to which it has exported each such substance	To be decided by the Conference of the Parties	USD 10000 (by 2009)	State budget
Article 16: Effectiveness evaluation	Requires an evaluation of effectiveness in fours years after the date of entry into force of the Convention and periodically thereafter. Requires also report and information, including the reports and monitoring information called for in paragraph 2 of article 16, the national reports submitted pursuant to article 15 and non-compliance information provided pursuant to the procedures to be established under article 17.	Commencing four years after the entry into force of the Convention	Included in 3.3.14	--
Annex A, part II subparagraph (g)	Requires each party to provide a report on the progress in eliminating polychlorinated biphenyls and submit it to the Conference of the Parties pursuant to article 15	Every five years (altogether 4 times)	USD 10000	State budget
Annex B, part II, paragraph 4	Not applicable to Nepal, since it has banned to import and use this chemical.	--		

3.3.15.4 Action Plan implementation process

The PMTC and POPs Unit in the MOEST will be responsible forthe fulfillment of these requirements. The POPs Unit will provide the required information and reports to the Convention on the basis of the reports which will be prepared during implementation of different action plans.

The reporting obligations will be elaborated and implemented in the country, when all of the reporting requirements are developed and approved by the Convention for Nepal.

3.3.16 Activity: Research, development and monitoring (article 11)

3.3.16.1 Present situation in Nepal

Due to the insufficiency of equipment and training of staff in laboratories and financial difficulties in making the analysis in the country or abroad, research in the area of persistent organic pollutants in Nepal is still in its infancy. Unfortunately there is no assessment of Annex C POPs made in Nepal as of today due to low level of awareness and the prohibiting cost of monitoring.

There is no information about the air concentrations of dioxins and furans in the areas of critical hot spots. Despite these facts, some NGOs, academic institutions have made use of UNEP dioxin tool kit for quantification of emission of dioxin from health care institutions. The level of 2,3,7,8 TCDD however in recent monitoring of some water, sediment and vegetable samples drawn from putative contaminated sites was not detectable at µg/kg level.

3.3.16.2 Objectives for research, development and monitoring

Owing to the low level of industrialization and need for compliance with the emission standards for Annex C POPs might take some time to come into operation. The private laboratory might not be interested for investing huge resources on developing PCDD/F analysis facility. However Government of Nepal should either make arrangements for such analysis with sophisticated laboratories in the region or establish one in the country. Thus the objectives of the research, development and monitoring should be:
Established network for cooperation, data and information exchange of scientific institutions involved in POPs research activities in home (involving academic institution/government laboratories) or in the region;

- Established and adopted an internationally accepted system of standardization of methods for residue analysis in abiotic and biotic matrices;
- Developed system of quality assurance and quality control in Nepalese laboratories.

3.3.16.3 Implementation Performance Monitoring and Periodic Review Mechanisms

Throughout the implementation of this action plan, there will be a Project Manager (PM), who reports to the Steering Committee on Implementation of Stockholm Convention in Nepal (SCISC) during the Action Plan Implementation of the project. The Project Manager will be a technically qualified person to provide overall guidance on the management of the process. The PM will ensure adherence to the work plan, which will be finalized during the first phase of the implementation. His/her main responsibilities will include advising on and monitoring of all technical aspects of the Action plan implementation as well as the financial control over the execution. The PM will work in close cooperation with the POPs Unit of the Ministry. SCISC will be established and will act as the Steering and Coordinating Committee for the execution of this Action Plan. It will be chaired by the Secretary of the Ministry, with relevant ministries, representatives of the private sector and the NGO sector. The SCISC will decide on the frequency of the meetings and its working procedures. This is the forum where the NGO sector can also raise questions and comment on the discussion topics. There will be a POPs Management Technical Committee (PMTC) formed under the SCISC for day to day execution support.

The PMTC will hold its regular sessions throughout the implementation but additional meetings can be held if necessary. The SCISC will oversee the project-related work of the PMTC and the implementation team. The SCISC will review, comment on and approve the work plan. All decisions of the committee, such as respective responsibilities, timelines and budget will be clearly communicated to those concerned. Activities will be implemented through subcontracts. Submitted tenders will be reviewed and evaluated by the PMTC subject to approval by SCISC.

The POPs Management Technical Committee will:

- develop its working procedures;
- monitor the execution by means of progress reports and close contact with the PM;
- evaluate the efficiency of the project management, including outcomes, budget and timelines;
- provide technical support to the PM and working teams;
- approve the work plan with timelines and budget of the implementation of this Action Plan prior to submission to SCISC;
- have meetings on a regular basis (monthly);
- agree on working arrangements and implementation plans with the Project Manager and the POPs Officer;
- oversee the work of the national experts engaged to undertake various activities required by the Action Plan and receive and review their reports;

The Project Manager will:

- agree on a subcontract with the Action Plan Implementation Project for the terms set out in this Action Plan;
- call principal stakeholders of the PMTC to oversee and coordinate the successful implementation of this Action Plan;
- establish an office within its premises charged with the successful implementation of the Action Plan;
- have day-to-day responsibility for the management and coordination of the implementation activities, including subcontracts, budgets, and reporting to the PMTC and the SCISC;
- appoint national experts when necessary to undertake the various actions required during the course of the work, using terms of reference agreed by the SCISC and ensure the quality of their work;
- provide a secretariat function to the SCISC and PMTC;
- report regularly to the POPs Management Technical Committee, and to the SCISC, on the progress of the implementation and the disbursement of the funds.

In order to achieve the objectives, the following measures should be undertaken:

- Preparation of an inventory of scientific institutions involved in POPs research activities;
- Establishment of a network for cooperation, data and information exchange of these institutions;
- Establishment of an internationally accepted system;
- Development of a scheme for adoption of the system by scientific institutions;
- Development of standards for quality assurance and control;
- Development of a scheme for adoption of the standards by the scientific institutions.

3.3.16.4 Implementation of Action Plan

Action Plan – 3.3.16 Activity: research, development and monitoring (article 11)							
Objectives	Established network for cooperation, data and information exchange of scientific institutions involved in POPs research activities in home (involving academic institution/government laboratories) or in the region			Established and adopted an internationally accepted system of standardization of methods for residue analysis in abiotic and biotic matrices		Developed system of quality assurance and quality control in Nepalese laboratories	
Activities	Preparation of an inventory of institutions involved in POPs research activities	Establishment of new and strengthening of existing labs at national level	Establishment of a network for cooperation, data and information exchange among these institutions	Establishment of internationally accepted system	Development of scheme for adoption of the system by research/ scientific institutions	Development of standards for quality assurance and control	Development of scheme for adoption of the standards by scientific institutions
Expected Results	Prepared inventory	Increased capacity of labs for analysis of all POPs	-Network established -Scientific institutions cooperating	System established	System adopted and applied by research/ scientific institutions	Standards for quality developed	Standards for quality accepted and applied by scientific institutions
Responsible Institution	MOEST	Relevant ministries /organizations and non-governmental organizations	Relevant ministries/ organizations	MOEST and relevant organizations	MOEST and relevant organizations	MOEST	MOEST and relevant organizations
Time Period	2007	2007-2010	2007-2009	2007-2009	2007-2009	2008-2010	2008-2010
Estimated budget	USD 5000	USD 100000	USD 10000	USD 30000	USD 60000	USD 60000	USD 60000
Sources of Financing	State budget	Donor support	State budget	State budget and Donor support	Donor support	Donor support	Donor support

3.3.16.5 Implementation Performance Monitoring and Periodic Review Mechanisms

Reporting to the POPs Management Technical Committee (PMTC)
The monitoring of the project execution will be undertaken by technical and financial reports, which will be developed by the PM. He/she will submit these reports to the PMTC on a regular basis. The PM will take corrective actions based on the comments and evaluations of the PMTC.

Reporting to the Steering Committee on Implementation of Stockholm Convention (SCISC)
Technical and financial reports will also be requested by the SCISC. These reports will evaluate the efficiency of project implementation, including outcomes, the budget and timelines. Their frequency will be decided, when the subcontract is developed between the SCISC and the PM. Payment distribution will also depend on these reports. An appointed Reviewer will, on a contracted basis, assist the PMTC in evaluating these reports and the implementation progress. He/she will be nominated by the SCISC which is responsible for coordinating the implementation of all Action Plans in the NIP. The PM will take corrective actions based on the comments of the PMTC.

Activities	Expected Results	Indicators of Success	Period for achieving Results	Frequency of Monitoring
Preparation of an inventory of institutions involved in POPs research activities	Prepared inventory	Number of organizations / institutions listed in the inventory	2007	Quarterly
Establishment of new and strengthening of existing labs at national level	Increased capacity of labs for analysis of all POPs	Facilites in the new and previously established labs	2007-2010	Once a year
Establishment of a network for cooperation, data and information exchange among these institutions	-Network established -Scientific institutions cooperating	-Amount of information and data exchanged -Number of cases of cooperations	2007-2009	Once a year
Establishment of internationally accepted system	System established	Structure of the system	2007-2009	Once a year
Development of scheme for adoption of the system by research/ scientific institutions	System adopted and applied by research/ scientific institutions	Number of institutions adopting the system	2007-2009	Once a year
Development of standards for quality assurance and control	Standards for quality developed	Structure of the Standards	2008-2010	Once a year
Development of scheme for adoption of the standards by scientific institutions	Standards for quality accepted and applied by scientific institutions	Number of research/academic institutions adopting the standards	2008-2010	Once a year

3.3.17 Activity: Technical and financial assistance (articles 12 and 13)

3.3.17.1 Eligibility

Nepal is among the developing countries with very weak economy and low infrastructures for development. Implementation of the planned measures and activities demands financial resources and the country, which has signed the Stockholm Convention with the hope to get rid of POPs chemicals, is heavily dependent on financial assistance from developed countries and international organizations to carry out different activities associated with the elimination of these chemicals.

3.3.17.2 Identified areas of technical assistance needs and priorities

The elimination of obsolete pesticides and PCB-contaminated dielectric fluid, decontamination of electrical equipment, education and awareness raising and capacity building are the major priority areas

that need technical assistance. The aim of this activity is to achieve support for activities to be undertaken in Nepal by enterprises, governmental and non-governmental organizations to satisfy the provisions of the convention pursuant to Articles 12 and 13.

3.3.17.3 Sources for financial and technical assistance

The total sum that would be required for the elimination or reduction of POPs is relatively high. Financial assistance may come from international organizations like GEF or other donor (developed) countries. The precondition for obtaining foreign assistance of this kind is the ratification of the Stockholm Convention by Nepal.

3.3.17.4 Assessment of the requested technical and financial Assistance

Technical assistance will be required mainly in elimination/disposal of obsolete pesticides and decontamination of PCB – contaminated oil and equipment and their disposal. Additional co-financing of activities on education and awareness raising, where NGOs and educational/academic institutions will have significant contributory role, can also be sought through bilateral cooperation with various countries and international organizations.

3.4 Development and capacity-building proposals and priorities

3.4.1 Situation in Nepal

One of the main obstacles in immediate disposal or reduction in release/emission of POPs in Nepal is inadequate infrastructure and capacity presently available in the country. With the limited capacity Nepal may not be able to carry out the priority activities within the stipulated time period regarding the implementation of the Stockholm Convention. Effective implementation of the NIP, developed in line with the provisions of the Stockholm Convention, therefore, requires strengthening of the national capacities, improvement of the data collection system and prerparation of emission and release factors. Then only reliable information on emissions and releases can be collected. All these require substantial financial support.

For the regular updating of the inventory of POPs-containing articles or POPs-contamianted wastes or POPs emitting sources, substantial technical and financial support will be required. Nepal can manage this part of the task with the available professionals, but the financial resources are still inadequate.

Nepal needs to regularly monitor the level of POPs (ie.contamination) in the biological materials and biota in different compartments of the environment, for which development of a new monitoring method will be required. Establishment of good research facilities in appropriate institutions and laboratories focusing on POPs analysis would be necessary and this also will require additional support.

Very large part of the Nepalese population was found to be unaware of the POPs and their severe impacts on human health and environment. Countrywide and massive awareness campaigns in different forms and through different fronts is an urgent task demanding additional professional support and financial resources.

Elimination of stocks of oblsolete pesticides has become the first priority for Nepal. Efforts are underway. But due to the high costs of elimination this process could not gain momentum. Moreover, the

uncertainity regarding the differerent types of pesticides (POPs and non-POPs), their exact quantities and locations was an additional obstacle to initiate the process of final disposal.

The PCBs-containing equipment and wastes are handled without proper safety measures. Even more alarming is that the old transformer oil, in most of the cases PCB contaminated, is illusively utilized as massage oil in muscular and joint pains.

The most difficult and comples task is the reduction of emissions of PCDD/F from five different sources. The following actions would be necessary to reduce this problem:

- Raise public awareness on the health hazards as a consequence of burning of impregnated wood and wastes in open burning
- Provide public education on threats and risks resulting from the use of stoves and from the burning of wastes
- Obtain more reliable information on emission levels from open burning, especially on the influence of burning of medical wastes, agricultural residues, urban wastes, and other chlorine containing solid wastes
- Modernize stoves fired with biomass

Substantially financial support is required to carry out the above activities and other supplementary activities, such as research on and introduction of new technologies as well as their implementation.

3.4.2 Key Investment requirements and priorities

The National Implementation Plan (NIP) for Stockholm Convention is developed in compliance with the provisions of the Convention. Issue specific action plans with priority activities are developed to indicate the areas where key investments are required. Further areas in which support from donors or from bilateral cooperation could be required will be included in the updated versions of the NIP.

3.5 Timetable for plan implementation and measures of success

Year / Activity	2007	2008	2009	2010	2012	2014	2016	2018	2020	2022	2024	2026	2028	2030
3.3.1: Institutional and regulatory strengthening measures														
• Establishment of the Enforcement Agency for Environmental Requirements	■													
• Establishment of Interagency Coordination Mechanism	■													
• Implementation of Action Plan on Stockholm Convention	■	■	■	■	■	■	■	■	■	■	■	■	■	
• Coordination and Cooperation between Basel, Rotterdam, Stockholm Conventions in Nepal	■	■												
• Cooperation and Coordination of Activities Concerning Promotion of BAT and BEP	■	■												
• Ban on the use of POPs containing materials	■	■												
• Ban on the use of chemicals potential for generating POPs	■	■												
• Ban on open burning of kitchen and garden waste in urban areas	■	■												
• Formulation/Amendment of Integrated Waste Management Policy and Amendment of SWMRM Act	■													
• Formulation of Hazardous Chemicals Management Rules	■	■												
• Harmonization of sector legislation	■	■												
• Establishing Information Education and Communication (IEC) System	■	■	■											
• Further strengthening and expanding the scope of alternate energy program for household & industrial use	■	■	■	■	■	■	■							
3.3.2: Measures to reduce or eliminate releases from intentional production and use														
• Harmonizing of sectoral laws and amendment with respect to time requirement and in line with POPs convention Article 3 (point 3 & 4) and Annex D.	■	■												
• Establishing and strengthening institutional aspect of both line ministries (MOAC and MOEST) for permanent set up of monitoring mechanism.	■	■	■	■										
3.3.3: Production, import and export, use, stockpiles and wastes of Annex A POPs pesticides (Annex A, part 1 chemicals)														
• Preparation and adoption of a strategy for complete inventory and collection of obsolete pesticides	■													
• Preparation and establishment of control mechanisms and cooperation of inspection bodies to oversee POPs wastes	■													
• Safe packaging and labelling and safe interim storage of obsolete pesticides until final disposal	■													
• Transport of obsolete pesticides and contaminated soil and containers to disposal site for disposal in line with Basel and Stockholm Conventions	■	■	■											
• Site stabilization and remediation	■	■	■	■										
• Establishment of a system for control of illegal import, application and balance between import and demand of pesticides	■	■	■	■										
3.3.4: Production, import and export, use, identification, labeling, removal, storage and disposal of PCBs and equipment containing PCBs (Annex A, part II chemicals)														
• Updating of transformer database along with labeling and tagging of decommissioned and in use transformers	■	■	■	■	■	■	■	■	■					
• Collection of information on retrofilling	■	■	■	■	■	■	■	■	■					
• Construction of warehouses to store PCB wastes (articles and oil)	■	■												
• Replacement of PCBs contaminated oil and articles	■	■	■	■	■	■	■	■	■					
• Formulation of Guidelines for collection, storage, further use and transportation	■	■	■	■										
• Disposal of PCB wastes									■	■	■	■	■	
• Ask welding workshops to stop using old oil and to return	■	■	■	■	■	■	■	■	■					

• On-site testing by portable Test-kit														
• Control of illegal import and use of PCBs contaminated oil														
3.3.5: Production, import and export, use, stockpiles and wastes of DDT (Annex B chemicals) if used in the country														
3.3.6: Register for specific exemptions and the continuing need for exemptions (article 4)														
3.3.7: Measures to reduce releases from unintentional production (article 5)														
• Updating/revising inventory of Annex C POPs in Nepal														
• Household energy switch for controlling emission of PCDD/Fs														
• Capacity building activities														
• Controlling open burning of agriculture residues and forest fires														
• Establishment of Electrical Crematoria														
• Establishment of hazardous waste management facility														
• Establishing system for long-term permanent monitoring and reporting on Annex C POPs														
• Regulatory framework for release limit values														
• Economic instruments for release reduction														
3.3.8: Measures to reduce releases from stockpiles and wastes (article 6)														
• Identify and Mapping of Stockpiles, Products, and articles consisting of or containing chemicals listed either in Annex A, B and C.														
• Preparation of an Inventory of Sewage Treatment Plants Number of sewage treatment plants that are in the inventory														
• Determination of the extent of the contaminated areas and determination of the level of contamination														
• Establishment of procedures for elimination of releases from stockpiles and wastes														
• Preparation of economical analyses for the sustainability of the process of recycling-burning dumping technology														
3.3.9: Identification of stockpiles, articles in use and wastes														
• Preparation and adoption of a strategy for inventory completion														
• Preparation and establishment of control mechanisms and cooperation of inspection bodies to oversee stockpiles, articles in use and wastes														
• Development of schemes for positive influence in the business sector, having active roles and responsibilities in this area														
3.3.10: Manage stockpiles and appropriate measures for handling and disposal of articles in use														
• Preparation and adoption of a strategy for handling and disposal of articles in use														
• Development of schemes for positive influence in the business sector, having active roles and responsibilities in this area														
• Preparation and establishment of control mechanisms and cooperation of inspection bodies concerning handling and disposal of articles in use														
3.3.11: Identification of contaminated sites (Annex A, B and C Chemicals) and remediation in an environmentally sound manner														
• Preparation of an implementation strategy for these activities														
• Preparation of a methodology of the assessment														
• Prioritization of contaminated areas for their recovery, taking into account mainly the impact of contamination on human health or its environmental risk														
• Preparation of technological and technical work procedures														
• Carrying out the decontamination activities														
3.3.12: Facilitating or undertaking information exchange and stakeholder involvement														
• Preparation of institutional and technical set up to establish National Focal Point														
• Preparation of stakeholders list														
• Development of a system for collection and exchange of information														
• Definition of formats for information exchange on POPs														
3.3.13: Public awareness, information and education (article 10)														

• Preparation and realization of training for government officials of different levels for implementation of the Stockholm Convention														
• Preparation and realization of training for business sector representatives														
• Educational activities focusing on POPs , their sources, applications, uses and hazards and management of POPs wastes														
• Preparation and implementation of countrywide information and educational campaign concerning hazards of POPs														
3.3.14: Effectiveness evaluation (article 16)														
3.3.15: Reporting														
3.3.16: Research, development and monitoring (article 11)														
• Preparation of an inventory of institutions involved in POPs research activities														
• Establishment of new and strengthening of existing labs at national level														
• Establishment of a network for cooperation, data and information exchange among these institutions														
• Establishment of internationally accepted system														
• Development of scheme for adoption of the system by research/ scientific institutions														
• Development of standards for quality assurance and control														
• Development of scheme for adoption of the standards by scientific institutions														
3.3.17: Technical and financial assistance (articles 12 and 13)														

3.6 Resource requirements (Amount in USD for the given year or period)

Activity	Year																
	2007	2008	2009	2010	2012	2014	2016	2018	2020	2022	2024	2026	2028	2030	Coordination	Total	%
3.3.1: Institutional and regulatory strengthening measures	713000	518000	505000	500000	1000000	1000000	500000								331520	5067520	12.1011
3.3.2: Measures to reduce or eliminate releases from intentional production and use	27500	27500	25000	25000											7350	112350	0.2683
3.3.3: Production, import and export, use, stockpiles and wastes of Annex A POPs pesticides (Annex A, part 1 chemicals)	335000	175000	125000	25000											46200	706200	1.686
3.3.4: Production, import and export, use, identification, labeling, removal, storage and disposal of PCBs and equipment containing PCBs (Annex A, part II chemicals)	186000	166000	41000	41000	76000	76000	76000	72000	372000	300000	300000	300000	300000		161420	2467420	5.892
3.3.5: Production, import and export, use, stockpiles and wastes of DDT (Annex B chemicals) if used in the country	Included	in	3.3.3														
3.3.6: Register for specific exemptions and the continuing need for exemptions (article 4)	NA																
3.3.7: Measures to reduce releases from unintentional production (article 5)	7592000	7577000	7563000	7531000											2118410	32381410	77.326
3.3.8: Measures to reduce releases from stockpiles and wastes (article 6)	31000	20000	15000	15000											5670	86670	0.207
3.3.9: Identification of stockpiles, articles in use and wastes	82500	2500	2500	2500											6300	96300	0.230
3.3.10: Manage stockpiles and appropriate measures for handling and disposal of articles in use	24500	12500	12500	12500											4340	66340	0.158
3.3.11: Identification of contaminated sites (Annex A, B and C Chemicals) and remediation in an environmentally sound manner	16250	6250	31250	26250	50000										9100	139100	0.332

3.3.12: Facilitating or undertaking information exchange and stakeholder involvement	35000														2450	37450	0.089
3.3.13: Public awareness, information and education (article 10)	175000	100000													19250	294250	0.703
3.3.14: Effectiveness evaluation (article 16)					10000										700	10700	0.0255
3.3.15: Reporting			10000	10500			5500		5500			5500		3000	2800	42800	0.102
.3.16: Research, development and monitoring (article 11)	64000	99000	97000	65000											22750	347750	0.830
3.3.17: Technical and financial assistance (articles 12 and 13)																	
Total for the given year or period	**9281750**	**8703750**	**8427250**	**8253750**	**1136000**	**1076000**	**581500**	**72000**	**377500**	**300000**	**300000**	**305500**	**300000**	**3000**	**2738260**	**41856260**	**100**

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List of stakeholders

Agriculture Information and Communication Centre.
Agriculture Input Company.
Center Department of Chemistry. T.U.
Center for Environment Awareness and Management Project (CEAMP).
Center for Environmental and Agricultural Polic.
Centre for Public Heath and Environment Development.
Clean Energy Nepal (CEN).
Department of Soil and Water Conservation.
Department of Cottage and Small Industries.
Department of Food technology and Qulity control (Old Name CFRL)
Department of Water Induced and Disaster Program.
Environmental and Public Health Organization.
Federation of Nepal Chamber of Commerce and Industry.
Health Epidemiology & Disease Control Division.
Kathmandu Metropolitan City
Kathmandu University.
Ministry of Agriculture and Cooperatives.
Ministry of Environment, Science & Technology.
Ministry of Health and Population.
Ministry of Industry, Commerce and Supply.
Ministry of Local Development.
Ministry of Soil and Water conservation.
Ministry of Water Resources.
National Forensic Lab.
National Planning Commission (NPC).
National Seed Company LTD.
Nepal Environmental & Scientific Services (NESS)
Nepal Academy of Science and Technology (NAST).
Nepal Agriculture Research Council (NARC).
Nepal Bureau of Standard and Metrology (NBSM).
Nepal Electricity Authority (NEA).
Nepal Health Research Council (NHRC).
Nepalese Forum of Environmental Journalists (NEFEJ).
Pesticide Association of Nepal (PAN).
Pesticide Registration and Management Division
Plant Protection Directorate (PPD).
POPs Project.
Pro Public.
Solid Waste Management and Resource Mobilization Centre (SWMRMC)
UNIDO, Kathmandu.

Annex I: Policy Decision on NIP endorsement

नेपाल सरकार
प्रधानमन्त्री तथा मन्त्रिपरिषद्को कार्यालय
(..... शाखा)

पत्र संख्या: पै.प्र. ९९०९१०६२
च.नं:

सिंहदरबार, काठमाडौं
नेपाल ।

मिति:.....२०६३।१२।७.....

श्री सचिवज्यू,
वातावरण, विज्ञान तथा प्रविधि मन्त्रालय ।

मिति २०६३।१२।७ मा बसेको मन्त्रिपरिषद् परराष्ट्र, सामाजिक तथा विकास समितिको बैठकबाट देहायबमोजिम निर्णय भएको व्यहोरा अनुरोध गर्दछु –

"स्टकहोम महासन्धि सम्बन्धी राष्ट्रिय कार्यान्वयन योजना स्वीकृत गर्ने बारे वातावरण, विज्ञान तथा प्रविधि मन्त्रालयको नं. १४-१८।४२-०६३।११।१७ को प्रस्ताव मं.प.बै.सं. ५१।०६३ मिति २०६३।११।२१ को मन्त्रिपरिषद्को बैठकबाट "मन्त्रिपरिषद्को परराष्ट्र, सामाजिक तथा विकास समितिमा छलफल गरी समितिको निर्णय बमोजिम गर्ने" निर्णय भएअनुसार मिति २०६३।१२।७ मा सो समितिको बैठक बसी छलफल हुँदा सो योजनाको Steering Committee of POPs Enabling Activities Project, Committee on Environmental Standards र Steering Committee on the Implementation of Stockholm Convention मा प्रधानमन्त्री तथा मन्त्रिपरिषद्को कार्यालयका सम्बन्धित महाशाखा हेर्ने सह सचिवलाई सदस्यमा थप गर्ने गरी उक्त "स्टकहोम महासन्धि सम्बन्धी राष्ट्रिय कार्यान्वयन योजना" स्वीकृत गर्ने ।"

२०६३।१२।१४
(दिपेन्द्रविक्रम थापा)
सचिव

Unofficial English Translation

Government of Nepal
Office of the Prime Minister and Council of Ministers

On proposal of the Ministry of Environment, Science and Technology (Proposal No. 14-18/42-063/11/17) regarding the endorsement of the National Implementation Plan for the Stockholm Convention, as per the decision of the Council of the Ministers to delegate its Committee on Foreign Affairs, Social and Development to endorse the National Implementation Plan for Stockholm Convention after necessary consultation, the Committee decided to endorse the National Implementation Plan on March 21, 2007.

Secretary

टेलिफोन: ४२११०००, ४२११०२५, ४२११०४०, ४२११०३५, ४२११०८०, ४२११०७३, ४२११०२१, ४२११०३८
फ्याक्स: ४२११०६५, ४२११०८६, ४२११०३८, ४२११०२१, ४२११०४७, पो.ब.नं.:२३३१२, काठमाडौं, नेपाल
इमेल: info@opmcm.gov.np
वेब साइट: http://www.opmcm.gov.np

Annex II: Pesticide data

Table1: Development of resistance in Helicoverpa armigera to different insecticides in Nepal

Insecticides	Increase in resistance (times)	
	Pokhara (1994)	Nepalgunj (1995)
Cypermethrin	56.0	103.0
Fenvalerate	53.0	126.0
Endosulfan	3.0	3.0
Monocrotophos	0.8	0.4
Methomyl	2.0	11.0
Quinalphos	0.8	4.0

Source: Armes and Pandey, 1995

Table 2: Poisoning cases related to different poison groups (1985/86 – 1990/91)

SN	Poison Types	Poisoning Cases (No)	
		Teaching Hospital	Bir Hospital
1	Organophosphate	45 (36.6)	469 (41.0)
2	Drugs	30 (24.4)	178 (15.6)
3	Rodenticide	19 (15.5)	242 (21.1)
4	Alcohol	5 (4.1)	-
5	Mushroom	3 (2.4)	-
6	Others	12 (9.7)	66 (5.8)
7	Unknown	9 (7.3)	190 (16.6)
	Total	123 (100.0)	1145 (100.0)

Figures in parenthesis indicate percentage
Source: Sayami and Shrestha (1995).

Table 3: Pesticide related ailments reported by retailers and farmers

SN	Ailments	Respondent (%)	
		Retailer	Farmer
1	Headache	38.2	43.5
2	Skin irritation/rashes	32.4	33.9
3	Throat infection/pain	32.4	22.6
4	Nausea	20.6	8.1
5	Eye irritation	14.7	29.0
6	Vomiting	-	33.9
7	Fever	-	11.3
8	Cough	-	21.0

Percentage add up >100 per cent due to multiple health problems
Source: Dahal (1995); Thapa et. al. (1995).

Table 4: Residue levels of organochlorine pesticides in water samples, 1997.

Lake	Water Sample by depth	γ–BHC Concentration (ppm)		
		I	II	III
Begnas	Surface	0.10	0.03	0.10
	2.5m depth	0.10	ND	0.045
	7.5m depth	0.08	0.01	0.034
Rupa	Surface	0.01	0.01	ND
	2.5m depth	ND	0.01	ND
	7.5m depth	-	0.01	-
Phewa	Surface	0.01	0.015	0.01
	2.5m depth	ND	0.01	0.01
	7.5m depth	ND	ND	0.01
Note: ND = Not detected, Source: Entomology Division, 1998				

Table 5: Soil Water Sample collection sites and Residues level of Organochlorine pesticides in Soil and Water Sample 2000

Soil Water Sample collection sites and Residues level of Organochlorine pesticides in Soil and Water Sample 2000

Sample No.	Collection Sites	Crop Field	Soil Layers	Location	Pesticide residue				
Soil samples from Kavre district					**α XHB–**	**β XHB –**	**γ XHB –**	**δ XHB –**	**Aldrin**
1	Horticulture Farm, Tamaghat	Tomatoes	0-30 cms.	1	N.D.	N.D.	N.D.	N.D.	0.002
2	Horticulture Farm, Tamaghat	Tomatoes	30-60 cms	1	0.0004	N.D.	0.00014	N.D.	N.D.
3	Ram Krishna, Tamaghat	Tomatoes	0-30 cms	2	0.0008	N.D.	0.0006	N.D.	N.D.
4	Ram Krishna, Tamaghat	Tomatoes	30-60 cms	2	N.D.	N.D.	N.D.	N.D.	N.D.
5	Santosh Bania, Hoakshe	Tomatoes	0-30 cms.	3	0.0015	N.D.	0.0006	N.D.	N.D.
6	Santosh Bania, Hoakshe	Tomatoes	30-60 cms	3	0.0005	N.D.	0.0003	N.D.	N.D.
Soil samples from Dhading district									
7	Maheswar Adhikary, Naubishe, Dharke	Beans	0-30 cms.	1	N.D.	N.D.	0.0003	N.D.	N.D.
8	Maheswar Adhikary, Naubishe, Dharke	Beans	30-60 cms	1	N.D.	N.D.	0.001	N.D.	N.D.
9	Hom Raj Thapalia, Dhsaha-1, Chauradi	Eggplants	0-30 cms	2	N.D.	N.D.	N.D.	N.D.	N.D.
10	Hom Raj Thapalia, Dhsaha-1, Chauradi	Eggplants	30-60 cms	2	N.D.	N.D.	N.D.	N.D.	N.D.
11	Yuba Raj Thapalia, Dhusaha-1, Chauradi	Eggplants	0-30 cms.	3	0.0013	N.D.	N.D.	N.D.	N.D.
12	Yuba Raj Thapalia, Dhusaha-1, Chauradi	Eggplants	30-60 cms	3	N.D.	N.D.	N.D.	N.D.	N.D.
Soil Sample from Chitwan District									
13	Kitab Miya, Ratnanagar-8, Shaurahachowk	Cucumber	0-30 cms.	1	N.D.	N.D.	0.0004	N.D.	N.D.
14	Kitab Miya, Ratnanagar-8, Shaurahachowk	Cucumber	30-60 cms	1	N.D.	N.D.	0.0001	N.D.	N.D.
15	Siean Chaudhary, Khirahani-2, Simaltadi	Eggplants	0-30 cms	2	N.D.	N.D.	0.0004	N.D.	N.D.
16	Siean Chaudhary, Khirahani-2, Simaltadi	Eggplants	30-60 cms	2	N.D.	N.D.	0.001	N.D.	N.D.
17	Aash Mohomad, Ratnanagar-9, Bakulahar	Gourds	0-30 cms.	3	N.D.	N.D.	0.0003	N.D.	N.D.
18	Aash Mohomad, Ratnanagar-9, Bakulahar	Gourds	30-60 cms	3	0.0004	N.D.	0.0003	N.D.	N.D.
Soil Sample from Bhaktpur District									
19	Purna Bahadur Bhasima, Thimi-4, Balkumari	Chilli	0-30 cms.	1	0.003	N.D.	N.D.	N.D.	N.D.
20	Ratna Bahadur Tako, Thimi-6, Nagadesh	Cabbage	0-30 cms.	2	N.D.	N.D.	0.0005	N.D.	N.D.
21	Ganga Prasad Vale, Katunje-8	Lettuce	0-30 cms.	3	N.D.	N.D.	N.D.	N.D.	N.D.
Water Sample from different districts									
22	Horticulture Farm, Tamaghat, Kavre	Pond water		1	N.D.	N.D.	0.00004	0.0002	N.D.
23	Maheswor Adhikary, Naubise-2, Dharke, Dhading	Surface water		1	0.00005	N.D.	0.00003	N.D.	N.D.
24	Siean Chaidhary, Khairani-2, Simaltadi, Chitwan	Surface water		1	N.D.	N.D.	0.00002	N.D.	N.D.
25	Purna Bdr. Bhasima, Thimi, Balkumari, Bhaktapur	Rice field water		1	0.00004	N.D.	N.D.	N.D.	N.D.

Source, Dhrub Manandhar, Senior Scientist, Entomology Division, NARC, Khumaltar, Nepal, ND = Not detected

Table 6: Laboratory result of School Playground's Soil Contamination with Pesticide next to Amlekhgunj Warehouse by Pro Public, 2005.

POLLUTION MONITORING LABORATORY

CENTRE FOR SCIENCE AND ENVIRONMENT
Core 6A Fourth Floor, India Habitat Centre
Lodhi Road, New Delhi 110003
Telephone: 011- 4645334/5; Telefax:011- 4645334
Report ID- CSE/PML/TRF/
Analytical test results for the soil sample

Identity of the customer	**Name: Mr. Ram Charitra Sah** **Name Of the organization: Forum for the protection of Public interest (PRO PUBLIC)** **Address:** Anam Nagar, Kathmandu Nepal **Phone Number: 0977- 1-4265023** **Fax Number: 0977-4268022** **E mail:- science@propublic.wlink.com.np, ramcharitra1@yahoo.com**
Name of the sample	Soil samples from playground near a major warehouse site
Number of the sample	5
Date of the sample collection	15.07.05
Sample collected by	Mr. Sah
Date of sample submission in the lab	30.07.05

1.Standard Scan for pesticides:
Organochlorines : □□□□ HCH, Heptachlor, Chlordane, DDD, DDT, DDE, Dieldrin, Aldrin , □- endosulfan, □-endosulfan, endosulfan sulfate, Methoxychlor
Organophosphorus : DDVP, Acephate, Monocrotofos,Phorate, Dimethoate, Phosphamidon, Ethion, Malathion, Chlorpyrifos,Quinalfos, Phenthoate, Profenofos
Nitrogenous herbicide: Atrazine
Heavy Metal - Mercury

2. Pesticides Detected in Soil samples from a play ground near a major warehouse site.

		Concentration (□g/g or ppm)				
1.		Soil - 0m	Soil -1m	Soil- 2m	Soil -3m	Soil -4m
2.	□-HCH	n.d	n.d	n.d	n.d	n.d
3.	□-HCH	n.d	n.d	0.0020	n.d	n.d
4.	□-HCH	0.0920	0.0964	0.1065	0.0833	0.0792
5.	□-HCH	0.0091	0.0091	0.0020	n.d	n.d
6.	Heptachlor	n.d	n.d	n.d	n.d	n.d
7.	Chlordane	n.d	n.d	n.d	n.d	n.d
8.	DDD	0.2112	0.0138	0.0189	0.0692	0.2614
9.	DDE	0.0529	0.0260	0.0423	0.0262	0.0773
10.	DDT	0.6397	0.12749	0.0858	0.9475	9.4621
11.	Dieldrin	0.0040	0.0040	0.00402	0.0029	0.0030
12.	Aldrin	n.d	n.d	n.d	n.d	0.0147
13.	□-endosulfan	0.00088	n.d	n.d	n.d	n.d
14.	□-endosulfan	n.d	n.d	n.d	n.d	n.d
15.	Endosulfan sulfate	n.d	n.d	n.d	n.d	n.d
16.	Methoxychlor	n.d	n.d	n.d	n.d	n.d
17.	Chlorpyrifos	0.0021	0.0091	0.0050	0.0047	0.0061
18.	Mercury	0.6391	0.3346	n.d	1.3242	1.045

Note: 1.n.d-not detected

Comments:

- Pesticide residues were analysed as per EPA methodology.
- Among 15 organochlorines tested □-HCH, DDD, DDE, DDT and Dieldrin were detected in all the soil samples collected from a playground near the major warehouse site.
- Among 14 organophosphorus pesticides analysed only chlorpyrifos was detected in all the samples.
- Among nitrogenous herbicide - atrazine was not detected in any of the samples.
- Mercury was detected in 4 of the 5 samples analysed

Signature:

Dr Sapna Johnson
(Senior Research Scientist)

Disclaimer:
Analysis was done by using standard methodology by Environment Protection Agency (EPA) for multiple pesticide residue analysis.
Heavy Metal- Mercury was analysed by EPA methodology-AAS-Cold Vapor technique

Table 7A : **Laboratory result of Vegetable Contamination with Pesticide from Kathmandu, Kavere and Bhaktpur by NEFEJ, 2005.**

S.No.	Locations	Sampling Date	Observed Residual Pesticide Concentration in Potatoes samples (ppm)				
			DDT	α- BHC	β-BHC	γ-BHC	δ-BHC
1	BKT-Bode-4	23 - 11 - 2004	N. D. (<0.005)	N. D. (<0.001)	N. D. (<0.001)	0.002	N. D. (<0.001)
2	BKT-Bode-5	23 - 11 - 2004	0.016	N. D. (<0.001)	N. D. (<0.001)	N. D. (<0.001)	N. D. (<0.001)
3	Sankhu Nilo - 6	19 - 11 - 2004	N. D. (<0.005)	N. D. (<0.001)	N. D. (<0.001)	N. D. (<0.001)	N. D. (<0.001)
4	Gothatar - 1	23 - 11 - 2004	N. D. (<0.005)	N. D. (<0.001)	N. D. (<0.001)	N. D. (<0.001)	N. D. (<0.001)
5	Gothatar - 2	23 - 11 - 2004	N. D. (<0.005)	N. D. (<0.001)	N. D. (<0.001)	N. D. (<0.001)	N. D. (<0.001)
6	Mulpani - 3	23 - 11 - 2004	N. D. (<0.005)	N. D. (<0.001)	N. D. (<0.001)	N. D. (<0.001)	N. D. (<0.001)
7	Sankhu Seto	18 - 11 - 2004	N. D. (<0.005)	N. D. (<0.001)	0.001	N. D. (<0.001)	N. D. (<0.001)
8	Indian Bangali	18 - 11 - 2004	0.041	N. D. (<0.001)	N. D. (<0.001)	0.001	N. D. (<0.001)
9	Nala Lamo Rato	18 - 11 - 2004	N. D. (<0.005)	N. D. (<0.001)	N. D. (<0.001)	N. D. (<0.001)	N. D. (<0.001)
10	Panauti Golo rato	18 - 11 - 2004	N. D. (<0.005)	N. D. (<0.001)	N. D. (<0.001)	N. D. (<0.001)	N. D. (<0.001)
11	Sankhu Rato	18 - 11 - 2004	N. D. (<0.005)	N. D. (<0.001)	N. D. (<0.001)	N. D. (<0.001)	N. D. (<0.001)
12	PanchKhal-1	16 - 12 - 2004	N. D. (<0.005)	N. D. (<0.001)	N. D. (<0.001)	N. D. (<0.001)	N. D. (<0.001)
13	Panchkhal-Anekote-4/5 (Bari)	16 - 12 - 2004	N. D. (<0.005)	N. D. (<0.001)	N. D. (<0.001)	N. D. (<0.001)	N. D. (<0.001)
14	Panchkhal (Bari) - 2	16 - 12 - 2004	N. D. (<0.005)	N. D. (<0.001)	N. D. (<0.001)	N. D. (<0.001)	N. D. (<0.001)
15	Bhakundebesi	16 - 12 - 2004	N. D. (<0.005)	N. D. (<0.001)	N. D. (<0.001)	N. D. (<0.001)	N. D. (<0.001)
1	Sankhu (Re sample)	16 - 12 - 2004	N. D. (<0.005)	N. D. (<0.001)	N. D. (<0.001)	N. D. (<0.001)	N. D. (<0.001)
	Trisuli Dhikure	16 - 12 - 2004	N. D. (<0.005)	N. D. (<0.001)	N. D. (<0.001)	N. D. (<0.001)	N. D. (<0.001)

Note: Although the experimental values obtained for potato could not be compared directly with other standards for lack of standard potato values, the overall indication is that DDT and BHC values obtained for domestic potato may not be high enough to cause health concern to potato consumers or to the environment.

Table 7B: Laboratory result of Soil Contamination with Pesticide from Kathmandu, Kavre and Bhaktpur by NEFEJ, 2005.

S.N.	Location	Observed Residue level in ppm				
		a BHC	β BHC	γ BHC	δ BHC	DDT
1	Gothatar - Kathmandu	N. D. (<0.001)	N. D. (<0.001)	N. D. (<0.001)	N. D. (<0.001)	N. D. (<0.005)
2	Mulpani - Kathmandu	N. D. (<0.001)	N.D. (<0.001)	0.001	N. D. (<0.001)	N. D. (<0.005)
3	Bode - Bhaktapur	N. D. (<0.001)	N. D. (<0.001)	N. D. (<0.001)	N. D. (<0.001)	N. D. (<0.005)
4	Bode - Bhaktapur	N. D. (<0.001)	N. D. (<0.001)	N. D. (<0.001)	N. D. (<0.001)	N. D. (<0.005)
5	Bode - Bhaktapur	0.001	N. D. (<0.001)	N. D. (<0.001)	N. D. (<0.001)	N. D. (<0.005)
6	Nala - Kavre	N. D. (<0.001)	N. D. (<0.001)	N. D. (<0.001)	N. D. (<0.001)	N. D. (<0.005)
7	Nala - Kavre	N. D. (<0.001)	N. D. (<0.001)	N. D. (<0.001)	N. D. (<0.001)	N. D. (<0.005)
8	Hokse Panchkhal - Kavre	0.001	N. D. (<0.001)	N. D. (<0.001)	N. D. (<0.001)	N. D. (<0.005)
9	Hokse Panchkhal - Kavre	N. D. (<0.001)	N. D. (<0.001)	N. D. (<0.001)	N. D. (<0.001)	N. D. (<0.005)
10	Panchkhal - Kavre	N. D. (<0.001)	N. D. (<0.001)	N. D. (<0.001)	N. D. (<0.001)	N. D. (<0.005)
11	Gokarna - Kathmandu	N. D. (<0.001)	N. D. (<0.001)	0.002	N. D. (<0.001)	N. D. (<0.005)
12	Gokarna - Kathmandu	0.001	N. D. (<0.001)	N. D. (<0.001)	N. D. (<0.001)	N. D. (<0.005)
13	Indrayani - Kathmandu	N. D. (<0.001)	N. D. (<0.001)	N. D. (<0.001)	N. D. (<0.001)	N. D. (<0.005)
14	Sankhu - Kathmandu	N. D. (<0.001)	N. D. (<0.001)	0.001	N. D. (<0.001)	N. D. (<0.005)
15	Sankhu - Kathmandu	N. D. (<0.001)	N. D. (<0.001)	N. D. (<0.001)	N. D. (<0.001)	N. D. (<0.005)
16	Imadole - Lalitpur	N. D. (<0.001)	N. D. (<0.001)	N. D. (<0.001)	N. D. (<0.001)	N. D. (<0.005)

Note: Altogether, 6 composite soils (three from Kathmandu, one from Kavre and two from Bhaktapur) showed some indications of BHC at levels of detection. While none of the soil samples indicated DDT contamination above the instrumental detection limit.

Annex III: Report of Sample Analyses carried out at SIIR, Delhi (India)

Table No 1: Analysis Results of Water Samples

Test Method: GC- MS

S.No.	Location	Date of Sampling	Concentration (mg/litre)			
			BHC	Aldrin	DDT	Chlordane
1.	Begnas Lake, Pokhra	23.05.2006	ND	ND	ND	ND
2.	Fewa Lake, Pokhra	23.05.2006	ND	ND	ND	ND
3.	Bis Hazari Lake, Chitwan National Park	24.05.2006	ND	ND	ND	ND
4.	Indrasarovar , Kulekhani Dam	26.05.2006	ND	ND	ND	ND
5.	Bagmati River near Pashupatinath Temple	28.05.2006	ND	ND	ND	ND

- **Limit of Detection : 0.00005m g/litre**

Table No 2: Analysis Results of Sediment and Soil Samples

Test Method: GC- MS

S.No.	Location	Date of Sampling	Concentration (mg/kg)			
			BHC	Aldrin	DDT	Chlordane
1.	Begnas Lake (Sediment), Pokhra	23.05.2006	ND	ND	ND	ND
2.	Fewa Lake (Sediment), Pokhra	23.05.2006	ND	ND	ND	ND
3.	Bis Hazari Lake (Sediment), Chitwan National Park	24.05.2006	ND	ND	ND	ND
4.	Indrasarovar (Sediment) , Kulekhani Dam	26.05.2006	ND	ND	ND	ND
5.	Bagmati River (Sediment) near Pashupatinath Temple	28.05.2006	ND	ND	ND	ND
6.	Amlekhgunj (Soil)	26.05.2006	ND	ND	ND	ND

- **Limit of Detection : 0.005 mg/kg**

Table No 3: Analysis Results of Fish Samples

Test Method: GC- MS

S.No.	Location	Date of Sampling	Concentration (mg/kg)			
			BHC	Aldrin	DDT	Chlordane
1.	Begnas Lake , Pokhra	23.05.2006	ND	ND	ND	ND
2.	Fewa Lake, Pokhra	23.05.2006	ND	ND	ND	ND
3.	Bis Hazari Lake, Chitwan National Park	24.05.2006	ND	ND	ND	ND

- **Limit of Detection : 0.002 mg/kg**

Table No 4: Analysis Results of Vegetable Samples

Test Method: GC- MS

S.No.	Location	Date of Sampling	Local Name of Vegetable	Concentration (mg/kg)			
				BHC	Aldrin	DDT	Chlordane
1.	Village Keshar Bagh, Geeta Nagar VDC, Chitwan	24.05.2006	i) Potato	ND	ND	ND	ND
			ii) Torai	ND	ND	ND	ND
			iii) Ghiya	ND	ND	ND	ND
2.	Panchkhal, Kavre	27.05.2006	i) Potato	ND	ND	ND	ND
			ii) Tomato	ND	ND	ND	ND
			iii) Shimla Mirch	ND	ND	ND	ND
			iv) Onion	ND	ND	ND	ND
3.	Sallaghari, Bhaktpur	27.05.2006	i) Pumpkin	ND	ND	ND	ND
			ii) Sarson ka saag	ND	ND	ND	ND
4.	Adam Tal, Charaundi, Dhaging	28.05.2006	i) Tomato	ND	ND	ND	ND
			ii) Pumpkin	ND	ND	ND	ND
5.	Palun	29.05.2006	i) Potato	ND	ND	ND	ND

- **Limit of Detection : 0.002 mg/kg**

Table No 5: Analysis Results of Milk Samples

Test Method: GC- MS

S.No.	Location	Date of Sampling	Type of Milk	Concentration (mg/kg)			
				BHC	Aldrin	DDT	Chlordane
1.	Village Keshar Bagh, Geeta Nagar VDC, Chitwan	24.05.2006	i) Cow-Milk	ND	ND	ND	ND
			ii) Mother's milk	ND	ND	ND	ND
2.	Birgunj	25.05.2006	Cow-Milk	ND	ND	ND	ND
3.	Amlekhgunj	26.05.2006	Cow-Milk	ND	ND	ND	ND
4.	Jorpati, Kathmandu	29.05.2006	Cow-Milk	ND	ND	ND	ND

- **Limit of Detection : 0.002 mg/kg**

Table No 6: Analysis Results of Egg Samples

Test Method: GC- MS

S.No.	Location	Date of Sampling	Type of Egg	Concentration (mg/kg)			
				BHC	Aldrin	DDT	Chlordane
1.	Village Keshar Bagh, Geeta Nagar VDC, Chitwan	24.05.2006	Chicken-Egg	ND	ND	ND	ND
2.	Amlekhgunj	26.05.2006	Chicken-Egg	ND	ND	ND	ND

- **Limit of Detection : 0.002 mg/kg**

Table No 7: Analysis Results of Ash Samples

Test Method: GC- MS

S.No.	Location	Date of Sampling	Type of Sample	Concentration(µg/kg)	
				TCDD	TCDF
1.	Tribhuvan University Teaching Hospital, Kathmandu	28.05.2006	Biomedical Incinerator Ash	ND	ND
2.	Patan Hospital, Kathmandu	28.05.2006	Biomedical Incinerator Ash	ND	ND

- **Limit of Detection : 1µg/kg**

Table No 8: Analysis Results of Leachate / Effluent Samples

Test Method: GC- MS

S.No.	Location	Date of Sampling	Type of Sample	Concentration (µg/litre)	
				TCDD	TCDF
1.	Gokarna Land fill Site	28.05.2006	Leachate Water	ND	ND
2.	Sova Baghmati	9.06.2006	Sediment water	ND	ND
3.	Bhrikuti pulp and Paper mills	9.06.2006	Final pulp	ND	ND
4.	Bhrikuti pulp and Paper mills	9.06.2006	Effluent water	ND	ND

- **Limit of Detection : 10 ng/litre**

Table No 9: Analysis Results of Waste/Used Oil Samples

Test Method : GC-ECD

S.No.	**Location**	**Concentration (mg/Kg)**
		Polychlorinated Biphenyls(PCBs)
1.	NEA Workshop, Lainchaur Kathmadnu	821
2.	Transformer oil (Swayambhu Ammunition)	736
3.	Patan-I	614
4.	Patan-II	3
5.	Patan Capacitor	959
7.	Syuchatar-I	16
8.	Syuchatar -II	33
9.	Syuchatar-III	ND
10.	Devighat HP-II	3
11.	Devighat-III	2
12.	Trishuli HP-II	2
13.	Trishuli HP-IV(X)	10
14.	Marsyangdi HP	5
15.	Biratnager Rani DC	1206
16.	Eastern Electric, Biratnagar	368
17.	Duhabi Grid Station	1095
18.	Duhabi Multi Fuel Power Plant	1214
19.	Kundahar Grid Station, Pokhara	145

- **Limit of Detection : 1 mg/kg**

Table No 10: Analysis Results of Unidentified Pesticides Formulations

Locations: Obsolete Pesticides Godown, Amlekhgunj

Test Method: GC- MS

S.No.	**Identification Level on Container**	**Name of Identified Pesticide**
1.	C-1/1	Chlordane, O,P-DDT
2.	C-1/6	Hexachloro Cyclohexane

3.	C-1/7	Hexachloro Cyclohexane & Aldrin
4.	C-1/8b	Hexachloro Cyclohexane ,Aldrin,& DDT
5.	C-1/27	Hexachloro Cyclohexane & Lindane
6.	C-1/45	Hexachloro Cyclohexane
7.	C-56	Aldrin
8.	C-1/59	Aldrin
9.	C-1/67+75 (Combined sample)	Aldrin
10.	C-1/68	O,P-DDT
11.	U-1	DDT
12.	U-15	Hexachloro Cyclohexane & Aldrin
13.	U-17	Hexachloro Cyclohexane
14.	U-18	Hexachloro Cyclohexane & Aldrin
15.	U-19	Dithiocarbamate
16.	SP-4 (NSC/Nepalgunj)	Hexachloro Cyclohexane
17.	SP-5 (NSC/Nepalgunj)	Hexachloro Cyclohexane
18.	SP-6 (Biratnagar)	Hexachloro Cyclohexane
19.	SP-7 (Biratnagar)	Hexachloro Cyclohexane